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Authority

The provisions of this Chapter 4 issued under the Public School Code of 1949 (24 P. S. §§ 1-101—27-2702), unless otherwise noted.

Source

The provisions of this Chapter 4 adopted January 15, 1999, effective January 16, 1999, 29 Pa.B. 399, unless otherwise noted.

Cross References

This chapter cited in 22 Pa. Code § 11.27 (relating to graduation); 22 Pa. Code § 11.31 (relating to students not enrolled in public schools due to private tutoring); 22 Pa. Code § 16.1 (relating to definitions); 22 Pa. Code § 16.4 (relating to strategic plans); 22 Pa. Code § 16.22 (relating to gifted multidisciplinary evaluation); 22 Pa. Code § 49.14 (relating to approval of institutions); 22 Pa. Code § 49.16 (relating to approval of induction plans); 22 Pa. Code § 49.42 (relating to letter of eligibility); 22 Pa. Code § 49.81 (relating to general); 22 Pa. Code § 49.101 (relating to general); 22 Pa. Code § 49.111 (relating to Supervisory Certificate); 22 Pa. Code § 49.121 (relating to Administrative Certificate); 22 Pa. Code § 49.141 (relating to general); and 22 Pa. Code § 339.2 (relating to operation).

GENERAL PROVISIONS**§ 4.1. Statutory authority.**

The statutory authority for this chapter is the School Code.

§ 4.2. Purpose.

The purpose of this chapter is to establish rigorous academic standards and assessments to facilitate the improvement of student achievement and to provide parents and communities a measure by which school performance can be determined.

§ 4.3. Definitions.

The following words and terms, when used in this chapter, have the following meanings, unless the context clearly indicates otherwise:

AVTS—Area vocational-technical school—A public school that provides vocational-technical education to secondary school students, out-of-school youth and adults in a geographical area comprised and operated by one or more school districts and established under sections 1840—1853 of the School Code (24 P. S. §§ 18-1840—18-1853).

Academic standard—What a student should know and be able to do at a specified grade level.

Apprenticeship program—A competency-based program that coordinates and integrates classroom instruction with a structured work-based employment experience designed for students.

Assessment—A valid and reliable measurement of student performance on a set of academic standards in a subject area that captures student understanding of the set as a whole and the central concepts, knowledge and skills of each content area.

Board—The State Board of Education established by sections 2601-B—2606-B of the School Code (24 P. S. §§ 26-2601-B—26-2606-B).

Cooperative vocational-technical education—A planned method of instruction developed through a signed cooperative arrangement among school representatives, students, parents and employers in the community to provide students with an opportunity to alternate in-school academic and vocational-technical instruction in entry-level paid employment in an occupational field, in which the student's total occupational work experience is planned, coordinated and supervised by the school in close cooperation with the employer.

Curriculum—A series of planned instruction aligned with the academic standards in each subject that is coordinated and articulated and implemented in a manner designed to result in the achievement at the proficient level by all students.

Department—The Department of Education of the Commonwealth.

ESOL—English to speakers of other languages.

Employment area—A geographic area where vocational-technical education program completers are most likely to be employed.

Individuals with Disabilities Education Act—20 U.S.C.A. §§ 1400—1482.

Intermediate unit—A regional educational service agency established under sections 951—974 of the School Code (24 P. S. §§ 9-951—9-974), which provides educational services to participating school districts as part of the public school system of this Commonwealth.

PSSA—Pennsylvania System of School Assessment.

Parent or guardian—A person legally responsible for a student's care.

Planned instruction—Instruction offered by a school entity based upon a written plan to enable students to achieve the academic standards under § 4.12 (relating to academic standards) and additional academic standards determined in strategic plans under § 4.13 (relating to strategic plans).

Prekindergarten—A program operated by a school district or by a community agency under contract from a school district that is open to children who are at least 3 years of age and completed prior to the school district's entry age for kindergarten.

School Code—The Public School Code of 1949 (24 P. S. §§ 1-101—27-2702).

School entity—A local public education provider (for example, public school district, charter school, cyber charter school, AVTS or intermediate unit).

School organization—The organization of a school district's programs into kindergarten, primary, intermediate level, middle level and high school programs, including programs operated at AVTSs.

Secretary—The Secretary of Education of the Commonwealth.

Strategic plan—A comprehensive plan for education developed under § 4.13.

Tech-prep program—A combined secondary and postsecondary program which leads to an associate degree or certificate and employment by providing technical preparation in engineering technology, applied science, mechanical, industrial or practical art or trade, agriculture, health or business, including development of competence in mathematics, science and communications through a sequential course of study.

Vocational-technical education—Programs under public supervision and control which provide an organized process of learning experiences designed to develop integrated academic and occupational skills, knowledge, attitudes, work habits and leadership ability for entry into and advancement within various levels of employment in occupational areas of agriculture, business, marketing and distribution, health, home economics and trade and industry and for participation in postsecondary education and training.

Authority

The provisions of this § 4.3 amended under section 2603-B of the Public School Code of 1949 (24 P. S. § 26-2603-B).

Source

The provisions of this § 4.3 amended December 15, 2006, effective December 16, 2006, 36 Pa.B. 7542; amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial pages (332005) and (332006).

Cross References

This section cited in 22 Pa. Code § 4.23 (relating to high school education); 22 Pa. Code § 4.28 (relating to special education); 22 Pa. Code § 338.2 (relating to definitions); and 22 Pa. Code § 339.1a (relating to definitions).

§ 4.4. General policies.

(a) It is the policy of the Board that the local curriculum be designed by school entities to achieve the academic standards under § 4.12 (relating to academic standards) and additional academic standards designated in strategic plans under § 4.13 (relating to strategic plans).

(b) It is the policy of the Board that local school entities have the greatest possible flexibility in curriculum planning consistent with providing quality education and in compliance with the School Code, including requirements for courses to be taught (24 P. S. §§ 15-1501 and 16-1605); subjects to be taught in the English language (24 P. S. § 15-1511); courses adapted to the age, development and needs of the pupils (24 P. S. § 15-1512); minimum school year of 180 days and minimum of 900 hours of instruction at the elementary level and 990 hours of instruction at the secondary level (24 P. S. §§ 15-1501 and 15-1504); employment of sufficient numbers of qualified professional employees (24 P. S. § 11-1106) and superintendents to enforce the curriculum requirements of State law (24 P. S. § 10-1005); and this part.

(c) Access to educational programs shall be provided without discrimination on the basis of a student's race, sex, color, religion, disability, sexual orientation or national origin.

(d) School entities shall adopt policies to assure that parents or guardians have the following:

- (1) Access to information about the curriculum, including academic standards to be achieved, instructional materials and assessment techniques.
- (2) A process for the review of instructional materials.
- (3) The right to have their children excused from specific instruction that conflicts with their religious beliefs, upon receipt by the school entity of a written request from the parents or guardians.
- (4) The right of the parent or guardian to review the State assessments in the school entity, at least 2 weeks prior to their administration, during convenient hours for parents and guardians. Necessary security requirements to maintain the validity of the assessment shall be taken in accordance with the State assessment administration instructions.
- (5) If upon inspection of State assessments parents or guardians find the assessments in conflict with their religious belief and wish their students to be excused from the assessment, the right of the parents or guardians will not be denied upon written request to the applicable school district superintendent, charter school chief executive officer or AVTS director.
- (6) Opportunity for involvement in the strategic planning process under § 4.13.
- (7) The right to have their children excluded from research studies or surveys conducted by entities other than a school entity unless prior written consent has been obtained.

Authority

The provisions of this § 4.4 amended under section 2603-B of the Public School Code of 1949 (24 P. S. § 26-2603-B).

Source

The provisions of this § 4.4 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial pages (332006), (323733) and (307695).

Cross References

This section cited in 22 Pa. Code § 11.7 (relating to religious objections).

ACADEMIC STANDARDS AND PLANNING**§ 4.11. Purpose of public education.**

(a) This section and §§ 4.12 and 4.13 (relating to academic standards; and strategic plans planning) describe the purpose of public education, the academic standards, their relationship with one another and strategic plans.

(b) Public education prepares students for adult life by attending to their intellectual and developmental needs and challenging them to achieve at their highest level possible. In conjunction with families and other community institutions, public education prepares students to become self-directed, life-long learners and responsible, involved citizens.

(c) Together with parents, families and community institutions, public education provides opportunities for students to:

- (1) Acquire knowledge and skills.
- (2) Develop integrity.
- (3) Process information.
- (4) Think critically.
- (5) Work independently.
- (6) Collaborate with others.
- (7) Adapt to change.

(d) The academic standards describe the knowledge and skills which students will be expected to demonstrate before graduating from a public school.

(e) Achievement of high academic standards in public education is dependent upon the quality of instruction in schools and student effort supported by the involvement of family and community.

(f) Assessment in public education is designed to determine student attainment of State and local academic standards.

(g) Public schools provide instruction throughout the curriculum so that students may develop knowledge and skills in the following areas:

- (1) Reading, writing, speaking and listening.
- (2) Mathematics.
- (3) Science and technology.

- (4) Environment and ecology.
 - (5) Social studies (civics and government, geography, economics and history).
 - (6) Arts and humanities.
 - (7) Career education and work.
 - (8) Health, safety and physical education.
 - (9) Family and consumer science.
- (h) Public education provides planned instruction to enable students to attain academic standards under § 4.12. Planned instruction consists of at least the following elements:
- (1) Objectives of a planned course, instructional unit or interdisciplinary studies to be achieved by all students.
 - (2) Content, including materials and activities, and estimated instructional time to be devoted to achieving the academic standards. Courses, instructional units or interdisciplinary studies of varying lengths of time may be taught.
 - (3) The relationship between the objectives of a planned course, instructional unit or interdisciplinary studies and academic standards specified under § 4.12 and to those determined in the school district's (including charter schools) or AVTS's strategic plan under § 4.13.
 - (4) Procedures for measurement of the objectives of a planned course, instructional unit or interdisciplinary studies.

Authority

The provisions of this § 4.11 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.11 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial pages (307695) to (307696).

§ 4.12. Academic standards.

- (a) School entities may develop, expand or improve existing academic standards in the following content areas:
- (1) *Science and technology.* Study of the natural world and facts, principles, theories and laws in the areas of biology, chemistry, physics and earth sciences. Technology is the application of science to enable societal development, including food and fiber production, manufacturing, building, transportation and communication. Science and technology share the use of the senses, science processes, inquiry, investigation, analysis and problem solving strategies.
 - (2) *Environment and ecology.* Understanding the components of ecological systems and their interrelationships with social systems and technologies. These components incorporate the disciplines of resource management, agricultural diversity, government and the impact of human actions on natural sys-

tems. This interaction leads to the study of watersheds, threatened and endangered species, pest management and the development of laws and regulations.

(3) *Social studies.*

(i) *History.* Study of the record of human experience including important events; interactions of culture, race and ideas; the nature of prejudice; change and continuity in political systems; effects of technology; importance of global-international perspectives; and the integration of geography, economics and civics studies on major developments in the history of the Commonwealth, the United States and the world.

(ii) *Geography.* Study of relationships among people, places and environments, of geographic tools and methods, characteristics of place, concept of region and physical processes.

(iii) *Civics and government.* Study of United States constitutional democracy, its values and principles, study of the Constitution of the Commonwealth and government including the study of principles, operations and documents of government, the rights and responsibilities of citizenship, how governments work and international relations.

(iv) *Economics.* Study of how individuals and societies choose to use resources to produce, distribute and consume goods and services. Knowledge of how economies work, economic reasoning and basic economic concepts, economic decision making, economic systems, the Commonwealth and the United States economy and international trade.

(4) *Arts and humanities.* Study of dance, theatre, music, visual arts, language and literature including forms of expression, historical and cultural context, critical and aesthetic judgment and production, performance or exhibition of work.

(5) *Career education and work.* Understanding career options in relationship to individual interests, aptitudes and skills including the relationship between changes in society, technology, government and economy and their effect on individuals and careers. Development of knowledge and skill in job-seeking and job-retaining skills and, for students completing vocational-technical programs, the skills to succeed in the occupation for which they are prepared.

(6) *Health, safety and physical education.* Study of concepts and skills which affect personal, family and community health and safety, nutrition, physical fitness, movement concepts and strategies, safety in physical activity settings, and leadership and cooperation in physical activities.

(7) *Family and consumer science.* Understanding the role of consumers as a foundation for managing available resources to provide for personal and family needs and to provide basic knowledge of child health and child care skills.

(8) *Reading, writing, speaking and listening.*

(i) *Reading.* The application of phonemic awareness, phonics and word study, vocabulary, fluency and text comprehension in reading critically across subject areas; the interpretation and analysis of literary expression with analysis of the origins and structures of the English language and learning how to search a variety of texts to conduct research.

(ii) *Writing.* Narrative, informational and persuasive formal writing for an audience, including spelling and editing skills; and informal writing to capture and organize information for individual use.

(iii) *Speaking and listening.* Participation in conversation and formal speaking presentations.

(9) *Mathematics.* The understanding of fundamental ideas and the development of proficient mathematical skills in numbers, computation, measurement, statistics and data analysis, probability and predictions, algebra and functions, geometry, trigonometry and concepts of calculus. Using this content, students will learn to think, reason and communicate mathematically.

(b) In designing educational programs, school entities shall provide for the attainment of the academic standards under subsections (a) and (c) and any additional academic standards that they describe in their strategic plans under § 4.13(c) (relating to strategic plans). Attaining the academic standards in this section requires students to demonstrate the acquisition and application of knowledge.

(c) School entities shall prepare students to attain academic standards in mathematics, reading, writing, speaking and listening as contained in Appendix A and incorporated here by reference and additional standards as may be adopted by the Board and promulgated as amendments to this chapter.

(d) A school entity's curriculum shall be designed to provide students with planned instruction needed to attain these academic standards.

(e) School entities shall apply academic standards for students in all areas described under subsections (a) and (c). The local assessment plan under § 4.52 (relating to local assessment system) must include a description of how the academic standards will be measured and how information from the assessments is used to assist students having difficulty meeting the academic standards.

(f) School entities shall assess the attainment of academic standards developed under subsections (a) and (c) and any other academic standards that they develop and describe in their strategic plans under § 4.52(c) for purposes of high school graduation and strategies for assisting students to attain them. Plans for assessment developed by school entities must take into account that academic standards in subsections (a) and (c) may be attained by students in various ways and shall be assessed in various ways. Children with disabilities may attain the academic standards by completion of their individualized education programs under the Individuals with Disabilities Education Act and this part.

(g) In planning any revision of the academic standards in subsection (a) content areas, the Secretary will consult with educators, business and community leaders and parents.

(h) School entities are responsible under subsections (a), (c) and (g), and § 4.13(c)(5) for assessing individual student attainment of academic standards and for assisting those students having difficulty attaining them. Upon request by a school entity, the Department will provide the requestor with technical assistance in the development of academic standards and assessments that are sufficient to assure that students are making progress toward the attainment of standards required for high school graduation under subsection (f) and those identified in the strategic plan under § 4.13(c)(3).

(i) Every 3 years, the Board will review the State academic standards and State assessments under this section to determine if they are appropriate, clear, specific and challenging, and will make revisions as necessary by revising this chapter.

Authority

The provisions of this § 4.12 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.12 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial pages (252321) to (252322) and (323735).

Cross References

This section cited in 22 Pa. Code § 4.3 (relating to definitions); 22 Pa. Code § 4.4 (relating to general policies); 22 Pa. Code § 4.11 (relating to purpose of public education); 22 Pa. Code § 4.13 (relating to strategic plans); 22 Pa. Code § 4.26 (relating to ESOL); 22 Pa. Code § 4.31 (relating to vocational-technical education); 22 Pa. Code § 4.51 (relating to State assessment system); 22 Pa. Code § 4.52 (relating to local assessment system); and 22 Pa. Code § 4.82 (relating to exceptions).

§ 4.13. Strategic plans.

(a) Every school district (including a charter school) shall develop and file with the Department a strategic plan once every 6 years and review that plan for revision at the mid-point according to an implementation schedule developed by the Department. The Department will notify each school district, by letter, of the due date for submission of the school district's plan to the Department at least 1 calendar year prior to its due date. A school district plan must incorporate appropriate components of the plan submitted under subsection (b) by an AVTS in which the district participates. In the development of a strategic plan, a school district (including a charter school) will, upon request, receive technical assistance from the Department

(b) Every AVTS, in conjunction with and with the approval of the majority of its participating school districts, shall develop and file with the Department a

strategic plan once every 6 years and review that plan at the mid-point according to an implementation schedule developed by the Department. The Department will notify each AVTS, by letter, of the due date for submission of the AVT's plan to the Department at least 1 calendar year prior to its due date. The strategic plan must incorporate appropriate components of the strategic plan submitted under subsection (a) by participating districts. In the development of the strategic plan, an AVTS will, upon request, receive technical assistance from the Department.

(c) The strategic plan must be based upon an analysis of internal and external needs, leading to the specifications of priorities for action and action plans. The requirement in subsections (a) and (b) to develop plans every 6 years and revisions every 3 years does not limit a school district's (including charter schools) or AVTS's ability to conduct a continuous strategic planning process. The plan must include the following components in addition to others the school district (including charter schools) or AVTS determines to include:

(1) A mission statement.

(2) A listing of the school district's (including charter schools) or AVTS's educational and organizational goals as they relate to student achievement and high school graduation requirements.

(3) A description of academic standards for student achievement which must be consistent with those under § 4.12 (relating to academic standards).

(4) The planned instruction to be offered and the instructional and assessment practices to be used to strive for the academic goals and attain academic standards under paragraph (3) and the high school graduation requirements under § 4.24 (relating to high school graduation requirements).

(5) An assessment plan under § 4.52 (relating to local assessment system) to determine the degree to which students are achieving academic standards under paragraph (3) including descriptions of methods and measures used to determine achievement, how information from the assessments shall be used to assist students who have not demonstrated attainment of the academic standards at a proficient level or higher and how information from the assessments shall be made available to the public.

(6) A plan for improving students' achievement, including specific, measurable goals for student growth and plans (including those listed in this section) that are designed to attain students' achievement goals. Achievement goals must demonstrate a connection to the academic standards under § 4.12 including, but not limited to, annual improvement goals for student scores on State and local assessments.

(7) The professional development plan under section 1205.1 of the School Code (24 P. S. § 12-1205.1) and § 49.17 (relating to continuing professional development) and the induction plan under § 49.16 (relating to approval of induction plans).

(8) A description of the school district's (including charter schools) or AVTS's organization and organizational goals and their relationship to differ-

ing student needs within the school district's (including charter schools) or AVTS's goals under paragraph (2) and the attainment of academic standards under paragraph (3).

(9) A description of the professional personnel, school library, classroom and other resources the school district (including charter schools) or AVTS plans to devote to the attainment of academic standards.

(10) A brief description of the process used to develop the strategic plan, including a list of persons involved in its development.

(11) A plan for additional instructional opportunities for students not achieving at the proficient level including identification procedures, alternate instructional strategies, monitoring of assessment procedures and opportunities for extended learning time.

(12) A description of how the school district will accomplish coordination with community operated infant and toddlers and preschool early intervention programs and the following before or after school programs and services for all grade levels, including prekindergarten, if offered, through grade 12:

- (i) Child care.
- (ii) After school programs.
- (iii) Youth workforce development programs.
- (iv) Tutoring.

(13) A school district that offers prekindergarten shall describe the prekindergarten program and explain how the district will coordinate with agencies that serve preschool age children with disabilities. The plan must address coordination activities designed to identify and serve children with disabilities and the supports and accommodations available to ensure both physical and programmatic access. The plan must address pre-kindergarten programs operated directly by the school district and those operated by community agencies under contract from the school district.

(14) A brief description of how the school district will provide for a smooth transition for prekindergarten students, when prekindergarten is offered, from the home setting and any early childhood care or education setting the students attend, to the school setting. This description must include how the district will coordinate with the infants and toddlers and preschool early intervention agencies that serve children with disabilities to ensure a smooth transition for those children to the school district's prekindergarten program.

(d) Strategic plans, the 6-year plan, mid-term review report, annual updates and other revisions to the plan, shall be developed through active participation by parents, students, school directors, teachers, school administrators, other school personnel and business and community representatives. Teacher representatives shall be chosen by teachers and administrative representatives shall be chosen by the administrative personnel; and school director representatives shall be chosen by the board of the school district or AVTS.

(e) Prior to its approval by the board of directors, the strategic plan and revisions of it shall be made available for public inspection in the school district's or AVTS's offices, on the school district's or AVTS's web site and nearest public library until the next regularly scheduled board meeting or a minimum of 28 days whichever comes first. The plan shall be filed with the Department after it is recommended by the school superintendent of record or chief executive officer and is approved by the school district's or AVTS's board of directors or charter school's board of trustees. If the board of directors or trustees alters the proposed strategic plan developed under subsection (d), it shall consult with the committee which developed it to reach the greatest possible consensus prior to its submission and include any minority report which is developed.

(f) A locally approved strategic plan shall remain in effect until it is superseded by a locally approved revision or a new strategic plan developed under this section.

Authority

The provisions of this § 4.13 amended under section 2603-B of The Public School Code of 1949 (24 P. S. § 26-2603-B).

Source

The provisions of this § 4.13 amended December 15, 2006, effective December 16, 2006, 36 Pa.B. 7542; amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872; amended March 7, 2008, effective February 16, 2008. Immediately preceding text appears at serial pages (332266) to (332269).

Cross References

This section is cited in 22 Pa. Code § 4.3 (relating to definitions); 22 Pa. Code § 4.4 (relating to general policies); 22 Pa. Code § 4.11 (relating to purpose of public education); 22 Pa. Code § 4.12 (relating to academic standards); 22 Pa. Code § 4.20 (relating to prekindergarten education); 22 Pa. Code § 4.21 (relating to elementary education: primary and intermediate levels); 22 Pa. Code § 4.22 (relating to middle level education); 22 Pa. Code § 4.23 (relating to high school education); 22 Pa. Code § 4.24 (relating to high school graduation requirements); 22 Pa. Code § 4.31 (relating to vocational-technical education); 22 Pa. Code § 4.33 (relating to advisory committees); 22 Pa. Code § 4.51 (relating to State assessment system); 22 Pa. Code § 4.52 (relating to local assessment system); 22 Pa. Code § 4.61 (relating to school profiles); 22 Pa. Code § 12.41 (relating to student services); and 22 Pa. Code § 14.104 (relating to educational plans).

CURRICULUM AND INSTRUCTION**§ 4.20. Prekindergarten education.**

School districts are not required to offer a prekindergarten program, and parents are not required to enroll their children in those programs if offered. Prekindergarten programs shall be designed so that students complete the program prior to their reaching the school district's entry age for kindergarten. The program, when offered, must provide a comprehensive program appropriate for the age and varying developmental levels of the students; be based on how young children develop and learn; include instruction to support each child's development in the areas of approaches to learning—creative expression, language and literacy, math, logic and science, social-personal development and physical development and health—and must be open to children with disabilities.

- (1) The Secretary will provide academic standards, appropriate for early learning at the prekindergarten level, as guidance for the use of school districts that offer prekindergarten programs.
- (2) Curriculum and instruction in the prekindergarten program must be standards-based.
- (3) Prekindergarten programs may be offered to all 3 and 4 year olds or may be targeted to children who are most in need of prekindergarten services who reside in the district. Targeted programs may serve children who are at risk of school failure because of limited English proficiency, community factors, economic disadvantage, but may not exclude or be limited exclusively to children with disabilities. If a program is limited to an attendance area, children with disabilities must live in that attendance area to participate in the program. An attendance area is the geographic area within a school district designated by the school board for the purpose of assigning students to a school.
- (4) The Secretary will issue guidance to school districts on developmentally appropriate curriculum, instruction and assessments for prekindergarten.
- (5) Each school district that provides prekindergarten shall design an assessment system that includes prekindergarten and uses a variety of assess-

ment strategies, which may include those listed in § 4.52(d) (relating to local assessment system), as appropriate.

(6) Prekindergarten programs must have a student/teacher ratio of no more than 20 students for one teacher and one teacher aide in a classroom (2 adults in a classroom for every 20 students). Programs of high quality ordinarily have a student/teacher ratio of 17 students for one teacher and one teacher aide in a classroom (2 adults for every 17 students). Programs operating under contract with community providers must comply with staffing qualifications as required by § 49.85(c) (relating to limitations).

(7) Beginning in the 2009-2010 school year, a teacher aide in a prekindergarten program shall meet one of the following criteria:

- (i) Completion of a least 2 years of postsecondary study.
- (ii) Possession of an associate's degree or higher.
- (iii) Ability to meet a rigorous standard of quality and demonstration through a formal State or local academic assessment of knowledge in and ability to assist in instructing reading, writing and mathematics. A rigorous standard of quality includes a demonstration of competence in basic literacy skills, including the ability to speak and write standard English and instruction of prekindergarten students in the acquisition of the knowledge, skills and abilities described in the early learning standards issued under paragraph (1).

(8) The Secretary may approve a meritorious prekindergarten program that does not meet all regulatory requirements for the program when, in the Secretary's judgment, the program provides high quality learning opportunities for students and meets the following conditions:

- (i) The school district has submitted to the Secretary a written request that provides justification for the waiver and includes a description of how the meritorious program will provide high quality learning opportunities for students.
- (ii) The approval of the meritorious prekindergarten program is valid only for 1 school year.
- (iii) Requests for renewals include evidence of positive student outcomes.

(9) A school district may make individual exceptions to the age of prekindergarten students based upon local policy to permit the enrollment of children under 3 years of age and 5 years of age or older.

(10) A school district planning to offer or contract with a community agency to offer a prekindergarten program shall develop an implementation plan that describes the program and its target population. The plan must identify the facilities, staffing needs and other resources that it will use to deliver the program. The school district shall consult with parents, community agencies and organizations, and child care, early intervention and head start representatives when developing the implementation plan. In years subsequent to the initial

year of the program, the implementation plan must become part of the strategic plan described in § 4.13 (relating to strategic plans) and included in the mid-term review and annual updates described in § 4.13.

(11) School district contracted prekindergarten programs operated by a community provider shall provide a lead teacher for each classroom who meets the following minimum qualifications:

(i) An associate's degree or greater in early childhood education or child development.

(ii) For programs operating before December 16, 2006, lead teachers shall possess a bachelor's degree and early childhood certificate as provided in § 49.85(a) (relating to limitations) on or before December 16, 2011.

(iii) For programs contracted after December 16, 2006, lead teachers shall possess a bachelor's degree and early childhood certificate as provided in § 49.85(a) within 5 years from the date students first attend the prekindergarten program.

Authority

The provisions of this § 4.20 issued under section 2603-B of The Public School Code of 1949 (24 P. S. § 26-2603-B).

Source

The provisions of this § 4.20 adopted December 15, 2006, effective December 16, 2006, 36 Pa.B. 7542.

§ 4.21. Elementary education: primary and intermediate levels.

(a) The primary program shall ordinarily be completed by children who are approximately 8 years of age. School districts shall provide opportunities for individualized rates of learning and social and emotional development that reflect differing rates of development and learning styles of young children.

(b) Curriculum and instruction in the primary program must be standards-based and focus on introducing young children to formal education, developing an awareness of the self in relation to others and the environment, and developing skills of communication, thinking and learning. Literacy skills, including phonemic awareness, phonological awareness, fluency, vocabulary and comprehension and developmental writing will begin in prekindergarten and kindergarten, if offered, and developed appropriately for the primary grade level.

(c) The intermediate level program shall ordinarily be completed by children who are approximately 11 years of age.

(d) Standards-based curriculum and instruction in the intermediate level must enable all students to reach the proficient level on the local assessment system and the Statewide assessment system. Academic standards will guide the focus on learning specific subject matter content.

(e) Planned instruction aligned with academic standards in the following areas shall be provided to every student every year in the primary program. Planned instruction may be provided as separate course or other interdisciplinary activity.

(1) Language arts, integrating reading, writing, phonics, spelling, listening, speaking, literature and grammar, and information management, including library skills.

(2) Mathematics, including problem-solving and computation skills.

(3) Science and technology education, involving active learning experiences for students.

(4) Environment and ecology education, involving active learning experiences for students.

(5) Social studies (civics and government, economics, geography and history).

(6) Health, safety and physical education, including instruction in concepts and skills which affect personal, family and community health and safety, nutrition, the prevention of alcohol, chemical and tobacco abuse, knowledge and practice of lifetime physical activities, personal fitness, basic movement skills and concepts, motor skill development, principles and strategies of movement, and safety practices in physical activity settings.

(7) The arts, including active learning experiences in art, music, dance and theatre.

(f) Planned instruction in the following areas shall be provided to every student every year in the intermediate level program. Planned instruction may be provided as a separate course or as an instructional unit within another course or other interdisciplinary instructional activity:

(1) Language arts, integrating reading, writing, spelling, listening, speaking, literature and grammar.

(2) Mathematics, including problem-solving and computation skills.

(3) Science and technology, including instruction about agriculture and agricultural science.

(4) Environment and ecology, including instruction about agriculture and agricultural science.

(5) Social studies (civics and government, economics, geography and history).

(6) The arts, including art, music, dance and theatre.

(7) Understanding and use of library and other information sources.

(8) Health, safety and physical education, including instruction in concepts and skills which affect personal, family and community health and safety, nutrition, the prevention of alcohol, chemical and tobacco abuse, knowledge and practice of lifetime physical activities, personal fitness, basic movement skills and concepts, motor skill development, principles and strategies of movement and safety practices in physical activity settings.

(g) Planned instruction aligned with academic standards in the following areas shall be provided to every student at least once by the end of elementary school. Planned instruction may be provided as a separate course or as an instructional unit within another course or other interdisciplinary instructional activity. See section 1511 of the School Code (24 P. S. § 15-1511).

- (1) History of the United States.
- (2) History of the Commonwealth.
- (3) Geography.
- (4) Civics.

(h) This section does not preclude the teaching of other planned instruction designed to achieve a school entity's mission, goals and academic standards.

(i) School districts, including charter schools, shall determine the most appropriate way to operate their primary and intermediate level elementary programs to achieve the purposes under subsections (b) and (d) and the mission, goals and academic standards in their strategic plans under § 4.13 (relating to strategic plans).

(j) Students who have not achieved proficiency in reading and mathematics during their primary grades (K—3), as determined by the school entity, shall be afforded additional instructional opportunities through a grade-level learning plan developed by the school entity. The plan will assist the student in acquiring the knowledge and skills necessary to achieve at the proficient level. Assessments to measure proficiency shall be described in the local assessment system under § 4.52 (relating to local assessment system).

(k) Students who have not achieved proficiency in reading and mathematics by the end of grade 5 as determined on State assessments under § 4.51 (relating to State assessment system) shall be afforded instructional opportunities to develop knowledge and skills necessary to achieve the proficient level.

Authority

The provisions of this § 4.21 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.21 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial pages (323741) and (252327) to (252328).

Cross References

This section cited in 22 Pa. Code § 4.27 (relating to physical education and athletics).

§ 4.22. Middle level education.

(a) The middle level planned instruction aligned with academic standards serves children who are approximately 11—14 years of age. School entities may modify the grouping of students based upon student needs identified in their strategic plans under § 4.13 (relating to strategic plans).

(b) Curriculum and instruction in the middle level program must be standards-based and focus on mastery of academic subjects, the development of critical and creative thinking, information literacy, good health and encourage active participation in the school and community.

(c) Planned instruction aligned with academic standards in the following areas shall be provided to every student in the middle level program. Planned instruction may be provided as a separate course or as an instructional unit within a course or other interdisciplinary instructional activity:

(1) Language arts, integrating reading, writing, listening, speaking, literature and grammar.

(2) Mathematics, including mathematical reasoning, algebra and problem-solving.

(3) Science and technology, which involves active learning experiences and which may include laboratory experiments and instruction in agriculture and agricultural science.

(4) Social studies (civics and government, economics, geography and history, including the history and cultures of the United States, the Commonwealth, and the world).

(5) Environment and ecology, including social, political and economic aspects of ecology, and instruction in agriculture and agricultural science.

(6) Information skills, including access to traditional and electronic information sources, computer use and research.

(7) Health, safety and physical education, including instruction in concepts and skills which affect personal, family and community health and safety, nutrition, physical fitness, movement concepts, motor skill development, safety in physical activity settings, and the prevention of alcohol, chemical and tobacco abuse.

(8) The arts, including art, music, dance and theatre.

(9) Career education, including exposure to various career options and the educational preparation necessary to achieve those options.

(10) Technology education, emphasizing practical application of academic skills and problem-solving experiences facilitated by technology.

(11) Family and consumer science, including principles of consumer behavior and basic knowledge of child health and child care skills.

(d) This section does not preclude the teaching of other planned instruction designed to achieve a school entity's academic standards.

(e) School entities shall determine the most appropriate way to operate their middle level programs to achieve the purposes under subsection (b) and the academic standards in their strategic plans under § 4.13.

Authority

The provisions of this § 4.22 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.22 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial pages (252328) and (293049).

Cross References

This section cited in 22 Pa. Code § 4.27 (relating to physical education and athletics).

§ 4.23. High school education.

(a) Instruction in the high school program must focus on the development of abilities needed to succeed in work and advanced education through planned instruction.

(b) Curriculum and instruction in the high school must be standards-based and provide all students opportunities to develop the skills of analysis, synthesis, evaluation and problem-solving and information literacy.

(c) Planned instruction aligned with academic standards in the following areas shall be provided to every student in the high school program. Planned instruction may be provided as a separate course or as an instructional unit within a course or other interdisciplinary instructional activity:

(1) Language arts, integrating reading, writing, listening, speaking, literature and grammar.

(2) Mathematics, including problem-solving, mathematical reasoning, algebra, geometry and concepts of calculus.

(3) Science and technology, including participation in hands-on experiments and at least one laboratory science chosen from life sciences, earth and space sciences, chemical sciences, physical sciences and agricultural sciences.

(4) Social studies (civics and government, economics, geography and history, including the history and cultures of the United States, the Commonwealth and the world).

(5) Environment and ecology, including scientific, social, political and economic aspects of ecology.

(6) The arts, including art, music, dance, theatre and humanities.

(7) Use of applications of microcomputers and software, including word processing, database, spreadsheets and telecommunications; and information skills, including access to traditional and electronic information sources, computer use and research.

(8) Health, safety and physical education, including instruction in concepts and skills which affect personal, family and community health and safety, nutrition, physical fitness, movement concepts, motor skill development, safety in physical activity settings, and the prevention of alcohol, chemical and tobacco abuse.

(9) Family and consumer science, including principles of consumer behavior and basic knowledge of child health, child care and early literacy skill development.

(d) The following planned instruction shall be made available to every student in the high school program:

(1) Vocational-technical education under §§ 4.3 and 4.31—4.35 (relating to definitions; and vocational-technical education).

(2) Business education, including courses to assist students in developing business and information technology skills.

(3) World languages under § 4.25 (relating to languages).

(4) Technology education, incorporating technological problem-solving and the impacts of technology on individuals and society.

(e) College-level advanced placement courses may be offered as planned instruction in the high school curriculum.

(f) This section does not preclude the teaching of other planned instruction designed to achieve a school district's, including a charter school's, academic standards.

(g) School districts, including a charter school, shall determine the most appropriate way to operate their high school programs to achieve the purposes under subsection (a) and the academic standards in their strategic plans under § 4.13 (relating to strategic plans).

Authority

The provisions of this § 4.23 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.23 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial pages (293049) to (293050).

Cross References

This section cited in 22 Pa. Code § 4.27 (relating to physical education and athletics).

§ 4.24. High school graduation requirements.

(a) Each school district, including a charter school, shall specify requirements for graduation in the strategic plan under § 4.13 (relating to strategic plans). Requirements must include course completion and grades, completion of a culminating project and results of local assessments aligned with the academic standards. Students shall demonstrate proficiency in reading, writing and mathematics on either the State assessments administered in grade 11 or 12 or local assessment aligned with academic standards and State assessments under § 4.52 (relating to local assessment system) at the proficient level or better to graduate. The purpose of the culminating project is to assure that students are able to apply, analyze, synthesize and evaluate information and communicate significant knowledge and understanding.

(b) Beginning in the 2002-2003 school year, students who attain a score at the proficient level on any State assessed discipline administered in grade 10, 11 or

12 shall be granted a Pennsylvania Certificate of Proficiency for that discipline. Students with disabilities who meet the required proficiency level on State assessments with appropriate accommodations shall be granted a Pennsylvania Certificate of Proficiency.

(c) Beginning in the 2002-2003 school year, students who attain a score at the advanced level of proficiency on any State assessed discipline administered in grade 10, 11 or 12 shall be granted a Pennsylvania Certificate of Distinction for that discipline. Students with disabilities who meet the required proficiency level on State assessments with appropriate accommodations shall be granted a Pennsylvania Certificate of Distinction.

(d) Each school district, including a charter school, shall describe in its strategic plan under § 4.13 how its planned instruction is designed to prepare students to meet the requirements of subsection (a).

(e) Children with disabilities who satisfactorily complete a special education program developed by an Individualized Education Program team under the Individuals with Disabilities Education Act and this part shall be granted and issued a regular high school diploma by the school district of residence. This subsection applies if the special education program of a child with a disability does not otherwise meet all requirements of this chapter. Children with disabilities who meet the required proficiency level on State assessments shall be granted the appropriate Certificate of Proficiency or Distinction.

(f) The Department will develop Pennsylvania Certificates of Proficiency and Distinction for each of the State assessed disciplines. The Department will distribute the certificates to each school district in sufficient quantity for the school district to issue to its students who have earned the Certificates. School districts shall enter student names on the appropriate certificate as described in subsections (b) and (c) and present the certificates to the student.

(g) The Department will develop, or cause to be developed, Certificates of Proficiency to acknowledge and recognize those students who attain a level of at least proficient in all State assessed disciplines. The certificates will be distinctive and differentiated from the certificates described in subsection (f). The certificates shall be awarded to students as appropriate in lieu of those prescribed in subsection (b).

(h) The Department will develop, or cause to be developed, Certificates of Distinction so as to acknowledge and recognize those students who attain a score at the advanced level of proficiency in all State assessed disciplines. The certificates will be distinctive and differentiated from the certificates described in subsection (f). The certificates shall be awarded to students as appropriate in lieu of those prescribed in subsection (c).

(i) Beginning in the 2003-04 school year, PSSA scores in each assessed discipline shall be included on student transcripts and may be released only with the permission of the student and parent or guardian, or the student only if the student is 18 years of age or older.

(j) This section does not allow for the release of individual student PSSA scores to the Department or other Commonwealth entities in accordance with § 4.51(c) (relating to State assessment system).

Authority

The provisions of this § 4.24 amended under section 32 of the act of June 29, 2002 (P. L. 524, No. 88).

Source

The provisions of this § 4.24 amended October 25, 2002, effective October 26, 2002, 32 Pa.B. 5266; amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial pages (293050) and (304973) to (304974).

Notes of Decisions

IEP Compliance

Court determined that hearing officer, when reaching the conclusion that the student had completed the graduation requirements, failed to consider whether the requirements of the student's individualized education program (IEP) were fulfilled, as required by § 4.24(e). Because school district did not fulfill IEP obligation, it was required to pay tuition and fees for a transitional program after high school for one year, which the court found fulfilled the graduation requirements of § 4.24(e), *Susquehanna Township School District v. Frances J.*, 823 A.2d 249, 255-56 (Pa.Cmwlt. 2003).

Cross References

This section cited in 22 Pa. Code § 4.13 (relating to strategic plans); and 22 Pa. Code § 4.31 (relating to vocational-technical education).

§ 4.25. Languages.

(a) World language programs must prepare students to be proficient in meeting the World Language Standards issued by the Department and available on its web site. Every school district shall provide planned instruction in at least two languages in addition to English, at least one of which shall be a modern language, and at least one of which shall be offered in a minimum 4-year sequence in the secondary program (middle level and high school).

(b) World language planned instruction under subsection (a) may be offered beginning at any grade level, including the elementary grades.

(c) World Language Standards issued by the Department will address the ability of students to communicate in a language other than English, including the ability to understand and interpret written and spoken language on a variety of topics and to develop knowledge and understanding of other cultures.

(d) As used in this section, the term "world language" means the study of the language, cultures, traditions and histories of different communities of people who communicate in languages other than English. American sign language is a world language.

Authority

The provisions of this § 4.25 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.25 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial page (304974).

Cross References

This section cited in 22 Pa. Code § 4.23 (relating to high school education).

§ 4.26. ESOL.

Every school district shall provide a program for each student whose dominant language is not English for the purpose of facilitating the student's achievement of English proficiency and the academic standards under § 4.12 (relating to academic standards). Programs under this section shall include appropriate bilingual-bicultural or English as a second language (ESL) instruction.

§ 4.27. Physical education and athletics.

(a) Physical education shall be taught as required under §§ 4.21(e)(5) and (f)(8), 4.22(c)(7) and 4.23(c)(9) (relating to elementary education: primary and intermediate levels; middle level education; and high school education).

(b) The physical education program must be adapted for students who are medically unable to participate in the regular physical education program.

(c) The physical education program shall provide coeducational instruction, except that separation by sex may be permitted in courses involving contact sports. Separation by sex may not be used to exclude students of either sex from participating in any physical education instruction.

(d) In addition to physical education instruction under subsections (a)—(c), students of both sexes shall have equal access in interscholastic and intramural athletic programs to all of the following:

- (1) School facilities.
- (2) Coaching and instruction.
- (3) Scheduling of practice time and games.
- (4) Number of activities at each level of competition.
- (5) Equipment, supplies and services.
- (6) Funding appropriate to the sport.

(e) School districts may sponsor coeducational teams in interscholastic and intramural sports programs.

(f) Interscholastic and intramural teams playing contact sports may be separated by sex, but this subsection may not be used to exclude students of either sex from participating in a sport.

Authority

The provisions of this § 4.27 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.27 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial page (293053).

§ 4.28. Special education.

(a) Under the Individuals with Disabilities Education Act and this part, children with disabilities shall be provided an education which enables them to be involved in and progress in the general curriculum under this chapter.

(b) Students who are gifted as defined in this part shall be provided an education that enables them to participate in acceleration or enrichment, or both, as appropriate.

(c) The educational program provided to children with disabilities shall be in accordance with their Individualized Education Programs under the Individuals with Disabilities Education Act and this part, even if the Individualized Education Program does not otherwise meet all requirements of this chapter.

(d) Planned instruction for children with disabilities shall conform to the requirements established for planned courses in § 4.3 (relating to definitions) as it relates to planned instruction.

§ 4.29. HIV/AIDS and other life-threatening and communicable diseases.

(a) Instruction regarding prevention of human immunodeficiency virus (HIV) infection/acquired immunodeficiency syndrome (AIDS) and other life-threatening and communicable diseases shall be given for primary, intermediate, middle school and high school education and shall follow the requirements of subsections (b) and (c).

(b) Educational materials and instruction shall be determined by the local school district and be appropriate to the age group being taught. The program of instruction must include information about the nature of the diseases, treatments and cures, methods of transmission and how infection can be prevented. The school district may omit instruction in the elementary grades on transmission of disease through sexual activity. Programs discussing transmission through sexual activity must stress that abstinence from sexual activity is the only completely reliable means of preventing sexual transmission. Programs must stress that avoidance of illegal drug use is the only completely reliable means of preventing transmission of disease through shared drug paraphernalia.

(c) A school entity shall excuse a pupil from HIV/AIDS instruction when the instruction conflicts with the religious beliefs or principles of the pupil or parent or guardian of the pupil and when excusal is requested in writing. Prior to the commencement of instruction, a school district shall publicize that detailed cur-

riculum outlines and curricular materials used in conjunction with the instruction are available to parents and guardians during normal school hours or at teacher-parent conferences. Curricular materials, if practical, shall be made available by the school entity for home instructional use by a parent or guardian if the student has been excused from the school entity's HIV/AIDS instruction.

Authority

The provisions of this § 4.29 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.29 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial page (252333).

VOCATIONAL-TECHNICAL EDUCATION

§ 4.31. Vocational-technical education.

(a) Vocational-technical education courses shall be developed in the planned instruction format and be accessible to all high school students attending those grades in which vocational-technical education courses are offered. All students and their parents or guardians shall be informed of the students' rights to participate in vocational-technical education programs and courses and that students with disabilities enrolled in the programs are entitled to services under Chapter 14 (relating to special education services and programs). Students who complete approved vocational-technical education programs shall have their occupational competency assessed by completion of the appropriate assessment under the Pennsylvania Skills Certificate Program or by completion of another occupational competency assessment approved by the Department. A student with a disability shall be provided appropriate accommodations when provided for in the student's individualized education program. Students shall also demonstrate proficiency in meeting academic standards as required under § 4.24(a) (relating to high school graduation requirements), including § 4.12(f) (relating to academic standards) and § 4.24(e) for students with disabilities with an individualized education program.

(b) Vocational-technical education courses may be taught at AVTSs or other high schools.

(c) Vocational-technical education programs must consist of a series of planned academic and vocational-technical education courses that are articulated with one another so that knowledge and skills are taught in a systematic manner. When appropriate, vocational-technical education programs must adopt, in program areas for which they are available, industry recognized skills standards and may also include cooperative vocational-technical education and participation in vocational student organizations to develop leadership skills.

(d) Vocational-technical education courses must include content based upon occupational analysis, clearly stated performance objectives deemed critical to successful employment and assessment of student competencies based upon performance standards. In listing planned instruction in its strategic plan under § 4.13 (relating to strategic plans), a school district or AVTS shall indicate which courses meet the requirements of this section.

(e) The record of a student enrolled in a vocational-technical education program must include the student's educational and occupational objectives and the results of the assessment of student competencies under subsection (d).

(f) Safety education, consisting of safety practices, accident prevention, occupational health habits and environmental concerns shall be integrated into the instruction and practices in vocational-technical education programs.

(g) School districts and AVTSs administering vocational-technical education programs shall develop written policies regarding admissions. Course announcements, guidance materials and other communications must convey the philosophy of equal access to students considering enrolling in AVTSs and include a description of admissions policies. The policies must assure that when admissions to AVTSs must be limited, the admissions shall be on a nondiscriminatory basis.

Authority

The provisions of this § 4.31 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.31 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial pages (252333) to (252334).

Cross References

This section cited in 22 Pa. Code § 4.23 (relating to high school education); and 22 Pa. Code § 4.32 (relating to standards and reports).

§ 4.32. Standards and reports.

(a) The Secretary is responsible for the promulgation of standards appropriate for implementing § 4.31 (relating to vocational-technical education). Present standards, to the extent that they are inconsistent, are superseded by this chapter.

(b) The Secretary will report annually to the Board on the status of vocational-technical education programs, including tech-prep and apprenticeship programs. Reports will include numbers and types of programs, numbers of students, post-program status of students, Statewide competency standards and assessment information.

Cross References

This section cited in 22 Pa. Code § 4.23 (relating to high school education).

§ 4.33. Advisory committees.

(a) A school district or AVTS administering or planning to administer vocational-technical education programs shall appoint a local advisory committee. Membership on the committee shall consist of business and industry representatives, public sector employers, agriculture, labor organizations, community organizations, postsecondary education institutions and the general public. The appointed advisory committee shall meet at least once each year and give advice to the board and the administration concerning the program of the school, including its general philosophy, academic and other standards, strategic plans, course offerings, support services, safety requirements and the skill needs of employers. An advisory committee may serve multiple institutions where employment areas overlap.

(b) An administrative committee, composed of chief school administrators representing participating school districts, shall be included in the organization of each AVTS. The committee shall play an integral part in the development of the AVTS strategic plan under § 4.13 (relating to strategic plans) and advise the AVTS board and the administration concerning the educational program and policies of the school.

(c) An occupational advisory committee shall be established for each vocational-technical education program or cluster of related programs offered by a school district or AVTS. The committee shall be appointed by the board of directors, and a majority of the members of the committee shall be employees and employers in the occupation for which training is provided. The committee shall meet at least twice each year to advise the board, administration and staff on curriculum, equipment, instructional materials, safety requirement, program evaluation and other related matters and to verify that the programs meet industry standards and, if appropriate, licensing board criteria and that they prepare students with occupation related competencies.

Authority

The provisions of this § 4.33 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.33 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial page (323743).

Cross References

This section cited in 22 Pa. Code § 4.23 (relating to high school education); 22 Pa. Code § 339.13 (relating to local advisory committee); and 22 Pa. Code § 339.14 (relating to occupational advisory committee).

§ 4.34. Programs and equipment.

(a) A satellite vocational-technical education program may be operated by an AVTS board in conformity with a memorandum of understanding adopted with the participating school district's board of school directors.

(b) Certified guidance personnel in each secondary school and AVTS shall be assigned responsibility to provide pupils with vocational-technical guidance services.

(c) Equipment will be deemed appropriate if it is compatible, insofar as practical, to that used in occupations or households for which vocational-technical education is provided.

Cross References

This section cited in 22 Pa. Code § 4.23 (relating to high school education).

§ 4.35. AVTSs.

(a) AVTS attendance areas shall conform to the plan of the State Board for Vocational Education. Boards of school directors may petition the State Board for Vocational Education for attendance area assignment or reassignment.

(b) The following provisions apply to the establishment of AVTSs:

(1) Where more than one district constitutes an attendance area, the appropriate intermediate unit may, and upon the request of any school district shall, call for an election by the boards of school directors within the attendance area to determine if an AVTS shall be established.

(2) A school district within the attendance area may elect to participate in the establishment of the AVTS.

(3) Where a single school district constitutes an attendance area, the board of school directors of that district may establish and operate AVTSs and be considered an AVTS board.

(c) The following provisions apply to articles of agreement for the establishment and operation of AVTSs:

(1) The boards of school directors of the school districts electing to participate in the AVTS shall enter into a written agreement setting forth rights and obligations of the participating school districts.

(2) No change will be made in the articles of agreement under paragraph (1) without the consent of each participating school district by the affirmative vote of each board of school directors.

(3) No school district may withdraw from the articles of agreement under paragraph (1) without the consent of each participating school district.

Cross References

This section cited in 22 Pa. Code § 4.23 (relating to high school education).

SCHEDULING AND LEARNING OPTIONS

§ 4.41. Scheduling.

(a) Kindergarten programs shall provide each kindergarten student with at least 2 1/2 hours of instruction each day for the full school term unless the school district, including charter schools, obtains prior Department approval for an alternative kindergarten program.

(b) A school district, including charter schools, shall obtain approval of the Department prior to scheduling 1/2-day sessions other than in kindergarten under subsection (a). A school district is not required to obtain approval of the Department prior to scheduling 1/2 day sessions for prekindergarten under subsection (e).

(c) A school district shall obtain approval of the Department prior to establishing a new school or changing school organization.

(d) Planned instruction offered in summer school may be designed as credit or noncredit offerings.

(e) School districts with prekindergarten programs shall provide prekindergarten students with at least 2 1/2 hours of instruction each day for the full school term unless the school district obtains prior Department approval for an alternative prekindergarten program.

Authority

The provisions of this § 4.41 amended under section 2603-B of The Public School Code of 1949 (24 P. S. § 26-2603-B).

Source

The provisions of this § 4.41 amended December 15, 2006, effective December 16, 2006, 36 Pa.B. 7542. Immediately preceding text appears at serial pages (252336) to (252337).

§ 4.42. Grade structure.

This chapter does not require educational programs to be organized in traditional grades according to students' chronological ages or academic achievement levels.

ASSESSMENT

§ 4.51. State assessment system.

(a) The State assessment system shall be designed to serve the following purposes:

(1) Provide students, parents, educators and citizens with an understanding of student and school performance consistent with the No Child Left Behind Act of 2001 the act of January 8, 2002 (Pub. L. No. 107-110, 115 Stat. 1425).

(2) Determine the degree to which school programs enable students to attain proficiency of academic standards under § 4.12 (relating to academic standards).

(3) Provide results to school entities for consideration in the development of strategic plans under § 4.13 (relating to strategic plans).

(4) Provide information to State policymakers including the General Assembly and the Board on how effective schools are in promoting and demonstrating student proficiency of academic standards.

(5) Provide information to the general public on school performance.

(6) Provide results to school entities based upon the aggregate performance of all students, for students with an Individualized Education Program (IEP) and for those without an IEP.

(b) State assessment instruments administered in reading, writing and mathematics in grades 5, 8 and 11 will be standards-based and criterion referenced and include essay or open-ended response items in addition to other item formats. The

proportion of type of items will vary by grade level. Neither State assessments nor academic standards under § 4.12 may require students to hold or express particular attitudes, values or beliefs. The Department will make samples of assessment questions, instrument formats, and scoring guides available to the public after each administration of State assessments. The criteria for judging performance on State assessments are as follows:

- (1) Performance on State reading assessments shall be demonstrated by students' responses to comprehension questions about age-appropriate reading passages and by their written responses to in-depth comprehension questions about the passages.
 - (2) Performance on State mathematics assessments shall be demonstrated by students' responses to questions about grade-appropriate content and by the quality of their responses to questions that require a written solution to a problem.
 - (3) Performance on State writing assessments shall be demonstrated by the quality of students' written compositions on a variety of topics and modes of writing.
 - (4) Levels of proficiency shall be advanced, proficient, basic and below basic. In consultation with educators, students, parents and citizens, the Department will develop and recommend to the Board for its approval specific criteria for advanced, proficient, basic and below basic levels of performance.
- (c) The Department will develop or cause to be developed State assessments based on academic standards in mathematics, reading and writing under § 4.12 and contained in Appendix A. In developing assessments, the Department will consult with educators, students, parents and citizens regarding the specific methods of assessment. To ensure that information regarding student performance is available to parents and teachers, State assessments developed under this section shall include student names. Individual test results shall be used in planning instruction only by parents, teachers, administrators and guidance counselors with a need to know based upon local board policy on testing and in reporting academic progress. The Department or other Commonwealth entities are prohibited from collecting individual student test scores, and may only collect aggregate test scores by school and district.
- (d) The State assessments shall be administered annually and include assessments of the State academic standards in mathematics and reading at grades 3—8 and 11; in writing at grades 5, 8 and 11; and in science at grades 4, 8 and 11.
- (e) Students not achieving at the proficient level in the administration of State assessments in grade 11 shall be provided one additional opportunity in grade 12 to demonstrate a proficient level on State assessments.
- (f) The Board will authorize the expansion of the State assessment system through a revision of this chapter.
- (g) The Department will implement provisions for security of the State assessment system, including the following provisions:
- (1) Action by a professional employee or commissioned officer that is willfully designed to divulge test questions, falsify student scores or in some other fashion compromise the integrity of the State assessment system as determined by the school entity shall be subject to disciplinary action under the Professional Educator Discipline Act (24 P. S. §§ 2070.1a—2070.18a).

(2) Cheating by students or employees other than those covered in paragraph (1) shall be subject to disciplinary action by the school district.

(3) Cheating or breaches of assessment security shall be reported to the Secretary as soon as detected.

(h) The Secretary has the authority to establish guidelines for the administration of the State assessment system.

(i) The Secretary will report each September to the Board and the General Assembly information and pertinent data relating to the State assessment system. The Secretary will also provide each school entity information and pertinent data for the school entity and its students.

(j) Children with disabilities and children with limited English proficiency shall be included in the State assessment system as required by Federal law, with appropriate accommodations, when necessary. As appropriate, the Commonwealth will develop guidelines for the participation of children with disabilities in alternate assessments for those children who cannot participate in the State assessment as determined by each child's Individualized Education Program team under the Individuals with Disabilities Education Act and this part.

Authority

The provisions of this § 4.51 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.51 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial pages (323745) to (323747).

Cross References

This section cited in 22 Pa. Code § 4.21 (relating to elementary education: primary intermediate levels); 22 Pa. Code § 4.24 (relating to high school graduating requirements); and 22 Pa. Code § 14.105 (relating to personnel).

§ 4.52. Local assessment system.

(a) Each school entity shall design an assessment system to do the following:

(1) Determine the degree to which students are achieving academic standards under §§ 4.12 and 4.13(c)(3) (relating to academic standards; and strategic plans). The school entity shall provide assistance to students not attaining academic standards at the proficient level or better and the assistance to be provided shall be indicated in the strategic plan under § 4.13.

(2) Use assessment results to improve curriculum and instructional practices, to guide instructional strategies and to develop future strategic plans under § 4.13.

(3) Provide information requested by the Department regarding the achievement of academic standards, which does not include student names, identification numbers or individually identifiable information.

(4) Provide summary information including results of assessments under this section to the general public regarding the achievement of students, which does not include student names, identification numbers or individually identifiable information.

(b) The local assessment system shall be implemented no later than 1 year after its strategic plan or revision is approved by the board of school directors under § 4.13.

(c) The local assessment system shall be described in the school entity's strategic plan under § 4.13(c)(5).

(d) The local assessment system shall be described in the district's (including a charter school's) or AVTS's strategic plan under § 4.13(c)(5), including industry certifications earned by vocational-technical students, Pennsylvania skill certificates earned by vocational technical education students, and projects completed by vocational-technical education students which demonstrate their occupational competency.

(e) The local assessment system shall be designed to include a variety of assessment strategies which may include the following:

- (1) Written work by students.
- (2) Scientific experiments conducted by students.
- (3) Works of art or musical, theatrical or dance performances by students.
- (4) Other demonstrations, performances, products or projects by students related to specific academic standards.
- (5) Examinations developed by teachers to assess specific academic standards.
- (6) Nationally-available achievement tests.
- (7) Diagnostic assessments.
- (8) Evaluations of portfolios of student work related to achievement of academic standards.
- (9) Other measures as appropriate, which may include standardized tests.

(f) Individual test information shall be maintained in a student's educational record in a manner consistent with section 438 of the Family Educational Rights and Privacy Act of 1974 (20 U.S.C.A § 1232g) and 34 CFR Part 99 (relating to family educational rights and privacy).

(g) Children with disabilities shall be included in the local assessment system, with appropriate accommodations, when necessary. As appropriate, the school district, including charter schools, or AVTS shall develop guidelines for the participation of children with disabilities in alternate assessments for those children who cannot participate in the local assessment as determined by each child's Individualized Education Program team under the Individuals with Disabilities Education Act and this part.

Authority

The provisions of this § 4.52 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.52 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial pages (323747) to (323748).

Cross References

This section cited in 22 Pa. Code § 4.12 (relating to academic standards); 22 Pa. Code § 4.13 (relating to strategic plans); 22 Pa. Code § 4.20 (relating to prekindergarten education); 22 Pa. Code § 4.21 (relating to elementary education: primary and intermediate levels); 22 Pa. Code § 4.24 (relating to high school graduation requirements); and 22 Pa. Code § 14.105 (relating to personnel).

4-30.2

SCHOOL PROFILES

§ 4.61. School profiles.

(a) School profiles developed by the Secretary will include information as required under section 220 of the School Code (24 P. S. § 2-220).

(b) In compiling school profiles under this chapter, the Department will provide school entities interpretive information to assist in using the profiles for strategic planning under § 4.13 (relating to strategic plans).

(c) The Secretary will prescribe procedures for reporting State assessment data to schools and communities.

(d) The Secretary will make available to the public, and report to the public with the same frequency and in the same detail as for children who are nondisabled, all data as required under the Individuals with Disabilities Education Act.

Authority

The provisions of this § 4.61 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.61 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial pages (323748) and (252341).

PROVISIONS RELATING TO OTHER THAN PUBLIC SCHOOLS

§ 4.71. Certification by principal of nonpublic nonlicensed school.

Elementary or secondary nonpublic nonlicensed schools, shall, within 30 days of beginning classes, file a notarized certificate with the Secretary as required by section 1327(b)(1) and (2) of the School Code (24 P. S. § 13-1327(b)(1) and (2)) in the form prescribed by the Secretary.

§ 4.72. Credentials other than the high school diploma.

The requirements for a Commonwealth secondary school diploma are as follows:

(1) The Commonwealth secondary school diploma may be issued to an applicant who is a resident of this Commonwealth and does not possess a secondary school diploma upon presentation of evidence of full matriculation and the satisfactory completion of a minimum of 1 full year or 30 semester hours of study at an accredited institution of postsecondary education.

(2) In addition to the provisions of paragraph (1), the Commonwealth secondary school diploma may be issued to an applicant who is a resident of this Commonwealth, does not possess a secondary school diploma and is not enrolled in a public, licensed private, registered accredited or licensed nonpublic secondary school upon earning a passing score as determined by the Department on the high school level tests of General Educational Development (GED). A person 18 years of age or older may qualify for GED testing upon request. A person between 16 and 18 years of age may qualify for GED testing upon the issuance of a court order or at the written request of one of the following:

(i) An employer who requires a high school equivalency credential for job opportunities.

(ii) An official of an accredited institution of postsecondary education which accepts applicants on the basis of GED test scores.

(iii) A recruiting officer of a branch of the armed forces that requires a high school equivalency credential for entry of new recruits.

(iv) The director of a State institution on behalf of residents, patients or inmates.

(3) The Department will not ordinarily issue a diploma until after the high school class of which the applicant was a member has been graduated. This restriction may be waived by the Department upon the recommendation of the school district for persons between 16 and 18 years of age who meet the higher education or GED requirements for the secondary school diploma.

Cross References

This section cited in 22 Pa. Code § 4.74 (relating to students in special situations).

§ 4.73. Correspondence schools.

An applicant 18 years of age or older will be issued a Certificate of Preliminary Education upon presentation to the Department of evidence of the issuance of a high school diploma by an accredited private correspondence school licensed or approved by the State Board of Private Licensed Schools.

§ 4.74. Students in special situations.

(a) A foreign student without educational credentials may earn the Commonwealth secondary school diploma by meeting the requirements under § 4.72 (relating to credentials other than the high school diploma).

(b) A graduate of a secondary school in another state which is not on an approved list of secondary schools may earn an appropriate credential by passing an examination administered by the education agency of that state or by its designee or by meeting the requirements for the Commonwealth secondary school diploma under § 4.72.

(c) Credit granted by a public school in this Commonwealth shall be accepted by all public schools and institutions in this Commonwealth upon the transfer of a student.

ENFORCEMENT AND IMPLEMENTATION

§ 4.81. Allegations of deficiencies.

(a) The Secretary will receive and investigate allegations of curriculum deficiencies from professional employees, commissioned officers, parents of students or other residents of a school entity.

(b) The Secretary will notify the school entity's superintendent or chief executive of allegations and may require the superintendent or chief executive to submit one or more of the following:

- (1) Relevant descriptions of planned instruction.
- (2) A series of written articulated courses of instructional units.
- (3) Relevant student assessment information.
- (4) Information on staff assignments.
- (5) Other information pertinent to investigating a specific allegation.

(c) If the Secretary determines that a curriculum deficiency exists, the school entity shall be required to submit to the Secretary for approval a plan to correct the deficiency.

(d) Within 1 year of the implementation of a corrective action plan under subsection (c), the Secretary will review the actions taken to correct the deficiency. If the deficiency remains uncorrected, the Secretary will send a formal notice of deficiency to the governing board of the school entity, and the notice shall be announced at the meeting of the school entity's governing board immediately following its receipt.

(e) If the school entity does not take appropriate actions to correct the deficiency after the notice of deficiency is announced, the Secretary will take action under State law.

Authority

The provisions of this § 4.81 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.81 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial page (286559).

Notes of Decisions

Inapplicable Offense

Educator's argument that the offensive conduct of manufacturing of grades was a curriculum deficiency that should be resolved under the Academic Standards and Assessment Chapter of the Administrative Code is misplaced. The conduct is properly prosecuted under the Teacher Certification Law. *Seltzer v. Department of Education*, 782 A.2d 48 (Pa. Cmwlth. 2001).

§ 4.82. Exceptions.

(a) The Secretary may grant exceptions to specific provisions of this chapter when it is necessary to adapt them to the curriculum needs of individual school entities or to facilitate transition to the revised provisions of this chapter. Specific exception may be made for school entities that develop or implement academic standards that are comparable to or exceed those found in § 4.12 (relating to academic standards). Exceptions may be granted under the following conditions:

(1) The request for an exception must be in writing and include relevant information supporting the need for the exception.

(2) The exception will be valid for a limited term not to exceed 2 years.

(3) The request shall be made prior to initiating the action requiring approval and shall have the prior approval of the board of school directors.

(b) The Secretary will report annually to the Board on the nature and status of requests for exceptions under this section.

Authority

The provisions of this § 4.82 amended under the Public School Code of 1949 (24 P. S. 26-2603-B).

Source

The provisions of this § 4.82 amended February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial pages (286559) to (286560).

§ 4.83. [Reserved].

Source

The provisions of this § 4.83 reserved February 15, 2008, effective February 16, 2008, 38 Pa.B. 872. Immediately preceding text appears at serial page (286560).

APPENDIX A Academic Standards for Reading, Writing, Speaking and Listening

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II. INTRODUCTION

This document includes Reading, Writing, Speaking and Listening Standards:

- 1.1. Learning to Read Independently
- 1.2. Reading Critically in All Content Areas
- 1.3. Reading, Analyzing and Interpreting Literature
- 1.4. Types of Writing
- 1.5. Quality of Writing
- 1.6. Speaking and Listening
- 1.7. Characteristics and Function of the English Language
- 1.8. Research

The Reading, Writing, Speaking and Listening Standards describe what students should know and be able to do with the English Language at four grade levels (third, fifth, eighth and eleventh). The standards provide the targets for instruction and student learning essential for success in all academic areas, not just language arts classrooms. Although the standards are not a curriculum or a prescribed series of activities, school entities will use them to develop a local school curriculum that will meet local students' needs.

The language arts—Reading, Writing, Speaking and Listening—are unique because they are processes that students use to learn and make sense of their world. Students do not read “reading”; they read about history, science, mathematics and other content areas as well as about topics for their interest and entertainment. Similarly, students do not write “writing”; they use written words to express their knowledge and ideas and to inform or entertain others.

Because of the unique nature of the language arts, all teachers in a school will use the Reading, Writing, Speaking and Listening Standards. The standards define the skills and strategies employed by effective readers and writers; therefore, all teachers will assist their students in learning them through multiple classroom situations in all the subject areas.

The Reading, Writing, Speaking and Listening standards also provide parents and community members with information about what students should know and be able to do as they progress through the educational program and at graduation. With a clearly defined target provided by the standards, parents, students, educators and community members become partners in learning success.

A glossary is included to assist the reader in understanding terminology contained in the standards.

1.1. Learning to Read Independently			
1.1.3. GRADE 3	1.1.5. GRADE 5	1.1.8. GRADE 8	1.1.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Identify the purposes and types of text (e.g., literature, information) before reading.</p> <p>B. Preview the text formats (e.g., title, headings, chapters, and table of contents).</p> <p>C. Use knowledge of phonics, word analysis (e.g., root words, prefixes and suffixes), syllabication, picture and context clues to decode and understand new words during reading.</p>	<p>A. Establish the purpose for reading a type of text (literature, information) before reading.</p> <p>B. Select texts for a particular purpose using the format of the text as a guide.</p> <p>C. Use knowledge of phonics, syllabication, prefixes, suffixes, the dictionary or context clues to decode and understand new words during reading. Use these words accurately in writing and speaking.</p>	<p>A. Locate appropriate texts (literature, information, documents) for an assigned purpose before reading.</p> <p>B. Identify and use common organizational structures and graphic features to comprehend information.</p> <p>C. Use knowledge of root words as well as context clues and glossaries to understand specialized vocabulary in the content areas during reading. Use these words accurately in speaking and writing.</p>	<p>A. Locate various texts, media and traditional resources for assigned and independent projects before reading.</p> <p>B. Analyze the structure of informational materials explaining how authors used these to achieve their purposes.</p> <p>C. Use knowledge of root words and words from literary works to recognize and understand the meaning of new words during reading. Use these words accurately in speaking and writing.</p>

1.1. Learning to Read Independently			
1.1.3. GRADE 3	1.1.5. GRADE 5	1.1.8. GRADE 8	1.1.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
D. Read text using self-monitoring comprehension strategies (e.g., predict, revise predictions, reread, use text organization headings, graphics, charts, and adjust reading rate).	D. Identify the basic ideas and facts in text using strategies (e.g., prior knowledge, illustrations and headings) and information from other sources to make predictions about text.	D. Identify basic facts and ideas in text using specific strategies (e.g., recall genre characteristics, set a purpose for reading, generate essential questions as aids to comprehension and clarify understanding through rereading and discussion).	D. Identify, describe, evaluate and synthesize the essential ideas in text. Assess those reading strategies that were most effective in learning from a variety of texts.
E. Acquire a reading vocabulary by identifying and correctly using words, (e.g. antonyms, synonyms, categories of words). Use a dictionary when appropriate.	E. Acquire a reading vocabulary by correctly identifying and using words (e.g., synonyms, homophones and homographs and words with roots, suffixes, and/or prefixes). Use a dictionary or related reference.	E. Expand a reading vocabulary by identifying and correctly using idioms and words with literal and figurative meanings. Use a dictionary or related reference.	E. Establish a reading vocabulary by identifying and correctly using new words acquired through the study of their relationships to other words. Use a dictionary or related reference.

1.1. Learning to Read Independently			
1.1.3. GRADE 3	1.1.5. GRADE 5	1.1.8. GRADE 8	1.1.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>F. Understand the meaning of and use correctly new vocabulary learned in various subject areas.</p> <p>G. Demonstrate after reading understanding and interpretation of both fiction and nonfiction text.</p> <ul style="list-style-type: none"> • Retell or summarize the major ideas, themes or procedures of the text. • Connect the new information or ideas in the text to known information. • Clarify ideas and understandings through rereading and discussion. 	<p>F. Identify, understand the meaning of and use correctly key vocabulary from various subject areas.</p> <p>G. Demonstrate after reading understanding and interpretation of both fiction and nonfiction text,</p> <ul style="list-style-type: none"> • Summarize the major ideas, themes or procedures of the text. • Relate new information or ideas from the text to that learned through additional reading and media (e.g., films, audiotapes). • Clarify ideas and understandings through 	<p>F. Understand the meaning of and apply key vocabulary across the various subject areas.</p> <p>G. Demonstrate after reading understanding and interpretation of both fiction and nonfiction text, including public documents.</p> <ul style="list-style-type: none"> • Make, and support with evidence, assertions about texts. • Compare and contrast texts using themes, settings, characters and ideas. • Make extensions to related ideas, topics or 	<p>F. Understand the meaning of and apply key vocabulary across the various subject areas.</p> <p>G. Demonstrate after reading understanding and interpretation of both fiction and nonfiction text, including public documents.</p> <ul style="list-style-type: none"> • Make, and support with evidence, assertions about texts. • Compare and contrast texts using themes, settings, characters and ideas. • Make extensions to related ideas, topics or

1.1. Learning to Read Independently			
1.1.3. GRADE 3	1.1.5. GRADE 5	1.1.8. GRADE 8	1.1.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<ul style="list-style-type: none">• Make responsible assertions about the text by citing evidence from the text.	<p>rereading and discussion.</p> <ul style="list-style-type: none">• Make responsible assertions about the ideas from the text by citing evidence.• Extend ideas found in the text.	<p>information.</p> <ul style="list-style-type: none">• Describe the context of a document.• Analyze the positions, arguments and evidence in public documents.	<p>information.</p> <ul style="list-style-type: none">• Assess the validity of the document based on context.• Analyze the positions, arguments and evidence in public documents.• Evaluate the strategies of the author.• Critique public documents to identify strategies common in public discourse.

1.1. Learning to Read Independently			
1.1.3. GRADE 3	1.1.5. GRADE 5	1.1.8. GRADE 8	1.1.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
H. Demonstrate fluency and comprehension in reading. <ul style="list-style-type: none"> • Read familiar materials aloud with accuracy. • Self-correct mistakes. • Use appropriate rhythm, flow, meter and pronunciation. • Read a variety of genres and types of text. • Demonstrate comprehension (Standard 1.1.3.G.). (Recommend: 25 books/year)	H. Demonstrate fluency and comprehension in reading. <ul style="list-style-type: none"> • Read familiar materials aloud with accuracy. • Self-correct mistakes. • Use appropriate rhythm, flow, meter and pronunciation. • Read a variety of genres and types of text. • Demonstrate comprehension (Standard 1.1.5.G.). (Recommend: 25 books/year)	H. Demonstrate fluency and comprehension in reading. <ul style="list-style-type: none"> • Read familiar materials aloud with accuracy. • Self-correct mistakes. • Use appropriate rhythm, flow, meter and pronunciation. • Read a variety of genres and types of text. • Demonstrate comprehension (Standard 1.1.8.G.). (Recommend: 25 books/year)	H. Demonstrate fluency and comprehension in reading. <ul style="list-style-type: none"> • Read familiar materials aloud with accuracy. • Self-correct mistakes. • Use appropriate rhythm, flow, meter and pronunciation. • Read a variety of genres and types of text. • Demonstrate comprehension (Standard 1.1.11.G.). (Recommend: 25 books/year)

1.2. Reading Critically in All Content Areas			
1.2.3. GRADE 3	1.2.5. GRADE 5	1.2.8. GRADE 8	1.2.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Read and understand essential content of informational texts and documents in all academic areas.</p> <ul style="list-style-type: none"> • Differentiate fact from opinion within text. • Distinguish between essential and nonessential information within a text. • Make inferences from text when studying a topic (e.g., science, social studies) and draw conclusions based on text. 	<p>A. Read and understand essential content of informational texts and documents in all academic areas.</p> <ul style="list-style-type: none"> • Differentiate fact from opinion across texts. • Distinguish between essential and non-essential information across a variety of texts, identifying stereotypes and exaggeration where present. • Make inferences about similar concepts in multiple texts and draw conclusions. 	<p>A. Read and understand essential content of informational texts and documents in all academic areas.</p> <ul style="list-style-type: none"> • Differentiate fact from opinion utilizing resources that go beyond traditional text (e.g., newspapers, magazines and periodicals) to electronic media. • Distinguish between essential and nonessential information across texts and going 	<p>A. Read and understand essential content of informational texts and documents in all academic areas.</p> <ul style="list-style-type: none"> • Differentiate fact from opinion across a variety of texts, by using complete and accurate information, coherent arguments and points of view. • Distinguish between essential and nonessential information across a variety of sources, identifying the

1.2. Reading Critically in All Content Areas			
1.2.3. GRADE 3	1.2.5. GRADE 5	1.2.8. GRADE 8	1.2.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<ul style="list-style-type: none"> Analyze text organization and content to derive meaning from text using established criteria. 	<ul style="list-style-type: none"> Evaluate text organization and content to determine the author's purpose and effectiveness. 	<p>beyond texts to a variety of media; identify bias and propaganda where present.</p> <ul style="list-style-type: none"> Draw inferences based on a variety of information sources. Evaluate text organization and content to determine the author's purpose and effectiveness according to the author's theses, accuracy, and thoroughness. 	<p>use of proper references or authorities and propaganda techniques where present.</p> <ul style="list-style-type: none"> Use teacher and student established criteria for making decisions and drawing conclusions. Evaluate text organization and content to determine the author's purpose and effectiveness according to the author's theses, accuracy, thoroughness, logic and reasoning.

1.2. Reading Critically in All Content Areas			
1.2.3. GRADE 3	1.2.5. GRADE 5	1.2.8. GRADE 8	1.2.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>B. Use and understand a variety of media and evaluate the quality of material produced.</p> <ul style="list-style-type: none"> • Use electronic media for research. • Identify techniques used in television and use the knowledge to distinguish between facts and misleading information. • Assess the quality of media project (e.g., script, play, audiotape) that has been developed for a targeted audience. 	<p>B. Use and understand a variety of media and evaluate the quality of material produced.</p> <ul style="list-style-type: none"> • Use a variety of media (e.g., computerized card catalogues, encyclopedias) for research. • Evaluate the role of media as a source of both entertainment and information. • Use established criteria to design and develop media project (e.g., script, play, audiotape) for a targeted audience. 	<p>B. Use and understand a variety of media and evaluate the quality of material produced.</p> <ul style="list-style-type: none"> • Compare and analyze how different media offer a unique perspective on the information presented. • Analyze the techniques of particular media messages and their effect on a targeted audience. • Use, design and develop a media project that expands understanding (e.g., authors and works from a particular historical period). 	<p>B. Use and understand a variety of media and evaluate the quality of material produced.</p> <ul style="list-style-type: none"> • Select appropriate electronic media for research and evaluate the quality of the information received. • Explain how the techniques used in electronic media modify traditional forms of discourse for different purposes. • Use, design and develop a media project to demonstrate understanding (e.g., a major writer or literary period or movement).

1.2. Reading Critically in All Content Areas			
1.2.3. GRADE 3	1.2.5. GRADE 5	1.2.8. GRADE 8	1.2.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
C. Produce work in at least one literary genre that follows the conventions of the genre.	C. Produce work in at least one literary genre that follows the conventions of the genre.	C. Produce work in at least one literary genre that follows the conventions of the genre.	C. Produce work in at least one literary genre that follows the conventions of the genre.

1.3. Reading, Analyzing and Interpreting Literature			
1.3.3. GRADE 3	1.3.5. GRADE 5	1.3.8. GRADE 8	1.3.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
A. Read and understand works of literature. B. Identify literary elements in stories describing characters, setting and plot.	A. Read and understand works of literature. B. Compare the use of literary elements within and among texts, including characters, setting, plot, theme, and point of view.	A. Read and understand works of literature. B. Analyze the use of literary elements by an author including characterization, setting, plot, theme, point of view, tone, and style.	A. Read and understand works of literature. B. Analyze the relationships, uses and effectiveness of literary elements used by one or more authors in similar genres including characterization, setting, plot, theme, point of view, tone, and style.

1.3. Reading, Analyzing and Interpreting Literature			
1.3.3. GRADE 3	1.3.5. GRADE 5	1.3.8. GRADE 8	1.3.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Identify literary devices in stories. (e.g., rhyme, rhythm, personification).</p> <p>D. Identify the structures in poetry (e.g., pattern books, predictable books nursery rhymes).</p>	<p>C. Describe how the author uses literary devices to convey meaning.</p> <ul style="list-style-type: none"> • Sound techniques (e.g., rhyme, rhythm, meter, alliteration) • Figurative language (e.g., personification, simile, metaphor, hyperbole). <p>D. Identify and respond to the effects of sound and structure in poetry (e.g., alliteration, rhyme, verse form).</p>	<p>C. Analyze the effect of various literary devices.</p> <ul style="list-style-type: none"> • Sound techniques (e.g., rhyme, rhythm, meter, alliteration) • Figurative language (e.g., personification, simile, metaphor, hyperbole, allusion). <p>D. Identify poetic forms (e.g., ballad, sonnet, couplet).</p>	<p>C. Analyze the effectiveness, in terms of literary quality, of the author's use of literary devices.</p> <ul style="list-style-type: none"> • Sound techniques (e.g., rhyme, rhythm, meter, alliteration) • Figurative language (e.g., personification, simile, metaphor, hyperbole, irony, satire) • Literary structures (e.g., foreshadowing, flashbacks, progressive and digressive time). <p>D. Analyze and evaluate in poetry the appropriateness of diction and figurative language (e.g., irony, understatement, overstatement, paradox).</p>

1.3. Reading, Analyzing and Interpreting Literature			
1.3.3. GRADE 3	1.3.5. GRADE 5	1.3.8. GRADE 8	1.3.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
E. Identify the structures in drama (e.g., dialogue, story enactment, acts, scenes).	E. Analyze drama as information source, entertainment, persuasion or transmitter of culture.	E. Analyze drama to determine the reasons for a character's actions taking into account the situation and basic motivation of the character.	E. Analyze how a scriptwriter's use of words creates tone and mood, and how choice of words advances the theme or purpose of the work.
F. Read and respond to nonfiction and fiction including poetry and drama.	F. Read and respond to nonfiction and fiction including poetry and drama.	F. Read and respond to nonfiction and fiction including poetry and drama.	F. Read and respond to nonfiction and fiction including poetry and drama.

1.4. Types of Writing			
1.4.3. GRADE 3	1.4.5. GRADE 5	1.4.8. GRADE 8	1.4.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Write narrative pieces (e.g., stories, poems, plays).</p> <ul style="list-style-type: none"> • Include detailed descriptions of people, places and things. • Use relevant illustrations. • Include literary elements (Standard 1.3.3.B). 	<p>A. Write poems, plays and multi-paragraph stories.</p> <ul style="list-style-type: none"> • Include detailed descriptions of people, places and things. • Use relevant illustrations. • Utilize dialogue. • Apply literary conflict. • Include literary elements (Standard 1.3.5.B). • Use literary devices (Standard 1.3.5.C). 	<p>A. Write short stories, poems and plays.</p> <ul style="list-style-type: none"> • Apply varying organizational methods. • Use relevant illustrations. • Utilize dialogue. • Apply literary conflict. • Include literary elements (Standard 1.3.8.B). • Use literary devices (Standard 1.3.8.C). 	<p>A. Write short stories, poems and plays.</p> <ul style="list-style-type: none"> • Apply varying organizational methods. • Use relevant illustrations. • Utilize dialogue. • Apply literary conflict. • Include varying characteristics (e.g., from limerick to epic, from whimsical to dramatic). • Include literary elements (Standard 1.3.11.B). • Use literary devices (Standard 1.3.11.C).

1.4. Types of Writing			
1.4.3. GRADE 3	1.4.5. GRADE 5	1.4.8. GRADE 8	1.4.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>B. Write informational pieces (e.g., descriptions, letters, reports, instructions) using illustrations when relevant.</p>	<p>B. Write multi-paragraph informational pieces (e.g., essays, descriptions, letters, reports, instructions).</p> <ul style="list-style-type: none"> • Include cause and effect. • Develop a problem and solution when appropriate to the topic. • Use relevant graphics (e.g., maps, charts, graphs, tables, illustrations, photographs). 	<p>B. Write multi-paragraph informational pieces (e.g., letters, descriptions, reports, instructions, essays, articles, interviews).</p> <ul style="list-style-type: none"> • Include cause and effect. • Develop a problem and solution when appropriate to the topic. • Use relevant graphics (e.g., maps, charts, graphs, tables, illustrations, photographs). • Use primary and secondary sources. 	<p>B. Write complex informational pieces (e.g., research papers, analyses, evaluations, essays).</p> <ul style="list-style-type: none"> • Include a variety of methods to develop the main idea. • Use precise language and specific detail. • Include cause and effect. • Use relevant graphics (e.g., maps, charts, graphs, tables, illustrations, photographs). • Use primary and secondary sources.

1.4. Types of Writing			
1.4.3. GRADE 3	1.4.5. GRADE 5	1.4.8. GRADE 8	1.4.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
C. Write an opinion and support it with facts.	C. Write persuasive pieces with a clearly stated position or opinion and supporting detail, citing sources when needed.	C. Write persuasive pieces. <ul style="list-style-type: none"> • Include a clearly stated position or opinion. • Include convincing, elaborated and properly cited evidence. • Develop reader interest. • Anticipate and counter reader concerns and arguments. D. Maintain a written record of activities, course work, experience, honors and interests.	C. Write persuasive pieces. <ul style="list-style-type: none"> • Include a clearly stated position or opinion. • Include convincing, elaborated and properly cited evidence. • Develop reader interest. • Anticipate and counter reader concerns and arguments. • Include a variety of methods to advance the argument or position. D. Maintain a written record of activities, course work, experience, honors and interests. E. Write a personal resumé.

1.5. Quality of Writing			
1.5.3. GRADE 3	1.5.5. GRADE 5	1.5.8. GRADE 8	1.5.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Write with a sharp, distinct focus identifying topic, task and audience.</p> <p>B. Write using well-developed content appropriate for the topic.</p> <ul style="list-style-type: none"> • Gather and organize information. • Write a series of related sentences or paragraphs with one central idea. • Incorporate details relevant and appropriate to the topic. 	<p>A. Write with a sharp, distinct focus identifying topic, task and audience.</p> <p>B. Write using well-developed content appropriate for the topic.</p> <ul style="list-style-type: none"> • Gather, organize and select the most effective information appropriate for the topic, task and audience. • Write paragraphs that have a topic sentence and supporting details. 	<p>A. Write with a sharp, distinct focus.</p> <ul style="list-style-type: none"> • Identify topic, task and audience. • Establish a single point of view. <p>B. Write using well-developed content appropriate for the topic.</p> <ul style="list-style-type: none"> • Gather, determine validity and reliability of and organize information. • Employ the most effective format for purpose and audience. • Write paragraphs that have details and information specific to the topic and relevant to the focus. 	<p>A. Write with a sharp, distinct focus.</p> <ul style="list-style-type: none"> • Identify topic, task and audience. • Establish and maintain a single point of view. <p>B. Write using well-developed content appropriate for the topic.</p> <ul style="list-style-type: none"> • Gather, determine validity and reliability of, analyze and organize information. • Employ the most effective format for purpose and audience. • Write fully developed paragraphs that have details and information specific to the topic and relevant to the focus.

1.5. Quality of Writing			
1.5.3. GRADE 3	1.5.5. GRADE 5	1.5.8. GRADE 8	1.5.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Write with controlled and/or subtle organization.</p> <ul style="list-style-type: none"> • Sustain a logical order. • Include a recognizable beginning, middle and end. <p>D. Write with an awareness of the stylistic aspects of composition.</p> <ul style="list-style-type: none"> • Use sentences of differing lengths and complexities. 	<p>C. Write with controlled and/or subtle organization.</p> <ul style="list-style-type: none"> • Sustain a logical order within sentences and between paragraphs using meaningful transitions. • Include an identifiable introduction, body and conclusion. <p>D. Write with an understanding of the stylistic aspects of composition.</p> <ul style="list-style-type: none"> • Use different types and lengths of sentences. 	<p>C. Write with controlled and/or subtle organization.</p> <ul style="list-style-type: none"> • Sustain a logical order within sentences and between paragraphs using meaningful transitions. • Establish topic and purpose in the introduction. • Reiterate the topic and purpose in the conclusion. <p>D. Write with an understanding of the stylistic aspects of composition.</p> <ul style="list-style-type: none"> • Use different types and lengths of sentences. 	<p>C. Write with controlled and/or subtle organization.</p> <ul style="list-style-type: none"> • Sustain a logical order throughout the piece. • Include an effective introduction and conclusion <p>D. Write with a command of the stylistic aspects of composition.</p> <ul style="list-style-type: none"> • Use different types and lengths of sentences. • Use precise language.

1.5. Quality of Writing			
1.5.3. GRADE 3	1.5.5. GRADE 5	1.5.8. GRADE 8	1.5.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<ul style="list-style-type: none"> • Use descriptive words and action verbs. <p>E. Revise writing to improve detail and order by identifying missing information and determining whether ideas follow logically.</p>	<ul style="list-style-type: none"> • Use precise language including adjectives, adverbs, action verbs and specific details that convey the writer's meaning. • Develop and maintain a consistent voice. <p>E. Revise writing to improve organization and word choice; check the logic, order of ideas and precision of vocabulary.</p>	<ul style="list-style-type: none"> • Use tone and voice through the use of precise language. <p>E. Revise writing after rethinking logic of organization and rechecking central idea, content, paragraph development, level of detail, style, tone and word choice.</p>	<p>E. Revise writing to improve style, word choice, sentence variety and subtlety of meaning after rethinking how questions of purpose, audience and genre have been addressed.</p>

1.5. Quality of Writing			
1.5.3. GRADE 3	1.5.5. GRADE 5	1.5.8. GRADE 8	1.5.11. GRADE 11
<i>Pennsylvania’s public schools shall teach, challenge and support every student to realize the student’s maximum potential and to acquire the knowledge and skills needed to:</i>			
F. Edit writing using the conventions of language. <ul style="list-style-type: none"> • Spell common, frequently used words correctly. • Use capital letters correctly (first word in sentences, proper nouns, pronoun “I”). • Punctuate correctly (periods, exclamation points, question marks, commas in a series). • Use nouns, pronouns, verbs, adjectives, adverbs and conjunctions properly. • Use complete sentences (simple, compound, 	F. Edit writing using the conventions of language. <ul style="list-style-type: none"> • Spell common, frequently used words correctly. • Use capital letters correctly • Punctuate correctly (periods, exclamation points, question marks, commas, quotation marks, apostrophes). • Use nouns, pronouns, verbs, adjectives, adverbs, conjunctions, prepositions and interjections properly. • Use complete sentences (simple, compound, 	F. Edit writing using the conventions of language. <ul style="list-style-type: none"> • Spell common, frequently used words correctly. • Use capital letters correctly. • Punctuate correctly (periods, exclamation points, question marks, commas, quotation marks, apostrophes, colons, semicolons, parentheses). • Use nouns, pronouns, verbs, adjectives, adverbs, conjunctions prepositions and interjections properly. 	F. Edit writing using the conventions of language. <ul style="list-style-type: none"> • Spell all words correctly. • Use capital letters correctly. • Punctuate correctly (periods, exclamation points, question marks, commas, quotation marks, apostrophes, colons, semicolons, parentheses, hyphens, brackets, ellipses). • Use nouns, pronouns, verbs, adjectives, adverbs, conjunctions, prepositions and interjections properly.

1.5. Quality of Writing			
1.5.3. GRADE 3	1.5.5. GRADE 5	1.5.8. GRADE 8	1.5.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
declarative, interrogative, exclamatory and imperative). G. Present and/or defend written work for publication when appropriate.	declarative, interrogative, exclamatory and imperative). G. Present and/or defend written work for publication when appropriate.	<ul style="list-style-type: none"> • Use complete sentences (simple, compound, complex, declarative, interrogative, exclamatory and imperative). G. Present and/or defend written work for publication when appropriate.	<ul style="list-style-type: none"> • Use complete sentences (simple, compound, complex, declarative, interrogative, exclamatory and imperative). G. Present and/or defend written work for publication when appropriate.

1.6. Speaking and Listening			
1.6.3. GRADE 3	1.6.5. GRADE 5	1.6.8. GRADE 8	1.6.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Listen to others.</p> <ul style="list-style-type: none"> • Ask questions as an aid to understanding. • Distinguish fact from opinion. <p>B. Listen to a selection of literature (fiction and/or nonfiction).</p> <ul style="list-style-type: none"> • Relate it to similar experiences. • Predict what will happen next. • Retell a story in chronological order. • Identify and define new words and concepts. 	<p>A. Listen to others.</p> <ul style="list-style-type: none"> • Ask pertinent questions. • Distinguish relevant information, ideas and opinions from those that are irrelevant. • Take notes when prompted. <p>B. Listen to a selection of literature (fiction and/or nonfiction).</p> <ul style="list-style-type: none"> • Relate it to what is known. • Predict the result of the story actions. • Retell actions of the story in sequence, explain the theme and describe the characters and setting. 	<p>A. Listen to others.</p> <ul style="list-style-type: none"> • Ask probing questions. • Analyze information, ideas and opinions to determine relevancy. • Take notes when needed. <p>B. Listen to selections of literature (fiction and/or nonfiction).</p> <ul style="list-style-type: none"> • Relate them to previous knowledge. • Predict content/events. • Summarize events and identify the significant points. • Identify and define new words and concepts. • Analyze the selections. 	<p>A. Listen to others.</p> <ul style="list-style-type: none"> • Ask clarifying questions. • Synthesize information, ideas and opinions to determine relevancy. • Take notes. <p>B. Listen to selections of literature (fiction and/or nonfiction).</p> <ul style="list-style-type: none"> • Relate them to previous knowledge. • Predict solutions to identified problems. • Summarize and reflect on what has been heard. • Identify and define new words and concepts. • Analyze and synthesize

1.6. Speaking and Listening			
1.6.3. GRADE 3	1.6.5. GRADE 5	1.6.8. GRADE 8	1.6.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Speak using skills appropriate to formal speech situations.</p> <ul style="list-style-type: none"> • Use appropriate volume. • Pronounce most words accurately. • Pace speech so that is understandable. • Demonstrate an awareness of audience. 	<ul style="list-style-type: none"> • Identify and define new words and concepts. • Summarize the selection. <p>C. Speak using skills appropriate to formal speech situations.</p> <ul style="list-style-type: none"> • Use complete sentences. • Pronounce words correctly. • Use appropriate volume. • Pace speech so that it is understandable. • Adjust content for different audiences (e.g., fellow classmates, parents). • Speak with a purpose in mind. 	<p>C. Speak using skills appropriate to formal speech situations.</p> <ul style="list-style-type: none"> • Use complete sentences. • Pronounce words correctly. • Adjust volume to purpose and audience. • Adjust pace to convey meaning. • Add stress (emphasis) and inflection to enhance meaning. 	<p>the selections relating them to other selections heard or read.</p> <p>C. Speak using skills appropriate to formal speech situations.</p> <ul style="list-style-type: none"> • Use a variety of sentence structures to add interest to a presentation. • Pace the presentation according to audience and purpose. • Adjust stress, volume, and inflection to provide emphasis to ideas or to influence the audience.

1.6. Speaking and Listening			
1.6.3. GRADE 3	1.6.5. GRADE 5	1.6.8. GRADE 8	1.6.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
D. Contribute to discussions. <ul style="list-style-type: none"> • Ask relevant questions. • Respond with appropriate information or opinions to questions asked. • Listen to and acknowledge the contributions of others. • Display appropriate turn-taking behaviors. 	D. Contribute to discussions. <ul style="list-style-type: none"> • Ask relevant questions. • Respond with relevant information or opinions to questions asked. • Listen to and acknowledge the contributions of others. • Adjust involvement to encourage equitable participation. • Give reasons for opinions. • Summarize, when prompted. 	D. Contribute to discussions. <ul style="list-style-type: none"> • Ask relevant, probing questions. • Respond with relevant information, ideas or reasons in support of opinions expressed. • Listen to and acknowledge the contributions of others. • Adjust tone and involvement to encourage equitable participation. • Clarify, illustrate or expand on a response when asked. • Present support for opinions. 	D. Contribute to discussions. <ul style="list-style-type: none"> • Ask relevant, clarifying questions. • Respond with relevant information or opinions to questions asked. • Listen to and acknowledge the contributions of others. • Adjust tone and involvement to encourage equitable participation. • Facilitate total group participation. • Introduce relevant, facilitating information, ideas and opinions to enrich the discussion.

1.6. Speaking and Listening			
1.6.3. GRADE 3	1.6.5. GRADE 5	1.6.8. GRADE 8	1.6.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>E. Participate in small and large group discussions and presentations.</p> <ul style="list-style-type: none"> • Participate in everyday conversation. • Present oral readings. • Deliver short reports (e.g., Show-and-Tell, field trip summary). • Conduct short interviews. • Give simple directions and explanations. • Report an emergency. 	<p>E. Participate in small and large group discussions and presentations.</p> <ul style="list-style-type: none"> • Participate in everyday conversation. • Present an oral reading. • Deliver research reports. • Conduct interviews. • Plan and participate in group presentations. • Contribute to informal debates. 	<ul style="list-style-type: none"> • Paraphrase and summarize, when prompted. <p>E. Participate in small and large group discussions and presentations.</p> <ul style="list-style-type: none"> • Initiate everyday conversation. • Select a topic and present an oral reading. • Conduct interviews as part of the research process. • Organize and participate in informal debates. 	<ul style="list-style-type: none"> • Paraphrase and summarize as needed. <p>E. Participate in small and large group discussions and presentations.</p> <ul style="list-style-type: none"> • Initiate everyday conversation. • Select and present an oral reading on an assigned topic. • Conduct interviews. • Participate in a formal interview (e.g., for job, college). • Organize and participate in informal debate around a specific topic.

1.6. Speaking and Listening			
1.6.3. GRADE 3	1.6.5. GRADE 5	1.6.8. GRADE 8	1.6.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>F. Use media for learning purposes.</p> <ul style="list-style-type: none"> • Explain the importance of television, radio, film and Internet in the lives of people. • Explain how advertising sells products. • Show or explain what was learned (e.g., audiotape, computer download). 	<p>F. Use media for learning purposes.</p> <ul style="list-style-type: none"> • Compare information received on television with that received on radio or in newspapers. • Access information on Internet. • Discuss the reliability of information received on Internet sources. • Explain how film can 	<p>F. Use media for learning purposes.</p> <ul style="list-style-type: none"> • Describe how the media provides information that is sometimes accurate, sometimes biased based on a point of view or by the opinion or beliefs of the presenter. • Analyze the role of advertising in the media. 	<ul style="list-style-type: none"> • Use evaluation guides (e.g., National Issues Forum, Toastmasters) to evaluate group discussion (e.g., of peers, on television). <p>F. Use media for learning purposes.</p> <ul style="list-style-type: none"> • Use various forms of media to elicit information, to make a student presentation and to complete class assignments and projects. • Evaluate the role of media in focusing attention and forming

1.6. Speaking and Listening			
1.6.3. GRADE 3	1.6.5. GRADE 5	1.6.8. GRADE 8	1.6.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
	represent either accurate versions or fictional versions of the same event. <ul style="list-style-type: none"> • Explain the role of advertisers in the media. • Use a variety of images and sound to create an effective presentation on a topic. 	<ul style="list-style-type: none"> • Create a multi-media (e.g., film, music, computer-graphic) presentation for display or transmission. 	opinions. <ul style="list-style-type: none"> • Create a multi-media (e.g., film, music, computer-graphic) presentation for display or transmission that demonstrates an understanding of a specific topic or issue or teaches others about it.

1.7. Characteristics and Functions of the English Language			
1.7.3. GRADE 3	1.7.5. GRADE 5	1.7.8. GRADE 8	1.7.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Identify words from other languages that are commonly used English words.</p> <p>B. Identify variations in the dialogues of literary characters and relate them to differences in occupation or geographical location.</p>	<p>A. Identify words from other languages that are commonly used English words. Use a dictionary to find the meanings and origins of these words.</p> <p>B. Identify differences in formal and informal speech (e.g., dialect, slang, jargon).</p> <p>C. Identify word meanings that have changed over time (e.g., cool, mouse).</p>	<p>A. Describe the origins and meanings of common, learned and foreign words used frequently in English language (e.g., carte blanche, faux pas).</p> <p>B. Analyze the role and place of standard American English in speech, writing and literature.</p> <p>C. Identify new words that have been added to the English language over time.</p>	<p>A. Describe the influence of historical events on the English language.</p> <p>B. Analyze when differences in language are a source of negative or positive stereotypes among groups.</p> <p>C. Explain and evaluate the role and influence of the English language within and across countries.</p>

1.8. Research			
1.8.3. GRADE 3	1.8.5. GRADE 5	1.8.8. GRADE 8	1.8.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Select a topic for research.</p> <p>B. Locate information using appropriate sources and strategies.</p> <ul style="list-style-type: none"> • Locate resources for a particular task (e.g., newspapers, dictionary). • Select sources (e.g., dictionaries, encyclopedias, interviews to write a family history, observations, electronic media). • Use tables of contents, key words and guide words. 	<p>A. Select and refine a topic for research.</p> <p>B. Locate information using appropriate sources and strategies.</p> <ul style="list-style-type: none"> • Evaluate the usefulness and qualities of the sources. • Select appropriate sources (e.g., dictionaries, encyclopedias, other reference materials, interviews, observations, computer databases). • Use tables of contents, indices, key words, cross-references and 	<p>A. Select and refine a topic for research.</p> <p>B. Locate information using appropriate sources and strategies.</p> <ul style="list-style-type: none"> • Determine valid resources for researching the topic, including primary and secondary sources. • Evaluate the importance and quality of the sources. • Select essential sources (e.g., dictionaries, encyclopedias, other reference materials, interviews, 	<p>A. Select and refine a topic for research.</p> <p>B. Locate information using appropriate sources and strategies.</p> <ul style="list-style-type: none"> • Determine valid resources for researching the topic, including primary and secondary sources. • Evaluate the importance and quality of the sources. • Select sources appropriate to the breadth and depth of the research (e.g., dictionaries,

1.8. Research			
1.8.3. GRADE 3	1.8.5. GRADE 5	1.8.8. GRADE 8	1.8.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<ul style="list-style-type: none">• Use traditional and electronic search tools.	<p>appendices.</p> <ul style="list-style-type: none">• Use traditional and electronic search tools.	<p>observations, computer databases).</p> <ul style="list-style-type: none">• Use tables of contents, indices, key words, cross-references and appendices.• Use traditional and electronic search tools.	<p>thesauruses, other reference materials, interviews, observations, computer databases).</p> <ul style="list-style-type: none">• Use tables of contents, indices, key words, cross references and appendices.• Use traditional and electronic search tools.

1.8. Research			
1.8.3. GRADE 3	1.8.5. GRADE 5	1.8.8. GRADE 8	1.8.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Organize and present the main ideas from research.</p> <ul style="list-style-type: none"> • Take notes from sources using a structured format. • Summarize, orally or in writing, the main ideas. 	<p>C. Organize and present the main ideas from research.</p> <ul style="list-style-type: none"> • Take notes from sources using a structured format. • Present the topic using relevant information. • Credit sources using a structured format (e.g., author, title). 	<p>C. Organize, summarize and present the main ideas from research.</p> <ul style="list-style-type: none"> • Identify the steps necessary to carry out a research project. • Take relevant notes from sources. • Develop a thesis statement based on research. • Give precise, formal credit for others' ideas, images or information using a standard method of documentation. • Use formatting techniques to create an understandable presentation for a designated audience. 	<p>C. Organize, summarize and present the main ideas from research.</p> <ul style="list-style-type: none"> • Take notes relevant to the research topic. • Develop a thesis statement based on research. • Anticipate readers' problems or misunderstandings. • Give precise, formal credit for others' ideas, images or information using a standard method of documentation. • Use formatting techniques (e.g., headings, graphics) to aid reader understanding.

III. GLOSSARY

Alliteration:	The repetition of initial consonant sounds in neighboring words.
Allusion:	An implied or indirect reference in literature to a familiar person, place or event.
Analysis:	The process or result of identifying the parts of a whole and their relationships to one another.
Antonym:	A word that is the opposite of another word.
Characterization:	The method an author uses to reveal characters and their various personalities.
Compare:	Place together characters, situations or ideas to show common or differing features in literary selections.
Context clues:	Information from the reading that identifies a word or group of words.
Conventions of Language:	Mechanics, usage and sentence completeness.
Evaluate:	Examine and judge carefully.
Figurative language:	Language that cannot be taken literally since it was written to create a special effect or feeling.
Fluency:	The clear, easy, written or spoken expression of ideas. Freedom from word-identification problems which might hinder comprehension in silent reading or the expression of ideas in oral reading.
Focus:	The center of interest or attention.
Genre:	A category used to classify literary works, usually by form, technique or content (e.g., prose, poetry).
Graphic organizer:	A diagram or pictorial device that shows relationships.
Homophone:	One of two or more words pronounced alike, but different in spelling or meaning (e.g., hair/hare, scale (fish)/scale (musical)).
Hyperbole:	An exaggeration or overstatement (e.g., <i>I was so embarrassed I could have died.</i>).

Idiomatic language:	An expression peculiar to itself grammatically or that cannot be understood if taken literally (e.g., <i>Let's get on the ball.</i>).
Irony:	The use of a word or phrase to mean the exact opposite of its literal or usual meaning; incongruity between the actual result of a sequence of events and the expected result.
Literary conflict:	The struggle that grows out of the interplay of the two opposing forces in a plot.
Literary elements:	The essential techniques used in literature (e.g., characterization, setting, plot, theme).
Literary devices:	Tools used by the author to enliven and provide voice to the writing (e.g., dialogue, alliteration).
Literary structures:	The author's method of organizing text, (e.g., foreshadowing and flashbacks).
Metaphor:	The comparison of two unlike things in which no words of comparison (<i>like</i> or <i>as</i>) are used (e.g., <i>That new kid in class is really a squirrel.</i>).
Meter:	The repetition of stressed and unstressed syllables in a line of poetry.
Narrative:	A story, actual or fictional, expressed orally or in writing.
Paraphrase:	Restate text or passage in other words, often to clarify meaning or show understanding.
Pattern book:	A book with a predictable plot structure and often written with predictable text; also known as predictable book.
Personification:	An object or abstract idea given human qualities or human form (e.g., <i>Flowers danced about the lawn.</i>).
Phonics:	The relationship between letters and sounds fundamental in beginning reading.
Point of view:	The way in which an author reveals characters, events and ideas in telling a story; the vantage point from which the story is told.

Public document:	A document that focuses on civic issues or matters of public policy at the community level and beyond.
Reading critically:	Reading in which a questioning attitude, logical analysis and inference are used to judge the worth of text; evaluating relevancy and adequacy of what is read; the judgment of validity or worth of what is read, based on sound criteria.
Reading rate:	The speed at which a person reads, usually silently.
Research:	A systematic inquiry into a subject or problem in order to discover, verify or revise relevant facts or principles having to do with that subject or problem.
Satire:	A literary tone used to ridicule or make fun of human vice or weakness.
Self-monitor:	Know when what one is reading or writing is not making sense; adjust strategies for comprehension.
Semantics:	The study of meaning in language.
Simile:	A comparison of two unlike things in which a word of comparison (<i>like</i> or <i>as</i>) is used (e.g., <i>She eats like a bird.</i>).
Sources:	
<i>Primary:</i>	Text and/or artifacts that tell or show a first-hand account of an event; original works used when researching.
<i>Secondary:</i>	Text and/or artifacts used when researching that are derived from something original.
Subject area:	An organized body of knowledge; a discipline; a content area.
Style:	How an author writes; an author's use of language, its effects and appropriateness to the author's intent and theme.
Synonym:	One of two or more words in a language that have highly similar meanings (e.g., sorrow, grief, sadness).
Syntax:	The pattern or structure of word order in sentences, clauses and phrases.

Theme:	A topic of discussion or writing; a major idea broad enough to cover the entire scope of a literary work.
Thesis:	The basic argument advanced by a speaker or writer who then attempts to prove it; the subject or major argument of a speech or composition.
Tone:	The attitude of the author toward the audience and characters (e.g., serious or humorous).
Voice:	The fluency, rhythm and liveliness in writing that makes it unique to the writer.

Academic Standards for Mathematics

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V. INTRODUCTION

This document includes Mathematics Standards:

- 2.1. Numbers, Number Systems and Number Relationships
- 2.2. Computation and Estimation
- 2.3. Measurement and Estimation
- 2.4. Mathematical Reasoning and Connections
- 2.5. Mathematical Problem Solving and Communication
- 2.6. Statistics and Data Analysis
- 2.7. Probability and Predictions
- 2.8. Algebra and Functions
- 2.9. Geometry
- 2.10. Trigonometry
- 2.11. Concepts of Calculus

The Mathematics Standards describe what students should know and be able to do at four grade levels (third, fifth, eighth and eleventh). They reflect the increasing complexity and sophistication that students are expected to achieve as they progress through school.

This document avoids repetition of learned skills, making an obvious progression across grade levels less explicit. Teachers shall expect that students know and can apply the concepts and skills expressed at the preceding level. Consequently, previous learning is reinforced but not retaught.

Students who achieve these mathematical standards will be able to communicate mathematically. Although it is an interesting and enjoyable study for its own sake, mathematics is most appropriately used as a tool to help organize and understand information from other academic disciplines. Because our capacity to deal with all things mathematical is changing rapidly, students must be able to bring the most modern and effective technology to bear on their learning of mathematical concepts and skills.

A glossary is included to assist the reader in understanding terminology contained in the standards.

2.1. Numbers, Number Systems and Number Relationships			
2.1.3. GRADE 3	2.1.5. GRADE 5	2.1.8. GRADE 8	2.1.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Count using whole numbers (to 10,000) and by 2's, 3's, 5's, 10's, 25's and 100's.</p> <p>B. Use whole numbers and fractions to represent quantities.</p> <p>C. Represent equivalent forms of the same number through the use of concrete objects, drawings, word names and symbols.</p>	<p>A. Use expanded notation to represent whole numbers or decimals.</p> <p>B. Apply number theory concepts to rename a number quantity (e.g., six, $\frac{12}{2}$, 3×2, $10 - 4$).</p> <p>C. Demonstrate that mathematical operations can represent a variety of problem situations.</p>	<p>A. Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).</p> <p>B. Simplify numerical expressions involving exponents, scientific notation and using order of operations.</p> <p>C. Distinguish between and order rational and irrational numbers.</p>	<p>A. Use operations (e.g., opposite, reciprocal, absolute value, raising to a power, finding roots, finding logarithms).</p>

2.1. Numbers, Number Systems and Number Relationships			
2.1.3. GRADE 3	2.1.5. GRADE 5	2.1.8. GRADE 8	2.1.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
D. Use drawings, diagrams or models to show the concept of fraction as part of a whole.	D. Use models to represent fractions and decimals.	D. Apply ratio and proportion to mathematical problem situations involving distance, rate, time and similar triangles.	
E. Count, compare and make change using a collection of coins and one-dollar bills.	E. Explain the concepts of prime and composite numbers.	E. Simplify and expand algebraic expressions using exponential forms.	
F. Apply number patterns (even and odd) and compare values of numbers on the hundred board.	F. Use simple concepts of negative numbers (e.g., on a number line, in counting and in temperature).	F. Use the number line model to demonstrate integers and their applications.	

2.1. Numbers, Number Systems and Number Relationships			
2.1.3. GRADE 3	2.1.5. GRADE 5	2.1.8. GRADE 8	2.1.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
G. Use concrete objects to count, order and group. H. Demonstrate understanding of one-to-one correspondence. I. Apply place-value concepts and numeration to counting, ordering and grouping. J. Estimate, approximate, round or use exact numbers as appropriate.	G. Develop and apply number theory concepts (e.g., primes, factors, multiples, composites) to represent numbers in various ways.	G. Use the inverse relationships between addition, subtraction, multiplication, division, exponentiation and root extraction to determine unknown quantities in equations.	

2.1. Numbers, Number Systems and Number Relationships			
2.1.3. GRADE 3	2.1.5. GRADE 5	2.1.8. GRADE 8	2.1.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
K. Describe the inverse relationship between addition and subtraction.			
L. Demonstrate knowledge of basic facts in four basic operations.			

2.2. Computation and Estimation			
2.2.3. GRADE 3	2.2.5. GRADE 5	2.2.8. GRADE 8	2.2.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
A. Apply addition and subtraction in everyday situations using concrete objects.	A. Create and solve word problems involving addition, subtraction, multiplication and division of whole numbers.	A. Complete calculations by applying the order of operations.	A. Develop and use computation concepts, operations and procedures on real numbers in problem solving situations.
B. Solve single- and double-digit addition and subtraction problems with regrouping in vertical form.	B. Develop and apply algorithms to solve word problems that involve addition, subtraction, and/or multiplication with decimals with and without regrouping.	B. Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.	B. Use estimation to solve problems for which exact answer is not needed.

2.2. Computation and Estimation			
2.2.3. GRADE 3	2.2.5. GRADE 5	2.2.8. GRADE 8	2.2.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Demonstrate the concept of multiplication as repeated addition and arrays.</p> <p>D. Demonstrate the concept of division as repeated subtraction and as sharing.</p> <p>E. Use estimation skills to arrive at conclusions.</p>	<p>C. Develop and apply algorithms to solve word problems that involve addition, subtraction, and/or multiplication with fractions and mixed numbers that include like and unlike denominators.</p> <p>D. Demonstrate the ability to round numbers.</p> <p>E. Determine through estimations the reasonableness of answers to problems involving addition, subtraction, multiplication and division of whole numbers.</p>	<p>C. Estimate the value of irrational numbers.</p> <p>D. Estimate amount of tips and discounts using ratios, proportions and percents.</p> <p>E. Determine the appropriateness of overestimating or underestimating in computation.</p>	<p>C. Construct and apply mathematical models, including lines and curves of best fit, to estimate values of related quantities.</p> <p>D. Describe and explain the amount of error that may exist in a computation using estimates.</p> <p>E. Recognize that the degree of precision needed in calculating a number depends on how the results will be used and the instruments used to generate the measure.</p>

2.2. Computation and Estimation			
2.2.3. GRADE 3	2.2.5. GRADE 5	2.2.8. GRADE 8	2.2.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
F. Determine the reasonableness of calculated answers. G. Explain addition and subtraction algorithms with regrouping.	F. Demonstrate skills for using fraction calculators to verify conjectures, confirm computations and explore complex problem-solving situations. G. Apply estimation strategies to a variety of problems including time and money. H. Explain multiplication and division algorithms. I. Select a method for computation and explain why it is appropriate.	F. Identify the difference between exact value and approximation and determine which is appropriate for a given situation.	F. Demonstrate skills for using computer spreadsheets and scientific and graphing calculators.

2.3. Measurement and Estimation			
2.3.3. GRADE 3	2.3.5. GRADE 5	2.3.8. GRADE 8	2.3.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
<p>A. Compare measurable characteristics of different objects on the same dimensions (e.g., time, temperature, area, length, weight, capacity, perimeter).</p> <p>B. Determine the measurement of objects with nonstandard and standard units (e.g., US customary and metric).</p> <p>C. Determine and compare elapsed times.</p> <p>D. Tell time (analog and digital) to the minute.</p>	<p>A. Select and use appropriate instruments and units for measuring quantities (e.g., perimeter, volume, area, weight, time, temperature).</p> <p>B. Select and use standard tools to measure the size of figures with specified accuracy, including length, width, perimeter and area.</p> <p>C. Estimate, refine and verify specified measurements of objects.</p> <p>D. Convert linear measurements within the same system.</p>	<p>A. Develop formulas and procedures for determining measurements (e.g., area, volume, distance).</p> <p>B. Solve rate problems (e.g., rate x time = distance, principal x interest rate = interest).</p> <p>C. Measure angles in degrees and determine relations of angles.</p> <p>D. Estimate, use and describe measures of distance, rate, perimeter, area, volume, weight, mass and angles.</p>	<p>A. Select and use appropriate units and tools to measure to the degree of accuracy required in particular measurement situations.</p> <p>B. Measure and compare angles in degrees and radians.</p> <p>C. Demonstrate the ability to produce measures with specified levels of precision.</p>

2.3. Measurement and Estimation			
2.3.3. GRADE 3	2.3.5. GRADE 5	2.3.8. GRADE 8	2.3.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
E. Determine appropriate unit of measure. F. Use concrete objects to determine area and perimeter. G. Estimate and verify measurements. Demonstrate that a single object has different attributes that can be measured in different ways (e.g. length, mass, weight, time, area, temperature, capacity, perimeter).	E. Add and subtract measurements.	E. Describe how a change in linear dimension of an object affects its perimeter, area and volume. F. Use scale measurements to interpret maps or drawings. G. Create and use scale models.	

2.4. Mathematical Reasoning and Connections			
2.4.3. GRADE 3	2.4.5. GRADE 5	2.4.8. GRADE 8	2.4.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
<p>A. Make, check and verify predictions about the quantity, size and shape of objects and groups of objects.</p> <p>B. Use measurements in everyday situations (e.g., determine the geography of the school building).</p>	<p>A. Compare quantities and magnitudes of numbers.</p> <p>B. Use models, number facts, properties and relationships to check and verify predictions and explain reasoning.</p> <p>C. Draw inductive and deductive conclusions within mathematical contexts.</p> <p>D. Distinguish between relevant and irrelevant information in a mathematical problem.</p>	<p>A. Make conjectures based on logical reasoning and test conjectures by using counter-examples.</p> <p>B. Combine numeric relationships to arrive at a conclusion.</p> <p>C. Use if . . . then statements to construct simple valid arguments.</p> <p>D. Construct, use and explain algorithmic procedures for computing and estimating with whole numbers, fractions, decimals and integers.</p>	<p>A. Use direct proofs, indirect proofs or proof by contradiction to validate conjectures.</p> <p>B. Construct valid arguments from stated facts.</p> <p>C. Determine the validity of an argument.</p> <p>D. Use truth tables to reveal the logic of mathematical statements.</p>

2.4. Mathematical Reasoning and Connections			
2.4.3. GRADE 3	2.4.5. GRADE 5	2.4.8. GRADE 8	2.4.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
	E. Interpret statements made with precise language of logic (e.g., "all," "or," "every," "none," "some," "or," "many"). F. Use statistics to quantify issues (e.g., in social studies, in science).	E. Distinguish between inductive and deductive reasoning. F. Use measurements and statistics to quantify issues (e.g., in family and consumer science situations).	E. Demonstrate mathematical solutions to problems (e.g., in the physical sciences).

2.5. Mathematical Problem Solving and Communication			
2.5.3. GRADE 3	2.5.5. GRADE 5	2.5.8. GRADE 8	2.5.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
<p>A. Use appropriate problem-solving strategies (e.g., guess and check, working backwards).</p> <p>B. Determine when sufficient information is present to solve a problem and explain how to solve a problem.</p>	<p>A. Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense and explain how the problem was solved.</p> <p>B. Use appropriate mathematical terms, vocabulary, language symbols and graphs to clearly and logically explain solutions to problems.</p>	<p>A. Invent, select, use and justify the appropriate methods, materials and strategies used to solve problems.</p> <p>B. Verify and interpret results using precise mathematical language, notation and representations, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs and diagrams.</p>	<p>A. Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.</p> <p>B. Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas and results.</p>

2.5. Mathematical Problem Solving and Communication			
2.5.3. GRADE 3	2.5.5. GRADE 5	2.5.8. GRADE 8	2.5.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
C. Select and use an appropriate method, materials and strategy to solve problems, including mental mathematics, paper and pencil and concrete objects.	C. Show ideas in a variety of ways, including words, numbers, symbols, pictures, charts, graphs, tables, diagrams and models. D. Connect, extend and generalize problem solutions to other concepts, problems and circumstances in mathematics. E. Select, use and justify the methods, materials and strategies used to solve problems.	C. Justify strategies and defend approaches used and conclusions reached. D. Determine pertinent information in problem situations and whether any further information is needed for solution.	C. Present mathematical procedures and results clearly, systematically, succinctly and correctly. D. Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.

2.5. Mathematical Problem Solving and Communication			
2.5.3. GRADE 3	2.5.5. GRADE 5	2.5.8. GRADE 8	2.5.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
	F. Use appropriate problem-solving strategies (e.g., solving a simpler problem, drawing a picture or diagram.		

2.6. Statistics and Data Analysis			
2.6.3. GRADE 3	2.6.5. GRADE 5	2.6.8. GRADE 8	2.6.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
<p>A. Gather, organize and display data using pictures, tallies, charts, bar graphs and pictographs.</p> <p>B. Formulate and answer questions based on data shown on graphs.</p> <p>C. Predict the likely number of times a condition will occur based on the analyzed data.</p>	<p>A. Organize and display data using pictures, tallies, tables, charts, bar graphs and circle graphs.</p> <p>B. Describe data sets using mean, median, mode and range.</p> <p>C. Sort data using Venn diagrams.</p>	<p>A. Compare and contrast different plots of data using values of mean, median, mode, quartiles and range.</p> <p>B. Explain effects of sampling procedures and missing or incorrect information on reliability.</p> <p>C. Fit a line to the scatter plot of two quantities and describe any correlation of the variables.</p>	<p>A. Design and conduct an experiment using random sampling. Describe the data as an example of a distribution using statistical measures of center and spread. Organize and represent the results with graphs. (Use standard deviation, variance and t-tests).</p> <p>B. Use appropriate technology to organize and analyze data taken from the local community.</p> <p>C. Determine the regression equation of best fit (e.g., linear, quadratic and exponential).</p>

2.6. Statistics and Data Analysis			
2.6.3. GRADE 3	2.6.5. GRADE 5	2.6.8. GRADE 8	2.6.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
<p>D. Form and justify an opinion on whether a given statement is reasonable based on a comparison to data.</p>	<p>D. Predict the likely number of times a condition will occur based on analyzed data.</p> <p>E. Construct and defend simple conclusions based on data.</p>	<p>D. Design and carry out a random sampling procedure.</p> <p>E. Analyze and display data in stem-and-leaf and box-and-whisker plots.</p> <p>F. Use scientific and graphing calculators and computer spreadsheets to organize and analyze data.</p> <p>G. Determine the validity of the sampling method described in studies published in local or National newspapers.</p>	<p>D. Make predictions using interpolation, extrapolation, regression and estimation using technology to verify them.</p> <p>E. Determine the validity of the sampling method described in a given study.</p> <p>F. Determine the degree of dependence of two quantities specified by a two-way table.</p> <p>G. Describe questions of experimental design, control groups, treatment groups, cluster sampling and reliability.</p>

2.6. Statistics and Data Analysis			
2.6.3. GRADE 3	2.6.5. GRADE 5	2.6.8. GRADE 8	2.6.11. GRADE 11
<i>Pennsylvania’s public schools shall teach, challenge and support every student to realize the student’s maximum potential and to acquire the knowledge and skills to:</i>			
			H. Use sampling techniques to draw inferences about large populations. I. Describe the normal curve and use its properties to answer questions about sets of data that are assumed to be normally distributed.

2.7. Probability and Predictions			
2.7.3. GRADE 3	2.7.5. GRADE 5	2.7.8. GRADE 8	2.7.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Predict and measure the likelihood of events and recognize that the results of an experiment may not match predicted outcomes.</p> <p>B. Design a fair and an unfair spinner.</p> <p>C. List or graph the possible results of an experiment.</p>	<p>A. Perform simulations with concrete devices (e.g., dice, spinner) to predict the chance of an event occurring.</p> <p>B. Determine the fairness of the design of a spinner.</p> <p>C. Express probabilities as fractions and decimals.</p>	<p>A. Determine the number of combinations and permutations for an event.</p> <p>B. Present the results of an experiment using visual representations (e.g., tables, charts, graphs).</p> <p>C. Analyze predictions (e.g., election polls).</p>	<p>A. Compare odds and probability.</p> <p>B. Apply probability and statistics to perform an experiment involving a sample and generalize its results to the entire population.</p> <p>C. Draw and justify a conclusion regarding the validity of a probability or statistical argument.</p>

2.7. Probability and Predictions			
2.7.3. GRADE 3	2.7.5. GRADE 5	2.7.8. GRADE 8	2.7.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
D. Analyze data using the concepts of largest, smallest, most often, least often and middle.	D. Compare predictions based on theoretical probability and experimental results. E. Calculate the probability of a simple event. F. Determine patterns generated as a result of an experiment. G. Determine the probability of an event involving "and," "or" or "not."	D. Compare and contrast results from observations and mathematical models. E. Make valid inferences, predictions and arguments based on probability.	D. Use experimental and theoretical probability distributions to make judgments about the likelihood of various outcomes in uncertain situations. E. Solve problems involving independent simple and compound events.

2.7. Probability and Predictions			
2.7.3. GRADE 3	2.7.5. GRADE 5	2.7.8. GRADE 8	2.7.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills needed to:</i>			
	<p>H. Predict and determine why some outcomes are certain, more likely, less likely, equally likely or impossible.</p> <p>I. Find all possible combinations and arrangements involving a limited number of variables.</p> <p>J. Develop a tree diagram and list the elements.</p>		

2.8. Algebra and Functions			
2.8.3. GRADE 3	2.8.5. GRADE 5	2.8.8. GRADE 8	2.8.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
<p>A. Recognize, describe, extend, create and replicate a variety of patterns including attribute, activity, number and geometric patterns.</p> <p>B. Use concrete objects and trial and error to solve number sentences and check if solutions are sensible and accurate.</p> <p>C. Substitute a missing addend in a number sentence.</p>	<p>A. Recognize, reproduce, extend, create and describe patterns, sequences and relationships verbally, numerically, symbolically and graphically, using a variety of materials.</p> <p>B. Connect patterns to geometric relations and basic number skills.</p> <p>C. Form rules based on patterns (e.g., an equation that relates pairs in a sequence).</p>	<p>A. Apply simple algebraic patterns to basic number theory and to spatial relations.</p> <p>B. Discover, describe and generalize patterns, including linear, exponential and simple quadratic relationships.</p> <p>C. Create and interpret expressions, equations or inequalities that model problem situations.</p>	<p>A. Analyze a given set of data for the existence of a pattern and represent the pattern algebraically and graphically.</p> <p>B. Give examples of patterns that occur in data from other disciplines.</p> <p>C. Use patterns, sequences and series to solve routine and nonroutine problems.</p>

2.8. Algebra and Functions			
2.8.3. GRADE 3	2.8.5. GRADE 5	2.8.8. GRADE 8	2.8.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
D. Create a story to match a given combination of symbols and numbers.	D. Use concrete objects and combinations of symbols and numbers to create expressions that model mathematical situations.	D. Use concrete objects to model algebraic concepts.	D. Formulate expressions, equations, inequalities, systems of equations, systems of inequalities and matrices to model routine and nonroutine problem situations.
E. Use concrete objects and symbols to model the concepts of variables, expressions, equations and inequalities.	E. Explain the use of combinations of symbols and numbers in expressions, equations and inequalities.	E. Select and use a strategy to solve an equation or inequality, explain the solution and check the solution for accuracy.	E. Use equations to represent curves (e.g., lines, circles, ellipses, parabolas, hyperbolas).
F. Explain the meaning of solutions and symbols.	F. Describe a realistic situation using information given in equations, inequalities, tables or graphs.	F. Solve and graph equations and inequalities using scientific and graphing calculators and computer spreadsheets.	F. Identify whether systems of equations and inequalities are consistent or inconsistent.

2.8. Algebra and Functions			
2.8.3. GRADE 3	2.8.5. GRADE 5	2.8.8. GRADE 8	2.8.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
G. Use a table or a chart to display information.	G. Select and use appropriate strategies, including concrete materials, to solve number sentences and explain the method of solution.	G. Represent relationships with tables or graphs in the coordinate plane and verbal or symbolic rules.	G. Analyze and explain systems of equations, systems of inequalities and matrices.
H. Describe and interpret the data shown in tables and charts.	H. Locate and identify points on a coordinate system.	H. Graph a linear function from a rule or table.	H. Select and use an appropriate strategy to solve systems of equations and inequalities using graphing calculators, symbol manipulators, spreadsheets and other software.
I. Demonstrate simple function rules.	I. Generate functions from tables of data and relate data to corresponding graphs and functions.	I. Generate a table or graph from a function and use graphing calculators and computer spreadsheets to graph and analyze functions.	I. Use matrices to organize and manipulate data, including matrix addition, subtraction, multiplication and scalar multiplication.

2.8. Algebra and Functions			
2.8.3. GRADE 3	2.8.5. GRADE 5	2.8.8. GRADE 8	2.8.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
J. Analyze simple functions and relationships and locate points on a simple grid.		J. Show that an equality relationship between two quantities remains the same as long as the same change is made to both quantities; explain how a change in one quantity determines another quantity in a functional relationship.	J. Demonstrate the connection between algebraic equations and inequalities and the geometry of relations in the coordinate plane. K. Select, justify and apply an appropriate technique to graph a linear function in two variables, including slope-intercept, x- and y-intercepts, graphing by transformations and the use of a graphing calculator.

2.8. Algebra and Functions			
2.8.3. GRADE 3	2.8.5. GRADE 5	2.8.8. GRADE 8	2.8.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
			<p>L. Write the equation of a line when given the graph of the line, two points on the line, or the slope of the line and a point on the line.</p> <p>M. Given a set of data points, write an equation for a line of best fit.</p> <p>N. Solve linear, quadratic and exponential equations both symbolically and graphically.</p> <p>O. Determine the domain and range of a relation, given a graph or set of ordered pairs.</p>

2.8. Algebra and Functions			
2.8.3. GRADE 3	2.8.5. GRADE 5	2.8.8. GRADE 8	2.8.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
			<p>P. Analyze a relation to determine whether a direct or inverse variation exists and represent it algebraically and graphically.</p> <p>Q. Represent functional relationships in tables, charts and graphs.</p> <p>R. Create and interpret functional models.</p> <p>S. Analyze properties and relationships of functions (e.g., linear, polynomial, rational, trigonometric, exponential, logarithmic).</p> <p>T. Analyze and categorize functions by their characteristics.</p>

2.9. Geometry			
2.9.3 GRADE 3	2.9.5. GRADE 5	2.9.8 GRADE 8	2.9.11 GRADE 11
<i>Pennsylvania's public school shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
<p>A. Name and label geometric shapes in two and three dimensions (e.g., circle/sphere, square/cube, triangle/pyramid, rectangle/prism).</p> <p>B. Build geometric shapes using concrete objects (e.g., manipulatives).</p> <p>C. Draw two- and three-dimensional geometric shapes and construct rectangles, squares and triangles on the geoboard and on graph paper satisfying specific criteria.</p>	<p>A. Give formal definitions of geometric figures.</p> <p>B. Classify and compare triangles and quadrilaterals according to sides or angles.</p> <p>C. Identify and measure circles, their diameters and radii.</p>	<p>A. Construct figures incorporating perpendicular and parallel lines, the perpendicular bisector of a line segment and an angle bisector using computer software.</p> <p>B. Draw, label, measure and list the properties of complementary, supplementary and vertical angles.</p> <p>C. Classify familiar polygons as regular or irregular up to a decagon.</p>	<p>A. Construct geometric figures using dynamic geometry tools (e.g., Geometer's Sketchpad, Cabri Geometre).</p> <p>B. Prove two triangles or two polygons are congruent or similar using algebraic, coordinate and deductive proofs.</p> <p>C. Identify and prove the properties of quadrilaterals involving opposite sides and angles, consecutive sides and angles and diagonals using deductive proofs.</p>

2.9. Geometry			
2.9.3 GRADE 3	2.9.5. GRADE 5	2.9.8 GRADE 8	2.9.11 GRADE 11
<i>Pennsylvania's public school shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
D. Find and describe geometric figures in real life.	D. Describe in words how geometric shapes are constructed.	D. Identify, name, draw and list all properties of squares, cubes, pyramids, parallelograms, quadrilaterals, trapezoids, polygons, rectangles, rhombi, circles, spheres, triangles, prisms and cylinders.	D. Identify corresponding parts in congruent triangles to solve problems.
E. Identify and draw lines of symmetry in geometric figures.	E. Construct two- and three-dimensional shapes and figures using manipulatives, geoboards and computer software.	E. Construct parallel lines, draw a transversal and measure and compare angles formed (e.g., alternate interior and exterior angles).	E. Solve problems involving inscribed and circumscribed polygons.
F. Identify symmetry in nature.	F. Find familiar solids in the environment and describe them.	F. Distinguish between similar and congruent polygons.	F. Use the properties of angles, arcs, chords, tangents and secants to solve problems involving circles.

2.9. Geometry			
2.9.3 GRADE 3	2.9.5. GRADE 5	2.9.8 GRADE 8	2.9.11 GRADE 11
<i>Pennsylvania's public school shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
<p>G. Fold paper to demonstrate the reflections about a line.</p> <p>H. Show relationships between and among figures using reflections.</p> <p>I. Predict how shapes can be changed by combining or dividing them.</p>	<p>G. Create an original tessellation.</p> <p>H. Describe the relationship between the perimeter and area of triangles, quadrilaterals and circles.</p> <p>I. Represent and use the concepts of line, point and plane.</p> <p>J. Define the basic properties of squares, pyramids, parallelograms, quadrilaterals, trapezoids, polygons, rectangles, rhombi, circles, triangles, cubes, prisms, spheres and cylinders.</p>	<p>G. Approximate the value of π (pi) through experimentation.</p> <p>H. Use simple geometric figures (e.g., triangles and squares) to create, through rotation, transformational figures in three dimensions.</p> <p>I. Generate transformations using computer software.</p> <p>J. Analyze geometric patterns (e.g., tessellations and sequences of shapes) and develop descriptions of the patterns.</p>	<p>G. Solve problems using analytic geometry.</p> <p>H. Construct a geometric figure and its image using various transformations.</p> <p>I. Model situations geometrically to formulate and solve problems.</p> <p>J. Analyze figures in terms of the kinds of symmetries they have.</p>

2.9. Geometry			
2.9.3 GRADE 3	2.9.5. GRADE 5	2.9.8 GRADE 8	2.9.11 GRADE 11
<i>Pennsylvania's public school shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
	<p>K. Analyze simple transformations of geometric figures and rotations of line segments.</p> <p>L. Identify properties of geometric figures (e.g., parallel, perpendicular, similar, congruent, symmetrical).</p>	<p>K. Analyze objects to determine if they illustrate tessellations, symmetry, congruence, similarity and scale.</p>	

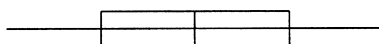
2.10. Trigonometry			
2.10.3 GRADE 3	2.10.5. GRADE 5	2.10.8 GRADE 8	2.10.11 GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
A. Identify right angles in the environment.	A. Identify and compare parts of right triangles including right angles, acute angles, hypotenuses and legs.	A. Compute measures of sides and angles using proportions, the Pythagorean Theorem and right triangle relationships.	A. Use graphing calculators to display periodic and circular functions; describe properties of the graphs.
B. Model right angles and right triangles using concrete objects.	B. Create right triangles on a geoboard.	B. Solve problems requiring indirect measurement for lengths of sides of triangles.	B. Identify, create and solve practical problems involving right triangles using the trigonometric functions and the Pythagorean Theorem.

2.11. Concepts of Calculus			
2.11.3 GRADE 3	2.11.5. GRADE 5	2.11.8 GRADE 8	2.11.11 GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
<p>A. Identify whole number quantities and measurements from least to most and greatest value.</p> <p>B. Identify least and greatest values represented in bar graphs and pictographs.</p> <p>C. Categorize rates of change as faster and slower.</p> <p>D. Continue a pattern of numbers or objects that could be extended infinitely.</p>	<p>A. Make comparisons of numbers (e.g., more, less, same, least, most, greater than, less than).</p> <p>B. Identify least and greatest values represented in bar and circle graphs.</p> <p>C. Identify maximum and minimum.</p> <p>D. Describe the relationship between rates of change and time.</p>	<p>A. Analyze graphs of related quantities for minimum and maximum values and justify the findings.</p> <p>B. Describe the concept of unit rate, ratio, and slope in context of rate of change.</p> <p>C. Continue a pattern of numbers or objects that could be extended infinitely.</p>	<p>A. Determine maximum and minimum values of a function over a specified interval.</p> <p>B. Interpret maximum and minimum values in problem situations.</p> <p>C. Graph and interpret rates of growth/decay.</p> <p>D. Determine sums of finite sequences of numbers and infinite geometric series.</p>

2.11. Concepts of Calculus			
2.11.3 GRADE 3	2.11.5. GRADE 5	2.11.8 GRADE 8	2.11.11 GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize the student's maximum potential and to acquire the knowledge and skills to:</i>			
	<p>E. Estimate areas and volumes as the sums of areas of tiles and volumes of cubes.</p> <p>F. Describe the relationship between the size of the unit of measurement and the estimate of the areas and volumes.</p>		E. Estimate areas under curves using sequences of areas.

VI. GLOSSARY

Absolute value:	A number's distance from zero on a number line. The absolute value of 2 is equal to the absolute value of -2 .
Algorithm:	A method of performing an arithmetic operation.
Analog time:	Time displayed on a timepiece having hour and minute hands.
Array:	Arrangement of a series of items according to the values of the items, e.g., largest to smallest.
Box-and-whisker plot:	A graphic method for showing a summary of data using median, quartiles and extremes of data.



Combination:	A subset of the elements in a given set, without regard to the order in which those elements are arranged.
Composite number:	Any positive integer exactly divisible by one or more positive integers other than itself and 1.
Congruent:	Having the same shape and the same size.
Conjecture:	A statement believed to be true but not proved.
Coordinate system:	A method of locating points in the plane or in space by means of numbers. A point in the plane is located by its distances from both a horizontal and a vertical line called the axes. The horizontal line is called the x-axis. The vertical line is called the y-axis. The pairs of numbers are called ordered pairs. The first number, called the x-coordinate, designates the distance along the horizontal axis. The second number, called the y-coordinate, designates the distance along the vertical axis. The point at which the two axes intersect has the coordinates (0,0) and is called the origin.

Correlation:	A measure of the mutual relationship between two variables.
Customary system:	A system of weights and measures frequently used in the United States. The basic unit of weight is the pound; the basic unit of capacity is the quart.
Deductive reasoning:	The process of reasoning from statements accepted as true to reach a conclusion.
Direct variation:	Two variables are so related that their ratio remains constant.
Domain:	The set of all possible values for the unknown in an open sentence.
Equation:	A statement of equality between two mathematical expressions (e.g., $X + 5 = Y - 2$).
Equivalent forms:	Different forms of numbers that name the same number (e.g., fraction, decimal, percent as $1/2$, $.5$, 50%).
Expanded notation:	Involves writing the number in expanded form to show the value of each digit (e.g., $15,629 = 10,000 + 5,000 + 600 + 20 + 9$).
Exponential function:	A function whose general equation is $y = a \times b^x$ or $y = a \times b^{kx}$, where a , b and k stand for constants.
Exponent:	A numeral used to tell how many times a number or variable is used as a factor (e.g., a^2 , 2^n , y^x).
Expression:	A mathematical phrase that can include operations, numerals and variables. In algebraic terms: $2l + 3x$; in numeric terms: $13.4 - 4.7$.
Factor:	The number or variable multiplied in a multiplication expression.
Factorial:	The expression $n!$ (n factorial) is the product of all the numbers from 1 to n for any positive integer n .
Function:	A relation in which each value of an independent variable is associated with a unique value of the dependent value.

Geoboard:	A board with pegs aligned in grid fashion that permits rubber bands to be wrapped around pegs to form geometric figures.
Graphing calculator:	A calculator that will store and draw the graphs of several functions at once.
Independent events:	Events such that the outcome of the first event has no effect on the probabilities of the outcome of the second event (e.g., two tosses of the same coin are independent events).
Inductive reasoning:	Generalizations made from particular observations in a common occurrence.
Inequality:	A mathematical sentence that contains a symbol, (e.g., $>$, $<$, \geq , \leq or \neq) in which the terms on either side of the symbol are unequal (e.g., $x < y$, $7 > 3$, $n \geq 4$).
Infinite:	Has no end or goes on forever.
Integer:	A number that is a positive whole number, a negative whole number or zero.
Inverse:	A new conditional formed by negating both the antecedent and the consequent of a conditional.
Inverse operations:	Operations that undo each other (e.g., addition and subtraction are inverse operations; multiplication and division are inverse operations).
Inverse variation:	When the ratio of one variable to the reciprocal of the other is constant, one of them is said to vary inversely as the other.
Irrational number:	A number that cannot be written as a simple fraction. It is an infinite and nonrepeating decimal.
Limit:	A number to which the terms of a sequence get closer so that beyond a certain term all terms are as close as desired to that number.
Line of best fit:	The line that fits a set of data points with the smallest value for the sum of the squares of the errors (vertical distances) from the data points to the line; the regression line.

Linear function:	A function whose general equation is $y = mx + b$, where m and b stand for constants and $m \neq 0$.
Linear measurement:	Measurement in a straight line.
Logarithm:	The exponent indicating the power to which a fixed number, the base, must be raised to produce a given number. For example, if $n^x = a$, the logarithm of a , with n as the base, is x ; symbolically, $\log_n a = x$. If the base is 10, the log of 100 is 2.
Manipulatives:	Materials that allow students to explore mathematical concepts in a concrete mode.
Mathematical model:	A representation in the mathematical world of some phenomenon in the real world. It frequently consists of a function or relation specifying how two variables are related.
Matrix:	A rectangular array of numbers representing such things as the coefficients in a system of equations arranged in rows and columns.
Maximum:	The greatest number in a set of data.
Mean:	The sum of the set of numbers divided by n , the number of numbers in the set.
Median:	The number that lies in the middle when a set of numbers is arranged in order. If there are two middle values, the median is the mean of these values.
Metric system:	A system of measurement used throughout the world based on factors of 10. It includes measures of length, weight and capacity.
Minimum:	The least number in a set of data.
Missing addend:	A member of an addition number sentence in which that term is missing (e.g., $5 + \underline{\quad} = 8$).
Mode:	The number(s) that occurs most often in a set of numbers (e.g., in the set 1, 2, 3, 3, 5, 8; the mode is 3).
Multiple:	A number that is the product of a given integer and another integer (e.g., 6 and 9 are multiples of 3).

Normal curve:	A graphical plot of a mathematical function (frequency distribution) which is unimodal and symmetrical.
One-to-one correspondence:	When one and only one element of a second set is assigned to an element of a first set, all elements of the second set are assigned, and every element of the first set has an assignment, the mapping is called one-to-one (e.g., in the set Bill Clinton, George Bush, Ronald Reagan, Jimmy Carter, Hillary Clinton, Barbara Bush, Nancy Reagan and Rosalynn Carter, there is a one-to-one correspondence between the pairs.)
Open sentence:	A statement that contains at least one unknown. It becomes true or false when a quantity is substituted for the unknown (e.g., $x + 5 = 9$, $y - 2 = 7$).
Order of operations:	Rules for evaluating an expression: work first within parentheses; then calculate all powers, from left to right; then do multiplications or divisions, from left to right; then do additions and subtractions, from left to right.
Patterns:	Regularities in situations such as those in nature, events, shapes, designs and sets of numbers (e.g., spirals on pineapples, geometric designs in quilts, the number sequence 3, 6, 9, 12, . . .).
Permutation:	An arrangement of a given number of objects from a given set in which the order of the objects is significant.
Perpendicular lines:	Two lines that intersect to form right angles. (e.g., \perp , \lrcorner , \llcorner).
Plotting points:	Locating points by means of coordinates, or a curve by plotted points, representing an equation by means of a curve so constructed.
Polygon:	A union of segments connected end to end, so that each segment intersects exactly two others at its endpoints.



Powers:	A number expressed using an exponent. The number 5^3 is read five to the third power or five cubed.
Prime:	An integer greater than one whose only positive factors are 1 and itself (e.g., 2, 3, 5, 7, 11, 13, 17 and 19).
Probability:	A number from 0 to 1 that indicates how likely something is to happen.
Problem solving:	Finding ways to reach a goal when no routine path is apparent.
Proof by contradiction:	A proof in which, if s is to be proven, one reasons from not- s until a contradiction is deduced; from this it is concluded that not- s is false, which means that s is true.
Proportion:	An equation of the form $a/b = c/d$ that states that the two ratios are equivalent.
Quadrilateral:	A four-sided polygon.
Quartiles:	The three values that divide an ordered set into four subsets of approximately equal size. The second quartile is the median.
Radian:	A unit of angular measure equal to $1/2\pi$ of a complete revolution.
Range (1):	The difference between the greatest number and the least number in a set of data.
Range (2):	The set of output values for a function.
Rate of change:	The limit of the ratio of an increment of the function value at the point to that of the independent variable as the increment of the variable approaches zero.
Ratio:	A comparison of two numbers by division.
Rational numbers:	Any number that can be written in the form a/b where a is any interger and b is any integer except zero.

Real numbers:	The set consisting of all rational numbers and all irrational numbers.
Reasonableness:	Quality of a solution so that it is not extreme or excessive.
Reciprocal:	The fractional number that results from dividing one by the number.
Rectangular prism:	A three-dimensional figure whose sides are all rectangles; a box.
Reflection:	A transformation that produces the mirror image of a geometric figure.
Regression:	The line that represents the least deviation from the points in a scatter plot of data.
Regular polygon:	A polygon in which all sides have the same measure and all angles have the same measure.
Relation:	A set of ordered pairs.
Reliability:	The extent to which a measuring procedure yields the same results on repeated trials.
Repeated addition:	A model for multiplication (e.g., $2 + 2 + 2 = 3 \times 2$).
Rotation:	A transformation that maps every point in the plane to its image by rotating the plane around a fixed point or line.
Scientific calculator:	A calculator that represents very large or very small numbers in scientific notation and with the powering, factorial, square root, negative and reciprocal keys.
Scientific notation:	A way of writing a number of terms of an integer power of 10 multiplied by a number greater than or equal to 1 and less than 10.
Sequence:	A set of ordered quantities (e.g., positive integers).
Series:	The indicated sum of the terms of a sequence.
Similarity:	Having the same shape but not necessarily the same size.
Simple event:	An event whose probability can be obtained from consideration of a single occurrence (e.g., the tossing of a coin is a simple event).

Simulation: Modeling a real event without actually observing the event.

Slope: The slope of a line is the ratio of the change in y to the corresponding change in x ; the constant m in the linear function equation; rise/run.

Standard deviation: The square root of the variance.

Stem-and-leaf plot: A frequency distribution made by arranging data (e.g., student scores on a test were 98, 96, 85, 93, 83, 87, 85, 87, 93, 75, 77 and 83. This data are displayed in a stem-and-leaf plot below.

$$\begin{array}{r|l} 9 & 8, 6, 3, 3 \\ 8 & 7, 7, 5, 5, 3, 3 \\ 7 & 7, 5 \end{array}$$

Systems of equations: Two or more equations that are conditions imposed simultaneously on all the variables, but may or may not have common solutions (e.g., $x + y = 2$, and $3x + 2y = 5$).

Symmetry: A line of symmetry separates a figure into two congruent halves, each of which is a reflection of the other (e.g., \emptyset , the line through the center of the circle divides it into congruent halves).

t-test: A statistical test done to test the difference of means of two samples.

Tessellation: A repetitive pattern of polygons that covers an area with no holes and no overlaps, like floor tiles.

Transformation: An operation on a geometric figure by which each point gives rise to a unique image.

Translation: A transformation that moves a geometric figure by sliding each of the points the same distance in the same direction.

Tree diagram: A diagram used to show the total number of possible outcomes in a probability experiment.

Trigonometric functions: A function (e.g., sine, cosine, tangent, cotangent, secant, cosecant) whose independent variable is an angle measure, usually in degrees or radians.

Valid argument:	An argument with the property no matter what statements are substituted in the premises, the truth value of the form is true. If the premises are true, then the conclusion is true.
Variable:	A symbol used to stand for any one of a given set of numbers or other objects (e.g., in the equation $y = x + 5$, y and x are variables).
Variance:	In a data set, the sum of the squared deviations divided by one less than the number of elements in the set (sample variance s^2) or by the number of elements in the set (population variance σ^2).
Vector:	A quantity that has both magnitude and direction (e.g., physical quantities such as velocity and force).
Venn diagram:	A display that pictures unions and intersections of sets.



Volume:	The amount of space enclosed in a space (3-dimensional) figure, measured in cubic units.
Y-intercept:	The y-intercept of a line is the y-coordinate of the point at which the graph of an equation crosses the y-axis.
π:	π , the ratio of the circumference of a circle to its diameter: about 3.1415926535.

**APPENDIX B Academic Standards for Science and Technology and
Environment and Ecology**

Source

The provisions of this Appendix B adopted January 4, 2002, effective January 5, 2002, 32 Pa.B. 17, unless otherwise noted

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VIII. INTRODUCTION

This document describes what students should know and be able to do in the following eight areas:

- 3.1. Unifying Themes of Science
- 3.2. Inquiry and Design
- 3.3. Biological Sciences
- 3.4. Physical Science, Chemistry and Physics
- 3.5. Earth Sciences
- 3.6. Technology Education
- 3.7. Technological Devices
- 3.8. Science, Technology and Human Endeavors

These standards describe what students should know and be able to do by the end of fourth, seventh, tenth and twelfth grade. In addition, these standards reflect the increasing complexity and sophistication that students are expected to achieve as they progress through school.

This document avoids repetition, making an obvious progression across grade levels less explicit. Teachers shall expect that students know and can apply the concepts and skills expressed at the preceding level. Consequently, previous learning is reinforced but not retaught.

Standards are arranged by categories, for example, 3.5 Earth Science. Under each category are standard statements that are preceded by a capital letter; for example, in 3.1 Unifying Themes, grade 10.B, “Describe concepts of models as a way to predict and understand science and technology.” Following the standard statements are bulleted standard descriptors, which explain the nature and scope of the standard. Descriptors specify the nature of the standard and the level of complexity needed in meeting that standard in a proficient manner. Descriptors

serve to benchmark the standard statement. Curriculum, instruction and assessment should focus on meeting the standard statement. Technology education, computer applications and science are separate curricular areas. Meeting standards should be approached as a collaborative effort among all curricular areas.

The following descriptors explain the intent of each standard category:

- 3.1. Unifying Themes** Unifying themes of science and technology provide big ideas that integrate with significant concepts. There are only a few fundamental concepts and processes that form the framework upon which science and technology knowledges are organized—motion and forces, energy, structure of matter, change over time and machines. These themes create the context through which the content of the disciplines can be taught and are emphasized in each standard.
- 3.2. Inquiry and Design** The nature of science and technology is characterized by applying process knowledge that enables students to become independent learners. These skills include observing, classifying, inferring, predicting, measuring, computing, estimating, communicating, using space/time relationships, defining operationally, raising questions, formulating hypotheses, testing and experimenting, designing controlled experiments, recognizing variables, manipulating variables, interpreting data, formulating models, designing models, and producing solutions. Everyone can use them to solve real-life problems. These process skills are developed across the grade levels and differ in the degree of sophistication, quantitative nature and application to the content.
- 3.3. Biological Sciences** Biology concerns living things, their appearance, different types of life, the scope of their similarities and differences, where they live and how they live. Living things are made of the same components as all other matter, involve the same kinds of transformations of energy and move using the same basic kinds of forces as described in chemistry and physics standards. Through the study of the diversity of life, students learn to understand how life has changed over a long period of time. This great variety of life forms continues to change even today as genetic instructions within cells are passed from generation to generation, yet the amazing integrity of most species remain.

- 3.4. Physical Science Chemistry and Physics** Physics and chemistry involve the study of objects and their properties. Students examine changes to materials during mixing, freezing, heating and dissolving and then learn how to observe and measure results. In chemistry students study the relationship between matter, atomic structure and its activity. Laboratory investigations of the properties of substances and their changes through a range of chemical interactions provide a basis for students to understand atomic theory and a variety of reaction types and their applications in business, agriculture and medicine. Physics deepens the understanding of the structure and properties of materials and includes atoms, waves, light, electricity, magnetism and the role of energy, forces and motion.
- 3.5. Earth Sciences** The dynamics of earth science include the studies of forces of nature that build the earth and wear down the earth. The understanding of these concepts uses principles from physical sciences, geography and mathematics.
- 3.6. Technology Education** Technology education is the use of accumulated knowledge to process resources to meet human needs and improve the quality of life. Students develop the ability to select and correctly use materials, tools, techniques and processes to answer questions, understand explanations and solve problems encountered in real life situations. These overriding themes require students to design, create, use, evaluate and modify systems of Biotechnologies, Information Technologies, and Physical Technologies.
- 3.7. Technological Devices** Students use tools to observe, measure, move and make things. New technological tools and techniques make it possible to enact far-reaching changes in our world. Technology enhances the students' abilities to identify problems and determine solutions. Computers play an integral role in every day life by extending our abilities to collect, analyze and communicate information and ideas.
- 3.8. Science, Technology and Human Endeavors** Scientific knowledge and societal needs often create a demand for new technology. Conversely, new technology advances scientific knowledge. Both influence society through the impact of their products and processes.

What Is Science? Any study of science includes the search for understanding the natural world and facts, principles, theories and laws that have been verified by the scientific community and are used to explain and predict natural phenomena and events.

Acquiring scientific knowledge involves constructing hypotheses using observation and knowledge in the content area in order to formulate useful questions that provoke scientific inquiry. As a result of repeated, rigorous testing over time and applying multiple perspectives to a problem, consistent information emerges. A theory describes this verifiable event or phenomena. Theories are powerful elements in science and are used to predict other events. As theories lose their ability to predict, they are modified, expanded or generalized or incorporated into a broader theory.

Knowledge of what science is incorporates carefully developed and integrated components:

- **Nature of science**—the ways in which scientists search for answers to questions and explanations of observations about the natural world; includes process knowledge of observing, classifying, inferring, predicting, measuring, hypothesizing, experimenting and interpreting data

- **Unifying themes of science**—concepts, generalizations and principles that result from and lead to inquiry

- **Knowledge**—facts, principles, theories and laws verifiable through scientific inquiry by the world community of scientists; includes physics, chemistry, earth science and biological sciences

- **Inquiry**—an intellectual process of logic that includes verification of answers to questions about and explanations for natural objects, events and phenomena

- **Process skills**—Recognition by students how knowledge is acquired and applied in science by observing, classifying, inferring, predicting, measuring, computing, estimating, communicating, using space/time relationships, defining operationally, formulating hypotheses, testing and experimenting, designing controlled experiments, recognizing variables, manipulating variables, interpreting data, formulating models, designing models and producing solutions.

- **Problem solving**—application of concepts to problems of human adaptation to the environment that often leads to recognition of new problems; has social implications and leads to personal decision-making and action; a process which forms the link for interactions between scientific and technological results or findings; involves operational definitions, recognizing variables, formulating models and asking questions

- **Scientific thinking**—the disposition to suspend judgment, not make decisions and not take action until results, explanations or answers have been tested and verified with information.

What Is Technology Education? It is the means by which we teach technology. Technology is a body of knowledge separate from but related to the sciences,

with specific content, curriculum and specific certification requirements. Technology is the application of tools, materials, processes and systems by humans to solve problems and provide benefits to humankind. We use technology in an attempt to improve our environment. These improvements may relate to survival needs (e.g., food, shelter, defense) or they may relate to human aspirations (e.g., knowledge, art, control). They can include unexpected benefits, unexpected costs and unexpected risks.

Technology education involves a broad spectrum of knowledge and activities. Effective technology education combines knowledge of content, process and skills to provide students with a holistic approach to learning. Technology education offers unique opportunities to apply numerous academic concepts through practical, hands-on applications. Instructional technology, on the other hand, deals specifically with use of computers and different software to solve problems and communicate effectively. Knowledge of content, process and skills should be used together to effectively engage students and promote a complete understanding of the sciences, related technologies and their interrelationship. The relationship between science and technology is one where science builds principles or theories and technology provides the practical application of those principles or theories.

Knowledge of content, process and skills in technology involves learning processes that include these components:

- Methods of designing and developing solutions
- Standards for selecting and using appropriate materials, tools and processes
- Experimental and design specifications for testing and evaluating solutions
- Criteria for judging the performance and impact of the solutions
- Evaluating the impact of modifying a system to improve performance.

Technology education can be divided into three main systems that include biotechnological, informational, and physical technologies:

Biotechnological Systems

Bioconversion
 Bioprocessing
 Environment
 Ergonomics
 Engineering/Design Systems
 Research and Development

Informational Systems

Computer-Aided Drafting/Design (CADD)
 Drafting & Design
 Desktop Publishing
 Electronic Communications Engineering/Design Systems
 Graphic Communications
 Communications Systems
 Multimedia Technology
 Networking Systems
 Research and Development
 Video and Television
 Production
 World Wide Web
 Design & Publishing

Physical Systems

Automation/Robotics
 Computer-Aided and Integrated Manufacturing (CAM/CIM)
 Construction
 Electronic Circuits/Control Systems
 Energy Systems
 Architecture and Community Planning
 Engineering/Design Systems
 Enterprise Organization & Operation
 Manufacturing
 Material Processes
 Research and Development
 Transportation

3.1. Unifying Themes			
3.1.4. GRADE 4	3.1.7. GRADE 7	3.1.10. GRADE 10	3.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Know that natural and human-made objects are made up of parts.</p> <ul style="list-style-type: none"> Identify and describe what parts make up a system. Identify system parts that are natural and human-made (e.g., ball point pen, simple electrical circuits, plant anatomy). Describe the purpose of analyzing systems. Know that technologies include physical technology systems (e.g., construction, manufacturing, transportation), informational systems and biochemical-related systems. 	<p>A. Explain the parts of a simple system and their relationship to each other.</p> <ul style="list-style-type: none"> Describe a system as a group of related parts that work together to achieve a desired result (e.g., digestive system). Explain the importance of order in a system. Distinguish between system inputs, system processes and system outputs. Distinguish between open loop and closed loop systems. Apply systems analysis to solve problems. 	<p>A. Discriminate among the concepts of systems, subsystems, feedback and control in solving technological problems.</p> <ul style="list-style-type: none"> Identify the function of subsystems within a larger system (e.g., role of thermostat in an engine, pressure switch). Describe the interrelationships among inputs, processes, outputs, feedback and control in specific systems. Explain the concept of system redesign and apply it to improve technological systems. Apply the universal systems model to illustrate specific solutions and troubleshoot specific problems. Analyze and describe the effectiveness of systems to solve specific problems. 	<p>A. Apply concepts of systems, subsystems, feedback and control to solve complex technological problems.</p> <ul style="list-style-type: none"> Apply knowledge of control systems concept by designing and modeling control systems that solve specific problems. Apply systems analysis to predict results. Analyze and describe the function, interaction and relationship among subsystems and the system itself. Compare and contrast several systems that could be applied to solve a single problem. Evaluate the causes of a system's inefficiency.

3.1. Unifying Themes			
3.1.4. GRADE 4	3.1.7. GRADE 7	3.1.10. GRADE 10	3.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>B. Know models as useful simplifications of objects or processes.</p> <ul style="list-style-type: none"> • Identify different types of models. • Identify and apply models as tools for prediction and insight. • Apply appropriate simple modeling tools and techniques. • Identify theories that serve as models (e.g., molecules). 	<p>B. Describe the use of models as an application of scientific or technological concepts.</p> <ul style="list-style-type: none"> • Identify and describe different types of models and their functions. • Apply models to predict specific results and observations (e.g., population growth, effects of infectious organisms). • Explain systems by outlining a system's relevant parts and its purpose and/or designing a model that illustrates its function. 	<p>B. Describe concepts of models as a way to predict and understand science and technology.</p> <ul style="list-style-type: none"> • Distinguish between different types of models and modeling techniques and apply their appropriate use in specific applications (e.g., kinetic gas theory, DNA). • Examine the advantages of using models to demonstrate processes and outcomes (e.g., blue print analysis, structural stability). • Apply mathematical models to science and technology. 	<p>B. Apply concepts of models as a method to predict and understand science and technology.</p> <ul style="list-style-type: none"> • Evaluate technological processes by collecting data and applying mathematical models (e.g., process control). • Apply knowledge of complex physical models to interpret data and apply mathematical models. • Appraise the importance of computer models in interpreting science and technological systems.

3.1. Unifying Themes			
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<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>C. Illustrate patterns that regularly occur and reoccur in nature.</p> <ul style="list-style-type: none"> • Identify observable patterns (e.g., growth patterns in plants, crystal shapes in minerals, climate, structural patterns in bird feathers). • Use knowledge of natural patterns to predict next occurrences (e.g., seasons, leaf patterns, lunar phases). 	<p>C. Identify patterns as repeated processes or recurring elements in science and technology.</p> <ul style="list-style-type: none"> • Identify different forms of patterns and use them to group and classify specific objects. • Identify repeating structure patterns. • Identify and describe patterns that occur in physical systems (e.g., construction, manufacturing, transportation), informational systems and biochemical-related systems. 	<p>C. Apply patterns as repeated processes or recurring elements in science and technology.</p> <ul style="list-style-type: none"> • Examine and describe recurring patterns that form the basis of biological classification, chemical periodicity, geological order and astronomical order. • Examine and describe stationary physical patterns. • Examine and describe physical patterns in motion. 	<p>C. Assess and apply patterns in science and technology.</p> <ul style="list-style-type: none"> • Assess and apply recurring patterns in natural and technological systems. • Compare and contrast structure and function relationships as they relate to patterns. • Assess patterns in nature using mathematical formulas.

3.1. Unifying Themes			
3.1.4. GRADE 4	3.1.7. GRADE 7	3.1.10. GRADE 10	3.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>D. Know that scale is an important attribute of natural and human made objects, events and phenomena.</p> <ul style="list-style-type: none"> Identify the use of scale as it relates to the measurement of distance, volume and mass. Describe scale as a ratio (e.g., map scales). Explain the importance of scale in producing models and apply it to a model. 	<p>D. Explain scale as a way of relating concepts and ideas to one another by some measure.</p> <ul style="list-style-type: none"> Apply various applications of size and dimensions of scale to scientific, mathematical, and technological applications. Describe scale as a form of ratio and apply to a life situation. 	<p>D. Apply scale as a way of relating concepts and ideas to one another by some measure.</p> <ul style="list-style-type: none"> Apply dimensional analysis and scale as a ratio. Convert one scale to another. 	<p>D. Analyze scale as a way of relating concepts and ideas to one another by some measure.</p> <ul style="list-style-type: none"> Compare and contrast various forms of dimensional analysis. Assess the use of several units of measurement to the same problem. Analyze and apply appropriate measurement scales when collecting data.

3.1. Unifying Themes			
3.1.4. GRADE 4	3.1.7. GRADE 7	3.1.10. GRADE 10	3.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>E. Recognize change in natural and physical systems.</p> <ul style="list-style-type: none"> Recognize change as fundamental to science and technology concepts. Examine and explain change by using time and measurement. Describe relative motion. Describe the change to objects caused by heat, cold, light or chemicals. 	<p>E. Identify change as a variable in describing natural and physical systems.</p> <ul style="list-style-type: none"> Describe fundamental science and technology concepts that could solve practical problems. Explain how ratio is used to describe change. Describe the effect of making a change in one part of a system on the system as a whole. 	<p>E. Describe patterns of change in nature, physical and man made systems.</p> <ul style="list-style-type: none"> Describe how fundamental science and technology concepts are used to solve practical problems (e.g., momentum, Newton's laws of universal gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, gas laws, feedback systems). Recognize that stable systems often involve underlying dynamic changes (e.g., a chemical reaction at equilibrium has molecules reforming continuously). 	<p>E. Evaluate change in nature, physical systems and man made systems.</p> <ul style="list-style-type: none"> Evaluate fundamental science and technology concepts and their development over time (e.g., DNA, cellular respiration, unified field theory, energy measurement, automation, miniaturization, Copernican and Ptolemaic universe theories). Analyze how models, systems and technologies have changed over time (e.g., germ theory, theory of evolution, solar system, cause of fire). Explain how correlation of variables does not necessarily imply causation.

3.1. Unifying Themes			
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		<ul style="list-style-type: none"> • Describe the effects of error in measurements. • Describe changes to matter caused by heat, cold, light or chemicals using a rate function. 	<ul style="list-style-type: none"> • Evaluate the patterns of change within a technology (e.g., changes in engineering in the automotive industry).

3.2. Inquiry and Design			
3.2.4. GRADE 4	3.2.7. GRADE 7	3.2.10. GRADE 10	3.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Identify and use the nature of scientific and technological knowledge.</p> <ul style="list-style-type: none"> • Distinguish between a scientific fact and a belief. • Provide clear explanations that account for observations and results. • Relate how new information can change existing perceptions. 	<p>A. Explain and apply scientific and technological knowledge.</p> <ul style="list-style-type: none"> • Distinguish between a scientific theory and a belief. • Answer “What if” questions based on observation, inference or prior knowledge or experience. • Explain how skepticism about an accepted scientific explanation led to a new understanding. • Explain how new information may change existing theories and practice. 	<p>A. Apply knowledge and understanding about the nature of scientific and technological knowledge.</p> <ul style="list-style-type: none"> • Compare and contrast scientific theories and beliefs. • Know that science uses both direct and indirect observation means to study the world and the universe. • Integrate new information into existing theories and explain implied results. 	<p>A. Evaluate the nature of scientific and technological knowledge.</p> <ul style="list-style-type: none"> • Know and use the ongoing scientific processes to continually improve and better understand how things work. • Critically evaluate the status of existing theories (e.g., germ theory of disease, wave theory of light, classification of subatomic particles, theory of evolution, epidemiology of AIDS).

3.2. Inquiry and Design			
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<p>B. Describe objects in the world using the five senses.</p> <ul style="list-style-type: none"> Recognize observational descriptors from each of the five senses (e.g., see-blue, feel-rough). Use observations to develop a descriptive vocabulary. 	<p>B. Apply process knowledge to make and interpret observations.</p> <ul style="list-style-type: none"> Measure materials using a variety of scales. Describe relationships by making inferences and predictions. Communicate, use space/time relationships, define operationally, raise questions, formulate hypotheses, test and experiment. Design controlled experiments, recognize variables, and manipulate variables. Interpret data, formulate models, design models, and produce solutions. 	<p>B. Apply process knowledge and organize scientific and technological phenomena in varied ways.</p> <ul style="list-style-type: none"> Describe materials using precise quantitative and qualitative skills based on observations. Develop appropriate scientific experiments: raising questions, formulating hypotheses, testing, controlled experiments, recognizing variables, manipulating variables, interpreting data, and producing solutions. Use process skills to make inferences and predictions using collected information and to communicate, using space/time relationships, defining operationally. 	<p>B. Evaluate experimental information for appropriateness and adherence to relevant science processes.</p> <ul style="list-style-type: none"> Evaluate experimental data correctly within experimental limits. Judge that conclusions are consistent and logical with experimental conditions. Interpret results of experimental research to predict new information or improve a solution.

3.2. Inquiry and Design			
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<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>C. Recognize and use the elements of scientific inquiry to solve problems.</p> <ul style="list-style-type: none"> • Generate questions about objects, organisms and/or events that can be answered through scientific investigations. • Design an investigation. • Conduct an experiment. • State a conclusion that is consistent with the information. 	<p>C. Identify and use the elements of scientific inquiry to solve problems.</p> <ul style="list-style-type: none"> • Generate questions about objects, organisms and/or events that can be answered through scientific investigations. • Evaluate the appropriateness of questions. • Design an investigation with limited variables to investigate a question. • Conduct a two-part experiment. • Judge the significance of experimental information in answering the question. • Communicate appropriate conclusions from the experiment. 	<p>C. Apply the elements of scientific inquiry to solve problems.</p> <ul style="list-style-type: none"> • Generate questions about objects, organisms and/or events that can be answered through scientific investigations. • Evaluate the appropriateness of questions. • Design an investigation with adequate control and limited variables to investigate a question. • Conduct a multiple step experiment. • Organize experimental information using a variety of analytic methods. • Judge the significance of experimental information in answering the question. • Suggest additional steps that might be done experimentally. 	<p>C. Apply the elements of scientific inquiry to solve multi-step problems.</p> <ul style="list-style-type: none"> • Generate questions about objects, organisms and/or events that can be answered through scientific investigations. • Evaluate the appropriateness of questions. • Design an investigation with adequate control and limited variables to investigate a question. • Organize experimental information using analytic and descriptive techniques. • Evaluate the significance of experimental information in answering the question. • Project additional questions from a research study that could be studied.

3.2. Inquiry and Design			
3.2.4. GRADE 4	3.2.7. GRADE 7	3.2.10. GRADE 10	3.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>D. Recognize and use the technological design process to solve problems.</p> <ul style="list-style-type: none"> • Recognize and explain basic problems. • Identify possible solutions and their course of action. • Try a solution. • Describe the solution, identify its impacts and modify if necessary. • Show the steps taken and the results. 	<p>D. Know and use the technological design process to solve problems.</p> <ul style="list-style-type: none"> • Define different types of problems. • Define all aspects of the problem, necessary information and questions that must be answered. • Propose the best solution. • Design and propose alternative methods to achieve solutions. • Apply a solution. • Explain the results, present improvements, identify and infer the impacts of the solution. 	<p>D. Identify and apply the technological design process to solve problems.</p> <ul style="list-style-type: none"> • Examine the problem, rank all necessary information and all questions that must be answered. • Propose and analyze a solution. • Implement the solution. • Evaluate the solution, test, redesign and improve as necessary. • Communicate the process and evaluate and present the impacts of the solution. 	<p>D. Analyze and use the technological design process to solve problems.</p> <ul style="list-style-type: none"> • Assess all aspects of the problem, prioritize the necessary information and formulate questions that must be answered. • Propose, develop and appraise the best solution and develop alternative solutions. • Implement and assess the solution. • Evaluate and assess the solution, redesign and improve as necessary. • Communicate and assess the process and evaluate and present the impacts of the solution.

3.3. Biological Sciences			
3.3.4. GRADE 4	3.3.7. GRADE 7	3.3.10. GRADE 10	3.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .</i>			
<p>A. Know the similarities and differences of living things.</p> <ul style="list-style-type: none"> • Identify life processes of living things (e.g., growth, digestion, react to environment). • Know that some organisms have similar external characteristics (e.g., anatomical characteristics; appendages, type of covering, body segments) and that similarities and differences are related to environmental habitat. • Describe basic needs of plants and animals. 	<p>A. Describe the similarities and differences that characterize diverse living things.</p> <ul style="list-style-type: none"> • Describe how the structures of living things help them function in unique ways. • Explain how to use a dichotomous key to identify plants and animals. • Account for adaptations among organisms that live in a particular environment. 	<p>A. Explain the structural and functional similarities and differences found among living things.</p> <ul style="list-style-type: none"> • Identify and characterize major life forms according to their placement in existing classification groups. • Explain the relationship between structure and function at the molecular and cellular levels. • Describe organizing schemes of classification keys. • Identify and characterize major life forms by kingdom, phyla, class and order. 	<p>A. Explain the relationship between structure and function at all levels of organization.</p> <ul style="list-style-type: none"> • Identify and explain interactions among organisms (e.g., mutually beneficial, harmful relationships). • Explain and analyze the relationship between structure and function at the molecular, cellular and organ-system level. • Describe and explain structural and functional relationships in each of the five (or six) kingdoms. • Explain significant biological diversity found in each of the biomes.

3.3. Biological Sciences			
3.3.4. GRADE 4	3.3.7. GRADE 7	3.3.10. GRADE 10	3.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . .</i>			
<p>B. Know that living things are made up of parts that have specific functions.</p> <ul style="list-style-type: none"> • Identify examples of unicellular and multicellular organisms. • Determine how different parts of a living thing work together to make the organism function. 	<p>B. Describe the cell as the basic structural and functional unit of living things.</p> <ul style="list-style-type: none"> • Identify the levels of organization from cell to organism. • Compare life processes at the organism level with life processes at the cell level. • Explain that cells and organisms have particular structures that underlie their functions. • Describe and distinguish among cell cycles, reproductive cycles and life cycles. • Explain disease effects on structures or functions of an organism. 	<p>B. Describe and explain the chemical and structural basis of living organisms.</p> <ul style="list-style-type: none"> • Describe the relationship between the structure of organic molecules and the function they serve in living organisms. • Identify the specialized structures and regions of the cell and the functions of each. • Explain how cells store and use information to guide their functions. • Explain cell functions and processes in terms of chemical reactions and energy changes. 	<p>B. Analyze the chemical and structural basis of living organisms.</p> <ul style="list-style-type: none"> • Identify and describe factors affecting metabolic function (e.g., temperature, acidity, hormones). • Evaluate metabolic activities using experimental knowledge of enzymes. • Evaluate relationships between structure and functions of different anatomical parts given their structure. • Describe potential impact of genome research on the biochemistry and physiology of life.

3.3. Biological Sciences			
3.3.4. GRADE 4	3.3.7. GRADE 7	3.3.10. GRADE 10	3.3.12. GRADE 12
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<p>C. Know that characteristics are inherited and, thus, offspring closely resemble their parents.</p> <ul style="list-style-type: none"> Identify characteristics for animal and plant survival in different climates. Identify physical characteristics that appear in both parents and offspring and differ between families, strains or species. 	<p>C. Know that every organism has a set of genetic instructions that determines its inherited traits.</p> <ul style="list-style-type: none"> Identify and explain inheritable characteristics. Identify that the gene is the basic unit of inheritance. Identify basic patterns of inheritance (e.g., dominance, recessive, codominance). Describe how traits are inherited. Distinguish how different living things reproduce (e.g., vegetative budding, sexual). Recognize that mutations can alter a gene. Describe how selective breeding, natural selection and genetic technologies can change genetic makeup of organisms. 	<p>C. Describe how genetic information is inherited and expressed.</p> <ul style="list-style-type: none"> Compare and contrast the function of mitosis and meiosis. Describe mutations' effects on a trait's expression. Distinguish different reproductive patterns in living things (e.g., budding, spores, fission). Compare random and selective breeding practices and their results (e.g., antibiotic resistant bacteria). Explain the relationship among DNA, genes and chromosomes. Explain different types of inheritance (e.g., multiple allele, sex-influenced traits). Describe the role of DNA in protein synthesis as it relates to gene expression. 	<p>C. Explain gene inheritance and expression at the molecular level.</p> <ul style="list-style-type: none"> Analyze gene expression at the molecular level. Describe the roles of nucleic acids in cellular reproduction and protein synthesis. Describe genetic engineering techniques, applications and impacts. Explain birth defects from the standpoint of embryological development and/or changes in genetic makeup.

3.3. Biological Sciences			
3.3.4. GRADE 4	3.3.7. GRADE 7	3.3.10. GRADE 10	3.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . .</i>			
<p>D. Identify changes in living things over time.</p> <ul style="list-style-type: none"> • Compare extinct life forms with living organisms. 	<p>D. Explain basic concepts of natural selection.</p> <ul style="list-style-type: none"> • Identify adaptations that allow organisms to survive in their environment. • Describe how an environmental change can affect the survival of organisms and entire species. • Know that differences in individuals of the same species may give some advantage in surviving and reproducing. • Recognize that populations of organisms can increase rapidly. • Describe the role that fossils play in studying the past. • Explain how biologic extinction is a natural process. 	<p>D. Explain the mechanisms of the theory of evolution.</p> <ul style="list-style-type: none"> • Analyze data from fossil records, similarities in anatomy and physiology, embryological studies and DNA studies that are relevant to the theory of evolution. • Explain the role of mutations and gene recombination in changing a population of organisms. • Compare modern day descendents of extinct species and propose possible scientific accounts for their present appearance. • Describe the factors (e.g., isolation, differential reproduction) affecting gene frequency in a population over time and their consequences. 	<p>D. Analyze the theory of evolution.</p> <ul style="list-style-type: none"> • Examine human history by describing the progression from early hominids to modern humans. • Apply the concept of natural selection as a central concept in illustrating evolution theory.

3.3. Biological Sciences			
3.3.4. GRADE 4	3.3.7. GRADE 7	3.3.10. GRADE 10	3.3.12. GRADE 12
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		<ul style="list-style-type: none"> • Describe and differentiate between the roles of natural selection and genetic drift. • Describe changes that illustrate major events in the earth's development based on a time line. • Explain why natural selection can act only on inherited traits. • Apply the concept of natural selection to illustrate and account for a species' survival, extinction or change over time. 	
Ecosystem Standards are in the Environment and Ecology Standard Category (4.6).			

3.4. Physical Science, Chemistry and Physics			
3.4.4. GRADE 4	3.4.7. GRADE 7	3.4.10. GRADE 10	3.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Recognize basic concepts about the structure and properties of matter.</p> <ul style="list-style-type: none"> Describe properties of matter (e.g., hardness, reactions to simple chemical tests). Know that combining two or more substances can make new materials with different properties. Know different material characteristics (e.g., texture, state of matter, solubility). 	<p>A. Describe concepts about the structure and properties of matter.</p> <ul style="list-style-type: none"> Identify elements as basic building blocks of matter that cannot be broken down chemically. Distinguish compounds from mixtures. Describe and conduct experiments that identify chemical and physical properties. Describe reactants and products of simple chemical reactions. 	<p>A. Explain concepts about the structure and properties of matter.</p> <ul style="list-style-type: none"> Know that atoms are composed of even smaller sub-atomic structures whose properties are measurable. Explain the repeating pattern of chemical properties by using the repeating patterns of atomic structure within the periodic table. Predict the behavior of gases through the use of Boyle's, Charles' or the ideal gas law, in everyday situations. Describe phases of matter according to the Kinetic Molecular Theory. Explain the formation of compounds and their resulting properties using bonding theories (ionic and covalent). 	<p>A. Apply concepts about the structure and properties of matter.</p> <ul style="list-style-type: none"> Apply rules of systematic nomenclature and formula writing to chemical substances. Classify and describe, in equation form, types of chemical and nuclear reactions. Explain how radioactive isotopes that are subject to decay can be used to estimate the age of materials. Explain how the forces that bind solids, liquids and gases affect their properties. Characterize and identify important classes of compounds (e.g., acids, bases, salts).

3.4. Physical Science, Chemistry and Physics			
3.4.4. GRADE 4	3.4.7. GRADE 7	3.4.10. GRADE 10	3.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .</i>			
		<ul style="list-style-type: none"> • Recognize formulas for simple inorganic compounds. • Describe various types of chemical reactions by applying the laws of conservation of mass and energy. • Apply knowledge of mixtures to appropriate separation techniques. • Understand that carbon can form several types of compounds. 	<ul style="list-style-type: none"> • Apply the conservation of energy concept to fields as diverse as mechanics, nuclear particles and studies of the origin of the universe. • Apply the predictability of nuclear decay to estimate the age of materials that contain radioactive isotopes. • Quantify the properties of matter (e.g., density, solubility coefficients) by applying mathematical formulas.

3.4. Physical Science, Chemistry and Physics			
3.4.4. GRADE 4	3.4.7. GRADE 7	3.4.10. GRADE 10	3.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>B. Know basic energy types, sources and conversions.</p> <ul style="list-style-type: none"> Identify energy forms and examples (e.g., sunlight, heat, stored, motion). Know the concept of the flow of energy by measuring flow through an object or system. Describe static electricity in terms of attraction, repulsion and sparks. Apply knowledge of the basic electrical circuits to design and construction simple direct current circuits. Classify materials as conductors and nonconductors. Know and demonstrate the basic properties of heat by producing it in a variety of ways. 	<p>B. Relate energy sources and transfers to heat and temperature.</p> <ul style="list-style-type: none"> Identify and describe sound changes in moving objects. Know that the sun is a major source of energy that emits wavelengths of visible light, infrared and ultraviolet radiation. Explain the conversion of one form of energy to another by applying knowledge of each form of energy. Explain the parts and functions in an electrical circuit. 	<p>B. Analyze energy sources and transfers of heat.</p> <ul style="list-style-type: none"> Determine the efficiency of chemical systems by applying mathematical formulas. Use knowledge of chemical reactions to generate an electrical current. Evaluate energy changes in chemical reactions. Use knowledge of conservation of energy and momentum to explain common phenomena (e.g., refrigeration system, rocket propulsion). Explain resistance, current and electro-motive force (Ohm's Law). 	<p>B. Apply and analyze energy sources and conversions and their relationship to heat and temperature.</p> <ul style="list-style-type: none"> Determine the heat involved in illustrative chemical reactions. Evaluate mathematical formulas that calculate the efficiency of specific chemical and mechanical systems. Use knowledge of oxidation and reduction to balance complex reactions. Apply appropriate thermodynamic concepts (e.g., conservation, entropy) to solve problems relating to energy and heat.

3.4. Physical Science, Chemistry and Physics			
3.4.4. GRADE 4	3.4.7. GRADE 7	3.4.10. GRADE 10	3.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .</i>			
<ul style="list-style-type: none"> • Know the characteristics of light (e.g., reflection, refraction, absorption) and use them to produce heat, color or a virtual image. 			

3.4. Physical Science, Chemistry and Physics			
3.4.4. GRADE 4	3.4.7. GRADE 7	3.4.10. GRADE 10	3.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .TrC.</i>			
<p>Observe and describe different types of force and motion.</p> <ul style="list-style-type: none"> Identify characteristics of sound (pitch, loudness and echoes). Recognize forces that attract or repel other objects and demonstrate them. Describe various types of motions. Compare the relative movement of objects and describe types of motion that are evident. Describe the position of an object by locating it relative to another object or the background (e.g., geographic direction, left, up). 	<p>C. Identify and explain the principles of force and motion.</p> <ul style="list-style-type: none"> Describe the motion of an object based on its position, direction and speed. Classify fluid power systems according to fluid used or mode of power transmission (e.g., air, oil). Explain various motions using models. Explain how convex and concave mirrors and lens change light images. Explain how sound and light travel in waves of differing speeds, sizes and frequencies. 	<p>C. Distinguish among the principles of force and motion.</p> <ul style="list-style-type: none"> Identify the relationship of electricity and magnetism as two aspects of a single electromagnetic force. Identify elements of simple machines in compound machines. Explain fluid power systems through the design and construction of appropriate models. Describe sound effects (e.g., Doppler effect, amplitude, frequency, reflection, refraction, absorption, sonar, seismic). Describe light effects (e.g., Doppler effect, dispersion, absorption, emission spectra, polarization, interference). Describe and measure the motion of sound, light and other objects. 	<p>C. Apply the principles of motion and force.</p> <ul style="list-style-type: none"> Evaluate wave properties of frequency, wavelength and speed as applied to sound and light through different media. Propose and produce modifications to specific mechanical power systems that will improve their efficiency. Analyze the principles of translational motion, velocity and acceleration as they relate to free fall and projectile motion. Analyze the principles of rotational motion to solve problems relating to angular momentum, and torque. Interpret a model that illustrates circular motion and acceleration.

3.4. Physical Science, Chemistry and Physics			
3.4.4. GRADE 4	3.4.7. GRADE 7	3.4.10. GRADE 10	3.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .</i>			
		<ul style="list-style-type: none"> • Know Newton's laws of motion (including inertia, action and reaction) and gravity and apply them to solve problems related to forces and mass. • Determine the efficiency of mechanical systems by applying mathematical formulas. 	<ul style="list-style-type: none"> • Describe inertia, motion, equilibrium, and action/ reaction concepts through words, models and mathematical symbols.

3.4. Physical Science, Chemistry and Physics			
3.4.4. GRADE 4	3.4.7. GRADE 7	3.4.10. GRADE 10	3.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . .</i>			
<p>D. Describe the composition and structure of the universe and the earth's place in it.</p> <ul style="list-style-type: none"> • Recognize earth's place in the solar system. • Explain and illustrate the causes of seasonal changes. • Identify planets in our solar system and their general characteristics. • Describe the solar system motions and use them to explain time (e.g., days, seasons), major lunar phases and eclipses. 	<p>D. Describe essential ideas about the composition and structure of the universe and the earth's place in it.</p> <ul style="list-style-type: none"> • Compare various planets' characteristics. • Describe basic star types and identify the sun as a star type. • Describe and differentiate comets, asteroids and meteors. • Identify gravity as the force that keeps planets in orbit around the sun and governs the rest of the movement of the solar system and the universe. • Illustrate how the position of stars and constellations change in relation to the Earth during an evening and from month to month. • Identify equipment and instruments that explore the universe. 	<p>D. Explain essential ideas about the composition and structure of the universe.</p> <ul style="list-style-type: none"> • Compare the basic structures of the universe (e.g., galaxy types, nova, black holes, neutron stars). • Describe the structure and life cycle of star, using the Hertzsprung-Russell diagram. • Describe the nuclear processes involved in energy production in a star. • Explain the "red-shift" and Hubble's use of it to determine stellar distance and movement. • Compare absolute versus apparent star magnitude and their relation to stellar distance. • Explain the impact of the Copernican and Newtonian thinking on man's view of the universe. 	<p>D. Analyze the essential ideas about the composition and structure of the universe.</p> <ul style="list-style-type: none"> • Analyze the Big Bang Theory's use of gravitation and nuclear reaction to explain a possible origin of the universe. • Compare the use of visual, radio and x-ray telescopes to collect data regarding the structure and evolution of the universe. • Correlate the use of the special theory of relativity and the life of a star.

3.4. Physical Science, Chemistry and Physics			
3.4.4. GRADE 4	3.4.7. GRADE 7	3.4.10. GRADE 10	3.4.12. GRADE 12
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	<ul style="list-style-type: none"> Identify the accomplishments and contributions provided by selected past and present scientists in the field of astronomy. Identify and articulate space program efforts to investigate possibilities of living in space and on other planets. 	<ul style="list-style-type: none"> Identify and analyze the findings of several space instruments in regard to the extent and composition of the solar system and universe. 	
Refer to Technology Standard Category 3.6 for applied uses of these concepts and principles.			

3.5. Earth Sciences			
3.5.4. GRADE 4	3.5.7. GRADE 7	3.5.10. GRADE 10	3.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Know basic landforms and earth history.</p> <ul style="list-style-type: none"> Describe earth processes (e.g., rusting, weathering, erosion) that have affected selected physical features in students' neighborhoods. Identify various earth structures (e.g., mountains, faults, drainage basins) through the use of models. Identify the composition of soil as weathered rock and decomposed organic remains. Describe fossils and the type of environment they lived in (e.g., tropical, aquatic, desert). 	<p>A. Describe earth features and processes.</p> <ul style="list-style-type: none"> Describe major layers of the earth. Describe the processes involved in the creation of geologic features (e.g., folding, faulting, volcanism, sedimentation) and that these processes seen today (e.g., erosion, weathering crustal plate movement) are similar to those in the past. Describe the processes that formed Pennsylvania geologic structures and resources including mountains, glacial formations, water gaps and ridges. Explain how the rock cycle affected rock formations in the state of Pennsylvania. 	<p>A. Relate earth features and processes that change the earth.</p> <ul style="list-style-type: none"> Illustrate and explain plate tectonics as the mechanism of continental movement and sea floor changes. Compare examples of change to the earth's surface over time as they related to continental movement and ocean basin formation (e.g., Delaware, Susquehanna, Ohio Rivers system formations, dynamics). Interpret topographic maps to identify and describe significant geologic history/ structures in Pennsylvania. Evaluate and interpret geologic history using geologic maps. Explain several methods of dating earth materials and structures. 	<p>A. Analyze and evaluate earth features and processes that change the earth.</p> <ul style="list-style-type: none"> Apply knowledge of geophysical processes to explain the formation and degradation of earth structures (e.g., mineral deposition, cave formations, soil composition). Interpret geological evidence supporting evolution. Apply knowledge of radioactive decay to assess the age of various earth features and objects.

3.5. Earth Sciences			
3.5.4. GRADE 4	3.5.7. GRADE 7	3.5.10. GRADE 10	3.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .</i>			
	<ul style="list-style-type: none"> • Distinguish between examples of rapid surface changes (e.g., landslides, earthquakes) and slow surface changes (e.g., weathering). • Identify living plants and animals that are similar to fossil forms. 	<ul style="list-style-type: none"> • Correlate rock units with general geologic time periods in the history of the earth. • Describe and identify major types of rocks and minerals. 	

3.5. Earth Sciences			
3.5.4. GRADE 4	3.5.7. GRADE 7	3.5.10. GRADE 10	3.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>B. Know types and uses of earth materials.</p> <ul style="list-style-type: none"> Identify uses of various earth materials (e.g., buildings, highways, fuels, growing plants). Identify and sort earth materials according to a classification key (e.g., soil/rock type). 	<p>B. Recognize earth resources and how they affect everyday life.</p> <ul style="list-style-type: none"> Identify and locate significant earth resources (e.g., rock types, oil, gas, coal deposits) in Pennsylvania. Explain the processes involved in the formation of oil and coal in Pennsylvania. Explain the value and uses of different earth resources (e.g., selected minerals, ores, fuel sources, agricultural uses). Compare the locations of human settlements as related to available resources. 	<p>B. Explain sources and uses of earth resources.</p> <ul style="list-style-type: none"> Compare the locations of strategic minerals and earth resources in the world with their geologic history using maps and global information systems. Demonstrate the effects of sedimentation and erosion before and after a conservation plan is implemented. Evaluate the impact of geologic activities/hazards (e.g., earthquakes, sinkholes, landslides). Evaluate land use (e.g., agricultural, recreational, residential, commercial) in Pennsylvania based upon soil characteristics. 	<p>B. Analyze the availability, location and extraction of earth resources.</p> <ul style="list-style-type: none"> Describe how the location of earth's major resources has affected a country's strategic decisions. Compare locations of earth features and country boundaries. Analyze the impact of resources (e.g., coal deposits, rivers) on the life of Pennsylvania's settlements and cities.

3.5. Earth Sciences			
3.5.4. GRADE 4	3.5.7. GRADE 7	3.5.10. GRADE 10	3.5.12. GRADE 12
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i></p>			
<p>C. Know basic weather elements.</p> <ul style="list-style-type: none"> • Identify cloud types. • Identify weather patterns from data charts (including temperature, wind direction and speed, precipitation) and graphs of the data. • Explain how the different seasons effect plants, animals, food availability and daily human life. 	<p>C. Describe basic elements of meteorology.</p> <ul style="list-style-type: none"> • Explain weather forecasts by interpreting weather data and symbols. • Explain the oceans' impact on local weather and the climate of a region. • Identify how cloud types, wind directions and barometric pressure changes are associated with weather patterns in different regions of the country. • Explain and illustrate the processes of cloud formation and precipitation. • Describe and illustrate the major layers of the earth's atmosphere. • Identify different air masses and global wind patterns and how they relate to the weather patterns in different regions of the U.S. 	<p>C. Interpret meteorological data.</p> <ul style="list-style-type: none"> • Analyze information from meteorological instruments and online sources to predict weather patterns. • Describe weather and climate patterns on global levels. • Evaluate specific adaptations plants and animals have made that enable them to survive in different climates. 	<p>C. Analyze atmospheric energy transfers.</p> <ul style="list-style-type: none"> • Describe how weather and climate involve the transfer of energy in and out of the atmosphere. • Explain how unequal heating of the air, ocean and land produces wind and ocean currents. • Analyze the energy transformations that occur during the greenhouse effect and predict the long-term effects of increased pollutant levels in the atmosphere. • Analyze the mechanisms that drive a weather phenomena (e.g., El Nino, hurricane, tornado) using the correlation of three methods of heat energy transfer.

3.5. Earth Sciences			
3.5.4. GRADE 4	3.5.7. GRADE 7	3.5.10. GRADE 10	3.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . .</i>			
<p>D. Recognize the earth's different water resources.</p> <ul style="list-style-type: none"> • Know that approximately three-fourths of the earth is covered by water. • Identify and describe types of fresh and saltwater bodies. • Identify examples of water in the form of solid, liquid and gas on or near the surface of the earth. • Explain and illustrate evaporation and condensation. • Recognize other resources available from water (e.g., energy, transportation, minerals, food). 	<p>D. Explain the behavior and impact of the earth's water systems.</p> <ul style="list-style-type: none"> • Explain the water cycle using the processes of evaporation and condensation. • Describe factors that affect evaporation and condensation. • Distinguish salt from fresh water (e.g., density, electrical conduction). • Compare the effect of water type (e.g., polluted, fresh, salt water) and the life contained in them. • Identify ocean and shoreline features (e.g., bays, inlets, spit, tidal marshes). 	<p>D. Assess the value of water as a resource.</p> <ul style="list-style-type: none"> • Compare specific sources of potable water (e.g., wells, public systems, rivers) used by people in Pennsylvania. • Identify the components of a municipal/agricultural water supply system and a wastewater treatment system. • Relate aquatic life to water conditions (e.g., turbidity, temperature, salinity, dissolved oxygen, nitrogen levels, pressure). • Compare commercially important aquatic species in or near Pennsylvania. • Identify economic resources found in marine areas. • Assess the natural and man-made factors that affect the availability of clean water (e.g., rock and mineral deposits, man-made pollution). 	<p>D. Analyze the principles and history of hydrology.</p> <ul style="list-style-type: none"> • Analyze the operation and effectiveness of a water purification and desalination system. • Evaluate the pros and cons of surface water appropriation for commercial and electrical use. • Analyze the historical development of water use in Pennsylvania (e.g., recovery of Lake Erie). • Compare the marine life and type of water found in the intertidal, neritic and bathyal zones.

3.5. Earth Sciences			
3.5.4. GRADE 4	3.5.7. GRADE 7	3.5.10. GRADE 10	3.5.12. GRADE 12
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Refer to Environment and Ecology Standards Categories 4.1, 4.3, 4.8 for standards that deal with environmental impact of Earth structures and forces.			

3.6. Technology Education			
3.6.4. GRADE 4	3.6.7. GRADE 7	3.6.10. GRADE 10	3.6.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Know that biotechnologies relate to propagating, growing, maintaining, adapting, treating and converting.</p> <ul style="list-style-type: none"> • Identify agricultural and industrial production processes that involve plants and animals. • Identify waste management treatment processes. • Describe how knowledge of the human body influences or impacts ergonomic design. • Describe how biotechnology has impacted various aspects of daily life (e.g., health care, agriculture, waste treatment). 	<p>A. Explain biotechnologies that relate to related technologies of propagating, growing, maintaining, adapting, treating and converting.</p> <ul style="list-style-type: none"> • Identify the environmental, societal and economic impacts that waste has in the environment. • Identify and explain the impact that a specific medical advancement has had on society. • Explain the factors that were taken into consideration when a specific object was designed. • Define and describe how fuels and energy can be generated through the process of biomass conversion. • Identify and group basic plant and animal production processes. 	<p>A. Apply biotechnologies that relate to propagating, growing, maintaining, adapting, treating and converting.</p> <ul style="list-style-type: none"> • Apply knowledge of plant and animal production processes in designing an improvement to existing processes. • Apply knowledge of biomedical technology applications in designing a solution to a simple medical problem (e.g., wheel chair design, artificial arteries). • Apply knowledge of how biomedical technology affects waste products in designing a solution that will result in reduced waste. • Apply ergonomic engineering factors when devising a solution to a specific problem. • Describe various methods of biochemical conversion. 	<p>A. Analyze biotechnologies that relate to propagating, growing, maintaining, adapting, treating and converting.</p> <ul style="list-style-type: none"> • Analyze and solve a complex production process problem using biotechnologies (e.g., hydroponics, fish farming, crop propagation). • Analyze specific examples where engineering has impacted society in protection, personal health application or physical enhancement. • Appraise and evaluate the cause and effect and subsequent environmental, economic and societal impacts that result from biomass and biochemical conversion.

3.6. Technology Education			
3.6.4. GRADE 4	3.6.7. GRADE 7	3.6.10. GRADE 10	3.6.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . .</i>			
	<ul style="list-style-type: none"> • Explain the impact that agricultural science has had on biotechnology. 	<ul style="list-style-type: none"> • Describe specific examples that reflect the impact that agricultural science has had on biotechnology. 	<ul style="list-style-type: none"> • Evaluate and apply biotechnical processes to complex plant and animal production methods. • Apply knowledge of biochemical-related technologies to propose alternatives to hazardous waste treatment. • Apply knowledge of agricultural science to solve or improve a biochemical related problem.

3.6. Technology Education			
3.6.4. GRADE 4	3.6.7. GRADE 7	3.6.10. GRADE 10	3.6.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . .</i>			
<p>B. Know that information technologies involve encoding, transmitting, receiving, storing, retrieving and decoding.</p> <ul style="list-style-type: none"> Identify electronic communication methods that exist in the community (e.g., digital cameras, telephone, internet, television, fiber optics). Identify graphic reproduction methods. Describe appropriate image generating techniques (e.g., photography, video). Demonstrate the ability to communicate an idea by applying basic sketching and drawing techniques. 	<p>B. Explain information technologies of encoding, transmitting, receiving, storing, retrieving and decoding.</p> <ul style="list-style-type: none"> Demonstrate the effectiveness of image generating technique to communicate a story (e.g., photography, video). Analyze and evaluate the effectiveness of a graphic object designed and produced to communicate a thought or concept. Apply basic technical drawing techniques to communicate an idea or solution to a problem. Apply the appropriate method of communications technology to communicate a thought. 	<p>B. Apply knowledge of information technologies of encoding, transmitting, receiving, storing, retrieving and decoding.</p> <ul style="list-style-type: none"> Describe the proper use of graphic and electronic communication systems. Apply a variety of advanced mechanical and electronic drafting methods to communicate a solution to a specific problem. Apply and analyze advanced communication techniques to produce an image that effectively conveys a message (e.g., desktop publishing, audio and/or video production). Illustrate an understanding of a computer network system by modeling, constructing or assembling its components. 	<p>B. Analyze knowledge of information technologies of processes encoding, transmitting, receiving, storing, retrieving and decoding.</p> <ul style="list-style-type: none"> Apply and analyze advanced information techniques to produce a complex image that effectively conveys a message (e.g., desktop publishing, audio and/or video production). Analyze and evaluate a message designed and produced using still, motion and animated communication techniques. Describe the operation of fiber optic, microwave and satellite informational systems. Apply various graphic and electronic information techniques to solve real world problems (e.g., data organization and analysis, forecasting, interpolation).

3.6. Technology Education			
3.6.4. GRADE 4	3.6.7. GRADE 7	3.6.10. GRADE 10	3.6.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .</i>			
<p>C. Know physical technologies of structural design, analysis and engineering, finance, production, marketing, research and design.</p> <ul style="list-style-type: none"> • Identify and group a variety of construction tasks. • Identify the major construction systems present in a specific local building. • Identify specific construction systems that depend on each other in order to complete a project. • Know skills used in construction. • Identify examples of manufactured goods present in the home and school. • Identify basic resources needed to produce a manufactured item. • Identify basic component operations in a specific manufacturing enterprise (e.g., cutting, shaping, attaching). 	<p>C. Explain physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design.</p> <ul style="list-style-type: none"> • Use knowledge of material effectiveness to solve specific construction problems (e.g., steel vs. wood bridges). • Differentiate among the different types of construction applications (e.g., microwave tower, power plants, aircrafts). • Explain basic material processes that manufactured objects undergo during production (e.g., separating, forming, combining). • Evaluate a construction activity by specifying task analyses and necessary resources. 	<p>C. Apply physical technologies to structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems.</p> <ul style="list-style-type: none"> • Describe and classify common construction by their characteristics and composition. • Compare and contrast specific construction systems that depend on each other in order to complete a project. • Evaluate material failure common to specific applications. • Demonstrate knowledge of various construction systems by building or interpreting models. • Select and apply the necessary resources to successfully conduct a manufacturing enterprise. 	<p>C. Analyze physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems.</p> <ul style="list-style-type: none"> • Apply knowledge of construction technology by designing, planning and applying all the necessary resources to successfully solve a construction problem. • Compare resource options in solving a specific manufacturing problem. • Analyze and apply complex skills needed to process materials in complex manufacturing enterprises. • Apply advanced information collection and communication techniques to successfully convey solutions to specific construction problems.

3.6. Technology Education			
3.6.4. GRADE 4	3.6.7. GRADE 7	3.6.10. GRADE 10	3.6.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .</i>			
<ul style="list-style-type: none"> • Identify waste and pollution resulting from a manufacturing enterprise. • Explain and demonstrate the concept of manufacturing (e.g., assemble a set of papers or ball point pens sequentially, mass produce an object). • Identify transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting. • Identify and experiment with simple machines used in transportation systems. • Explain how improved transportation systems have changed society. 	<ul style="list-style-type: none"> • Explain the relationships among the basic resources needed in the production process for a specific manufactured object. • Explain the difference between design engineering and production engineering processes. • Analyze manufacturing steps that affect waste and pollutants. • Explain transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting. • Identify and explain the workings of several mechanical power systems. • Model and explain examples of vehicular propulsion, control, guidance, structure and suspension systems. • Explain the limitations of land, marine, air and space transportation systems. 	<ul style="list-style-type: none"> • Apply concepts of design engineering and production engineering in the organization and application of a manufacturing activity. • Apply the concepts of manufacturing by redesigning an enterprise to improve productivity or reduce or eliminate waste and/or pollution. • Evaluate the interrelationship of various transportation systems in the community. • Analyze the impacts that transportation systems have on a community. 	<ul style="list-style-type: none"> • Assess the importance of capital on specific construction applications. • Analyze the positive and negative qualities of several different types of materials as they would relate to specific construction applications. • Analyze transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting. • Analyze the concepts of vehicular propulsion, guidance, control, suspension and structural systems while designing and producing specific complex transportation systems.

3.7. Technological Devices			
3.7.4. GRADE 4	3.7.7. GRADE 7	3.7.10. GRADE 10	3.7.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . .</i>			
<p>A. Explore the use of basic tools, simple materials and techniques to safely solve problems.</p> <ul style="list-style-type: none"> Describe the scientific principles on which various tools are based. Group tools and machines by their function. Select and safely apply appropriate tools and materials to solve simple problems. 	<p>A. Describe the safe and appropriate use of tools, materials and techniques to answer questions and solve problems.</p> <ul style="list-style-type: none"> Identify uses of tools, machines, materials, information, people, money, energy and time that meet specific design criteria. Describe safe procedures for using tools and materials. Assess materials for appropriateness of use. 	<p>A. Identify and safely use a variety of tools, basic machines, materials and techniques to solve problems and answer questions.</p> <ul style="list-style-type: none"> Select and safely apply appropriate tools, materials and processes necessary to solve complex problems. Apply advanced tool and equipment manipulation techniques to solve problems. 	<p>A. Apply advanced tools, materials and techniques to answer complex questions.</p> <ul style="list-style-type: none"> Demonstrate the safe use of complex tools and machines within their specifications. Select and safely apply appropriate tools, materials and processes necessary to solve complex problems that could result in more than one solution. Evaluate and use technological resources to solve complex multi-step problems.

3.7. Technological Devices			
3.7.4. GRADE 4	3.7.7. GRADE 7	3.7.10. GRADE 10	3.7.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
B. Select appropriate instruments to study materials. <ul style="list-style-type: none">• Develop simple skills to measure, record, cut and fasten.• Explain appropriate instrument selection for specific tasks.	B. Use appropriate instruments and apparatus to study materials. <ul style="list-style-type: none">• Select appropriate instruments to measure the size, weight, shape and temperature of living and non-living objects.• Apply knowledge of different measurement systems to measure and record objects' properties.	B. Apply appropriate instruments and apparatus to examine a variety of objects and processes. <ul style="list-style-type: none">• Describe and use appropriate instruments to gather and analyze data.• Compare and contrast different scientific measurement systems; select the best measurement system for a specific situation.• Explain the need to estimate measurements within error of various instruments.• Apply accurate measurement knowledge to solve everyday problems.• Describe and demonstrate the operation and use of advanced instrumentation in evaluating material and chemical properties (e.g., scanning electron microscope, nuclear magnetic resonance machines).	B. Evaluate appropriate instruments and apparatus to accurately measure materials and processes. <ul style="list-style-type: none">• Apply and evaluate the use of appropriate instruments to accurately measure scientific and technologic phenomena within the error limits of the equipment.• Evaluate the appropriate use of different measurement scales (macro and micro).• Evaluate the utility and advantages of a variety of absolute and relative measurement scales for their appropriate application.

3.7. Technological Devices			
3.7.4. GRADE 4	3.7.7. GRADE 7	3.7.10. GRADE 10	3.7.12. GRADE 12
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .</i></p>			
<p>Computer literacy, including the use of hardware and software in standard statements C, D, and E, should be integrated across all content areas.</p>			
<p>C. Identify basic computer operations and concepts.</p> <ul style="list-style-type: none"> • Identify the major parts necessary for a computer to input and output data. • Explain and demonstrate the basic use of input and output devices (e.g., keyboard, monitor, printer, mouse). • Explain and demonstrate the use of external and internal storage devices (e.g., disk drive, CD drive). 	<p>C. Explain and demonstrate basic computer operations and concepts.</p> <ul style="list-style-type: none"> • Know specialized computer applications used in the community. • Describe the function of advanced input and output devices (e.g., scanners, video images, plotters, projectors) and demonstrate their use. • Demonstrate age appropriate keyboarding skills and techniques. 	<p>C. Apply basic computer operations and concepts.</p> <ul style="list-style-type: none"> • Identify solutions to basic hardware and software problems. • Apply knowledge of advanced input devices. • Apply knowledge of hardware setup. • Describe the process for basic software installation and demonstrate it. • Analyze and solve basic operating systems problems. • Apply touch keyboarding skills and techniques at expectable speed and accuracy. • Demonstrate the ability to perform basic software installation. 	<p>C. Evaluate computer operations and concepts as to their effectiveness to solve specific problems.</p> <ul style="list-style-type: none"> • Describe and demonstrate atypical software installation. • Analyze and solve hardware and advanced software problems. • Assess and apply multiple input and output devices to solve specific problems.

3.7. Technological Devices			
3.7.4. GRADE 4	3.7.7. GRADE 7	3.7.10. GRADE 10	3.7.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>D. Use basic computer software.</p> <ul style="list-style-type: none"> • Apply operating system skills to perform basic computer tasks. • Apply basic word processing skills. • Identify and use simple graphic and presentation materials generated by the computer. • Apply specific instructional software. 	<p>D. Apply computer software to solve specific problems.</p> <ul style="list-style-type: none"> • Identify software designed to meet specific needs (e.g., Computer Aided Drafting, design software, tutorial, financial, presentation software). • Identify and solve basic software problems relevant to specific software applications. • Identify basic multimedia applications. • Demonstrate a basic knowledge of desktop publishing applications. • Apply intermediate skills in utilizing word processing, database and spreadsheet software. • Apply basic graphic manipulation techniques. 	<p>D. Utilize computer software to solve specific problems.</p> <ul style="list-style-type: none"> • Identify legal restrictions in the use of software and the output of data. • Apply advanced graphic manipulation and desktop publishing techniques. • Apply basic multimedia applications. • Apply advanced word processing, database and spreadsheet skills. • Describe and demonstrate how two or more software applications can be used to produce an output. • Select and apply software designed to meet specific needs. 	<p>D. Evaluate the effectiveness of computer software to solve specific problems.</p> <ul style="list-style-type: none"> • Evaluate the effectiveness of software to produce an output and demonstrate the process. • Design and apply advanced multimedia techniques. • Analyze, select and apply the appropriate software to solve complex problems. • Evaluate the effectiveness of the computer as a presentation tool. • Analyze the legal responsibilities of computer users.

3.7. Technological Devices			
3.7.4. GRADE 4	3.7.7. GRADE 7	3.7.10. GRADE 10	3.7.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .</i>			
<p>E. Identify basic computer communications systems.</p> <ul style="list-style-type: none"> • Apply a web browser. • Apply basic electronic mail functions. • Use on-line searches to answer age appropriate questions. 	<p>E. Explain basic computer communications systems.</p> <ul style="list-style-type: none"> • Describe the organization and functions of the basic parts that make up the World Wide Web. • Apply advanced electronic mail functions. • Apply basic on-line research techniques to solve a specific problem. 	<p>E. Apply basic computer communications systems.</p> <ul style="list-style-type: none"> • Identify and explain various types of on-line services. • Identify and explain the function of the parts of a basic network. • Describe and apply the components of a web page and their function. • Explain and demonstrate file transfer within and out side of a computer network. • Identify, describe and complete advanced on-line research. 	<p>E. Assess the effectiveness of computer communications systems.</p> <ul style="list-style-type: none"> • Assess the effectiveness of a computer based communications system. • Transfer files among different computer platforms. • Analyze the effectiveness of on-line information resources to meet the needs for collaboration, research, publications, communications and productivity. • Apply knowledge of protocol standards to solve connectivity problems.

3.8. Science, Technology and Human Endeavors			
3.8.4. GRADE 4	3.8.7. GRADE 7	3.8.10. GRADE 10	3.8.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Know that people select, create and use science and technology and that they are limited by social and physical restraints.</p> <ul style="list-style-type: none"> Identify and describe positive and negative impacts that influence or result from new tools and techniques. Identify how physical technology (e.g., construction, manufacturing, transportation), informational technology and biotechnology are used to meet human needs. Describe how scientific discoveries and technological advancements are related. Identify interrelationships among technology, people and their world. Apply the technological design process to solve a simple problem. 	<p>A. Explain how sciences and technologies are limited in their effects and influences on society.</p> <ul style="list-style-type: none"> Identify and describe the unavoidable constraints of technological design. Identify changes in society as a result of a technological development. Identify and explain improvements in transportation, health, sanitation and communications as a result of advancements in science and technology and how they effect our lives. 	<p>A. Analyze the relationship between societal demands and scientific and technological enterprises.</p> <ul style="list-style-type: none"> Identify past and current tradeoffs between increased production, environmental harm and social values (e.g., increased energy needs, power plants, automobiles). Compare technologies that are applied and accepted differently in various cultures (e.g., factory farming, nuclear power). Describe and evaluate social change as a result of technological developments. Assess the social impacts of a specific international environmental problem by designing a solution that applies the appropriate technologies and resources. 	<p>A. Synthesize and evaluate the interactions and constraints of science and technology on society.</p> <ul style="list-style-type: none"> Compare and contrast how scientific and technological knowledge is both shared and protected. Evaluate technological developments that have changed the way humans do work and discuss their impacts (e.g., genetically engineered crops). Evaluate socially proposed limitations of scientific research and technological application.

3.8. Science, Technology and Human Endeavors			
3.8.4. GRADE 4	3.8.7. GRADE 7	3.8.10. GRADE 10	3.8.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .</i>			
<p>B. Know how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.</p> <ul style="list-style-type: none"> Identify and distinguish between human needs and improving the quality of life. Identify and distinguish between natural and human-made resources. Describe a technological invention and the resources that were used to develop it. 	<p>B. Explain how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.</p> <ul style="list-style-type: none"> Identify interrelationships between systems and resources. Identify and describe the resources necessary to solve a selected problem in a community and improve the quality of life. Identify and explain specific examples of how agricultural science has met human needs and has improved the quality of life. 	<p>B. Analyze how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.</p> <ul style="list-style-type: none"> Identify several problems and opportunities that exist in your community, apply various problem-solving methods to design and evaluate possible solutions. Analyze a recently invented item, describing the human need that prompted its invention and the current and potential social impacts of the specific invention. Apply knowledge of oceanography, meteorology, geology and human anatomy to explain important considerations that need to be made for construction of homes, buildings and businesses in the United States. 	<p>B. Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.</p> <ul style="list-style-type: none"> Apply appropriate tools, materials and processes to solve complex problems. Use knowledge of human abilities to design or modify technologies that extend and enhance human abilities. Apply appropriate tools, materials and processes to physical, informational or biotechnological systems to identify and recommend solutions to international problems. Apply knowledge of agricultural science to develop a solution that will improve on a human need or want.

3.8. Science, Technology and Human Endeavors			
3.8.4. GRADE 4	3.8.7. GRADE 7	3.8.10. GRADE 10	3.8.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . .</i>			
		<ul style="list-style-type: none"> Assess the impacts that agricultural science has had on meeting human needs and improving the quality of life. 	

3.8. Science, Technology and Human Endeavors			
3.8.4. GRADE 4	3.8.7. GRADE 7	3.8.10. GRADE 10	3.8.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .</i>			
<p>C. Know the pros and cons of possible solutions to scientific and technological problems in society.</p> <ul style="list-style-type: none"> • Compare the positive and negative expected and unexpected impacts of technological change. • Identify and discuss examples of technological change in the community that have both positive and negative impacts. 	<p>C. Identify the pros and cons of applying technological and scientific solutions to address problems and the effect upon society.</p> <ul style="list-style-type: none"> • Describe the positive and negative expected and unexpected effects of specific technological developments. • Describe ways technology extends and enhances human abilities. 	<p>C. Evaluate possibilities, consequences and impacts of scientific and technological solutions.</p> <ul style="list-style-type: none"> • Relate scientific and technological advancements in terms of cause and effect. • Describe and evaluate the impacts that financial considerations have had on specific scientific and technological applications. • Compare and contrast potential solutions to technological, social, economic and environmental problems. • Analyze the impacts on society of accepting or rejecting scientific and technological advances. 	<p>C. Evaluate the consequences and impacts of scientific and technological solutions.</p> <ul style="list-style-type: none"> • Propose solutions to specific scientific and technological applications, identifying possible financial considerations. • Analyze scientific and technological solutions through the use of risk/benefit analysis. • Analyze and communicate the positive or negative impacts that a recent technological invention had on society. • Evaluate and describe potential impacts from emerging technologies and the consequences of not keeping abreast of technological advancements (e.g., assessment alternatives, risks, benefits, costs, economic impacts, constraints).

IX. GLOSSARY

Allele:	Any of a set of possible forms of a gene.
Biochemical conversion:	The changing of organic matter into other chemical forms.
Biomass conversion:	The changing of organic matter that has been produced by photosynthesis into useful liquid, gas or fuel.
Biomedical technology:	The application of health care theories to develop methods, products and tools to maintain or improve homeostasis.
Biomes:	A community of living organisms of a single major ecological region.
Biotechnology:	The ways that humans apply biological concepts to produce products and provide services.
Carbon chemistry:	The science of the composition, structure, properties and reactions of carbon based matter, especially of atomic and molecular systems; sometimes referred to as organic chemistry.
Construction technology:	The ways that humans build structures on sites.
Desalinization:	To remove salts and other chemicals from sea or saline water.
Dichotomous:	Divided or dividing into two parts or classifications.
Electronic communication:	System for the transmission of information using electronic technology (e.g., digital cameras, cellular telephones, Internet, television, fiber optics).
Embryology:	The branch of biology dealing with the development of living things from fertilized egg to its developed state.
Engineering:	The application of scientific, physical, mechanical and mathematical principles to design processes, products and structures that improve the quality of life.
Enzyme:	A protein that increases the rate of a chemical reaction without being changed by the reaction; an organic catalyst.

Ergonomical:	Of or relating to the design of equipment or devices to fit the human body's control, position, movement and environment.
Evolution:	A process of change that explains why what we see today is different from what existed in the past; it includes changes in the galaxies, stars, solar system, earth and life on earth. Biological evolution is a change in hereditary characteristics of groups of organisms over the course of generations.
Fact:	Information that has been objectively verified.
Geologic hazard:	A naturally occurring or man-made condition or phenomenon that presents a risk or is a potential danger to life and property (e.g., landslides, floods, earthquakes, ground subsidence, coastal and beach erosion, faulting, dam leakage and failure, mining disasters, pollution and waste disposal, sinkholes).
Geologic map:	A representation of a region on which is recorded earth information (e.g., the distribution, nature and age relationships of rock units and the occurrences of structural features, mineral deposits and fossil localities).
Hydrology:	The scientific study of the properties, distribution and effects of water on the earth's surface, in the soil and underlying rocks and in the atmosphere.
Hypothesis:	An assertion subject to verification or proof as a premise from which a conclusion is drawn.
Information technology:	The technical means that humans create to store and transmit information.
Inquiry:	A systematic process for using knowledge and skills to acquire and apply new knowledge.
Instructional technology:	Any mechanical aid (including computer technology) used to assist in or enhance the process of teaching and learning.
Law:	Summarizing statement of observed experimental facts that has been tested many times and is generally accepted as true.

Manufacturing technology:	The ways that humans produce goods and products.
Mitosis:	The sequential differentiation and segregation of replicated chromosomes in a cell's nucleus that precedes complete cell division.
Model:	A description, analogy or a representation of something that helps us understand it better (e.g., a physical model, a conceptual model, a mathematical model).
Nova:	A variable star that suddenly increases in brightness to several times its normal magnitude and returns to its original appearance in a few weeks to several months or years.
Patterns:	Repeated processes that are exhibited in a wide variety of ways; identifiable recurrences of the element and/or the form.
Physical technology:	The ways that humans construct, manufacture and transport products.
Radioactive isotope:	An atom that gives off nuclear radiation and has the same number of protons (atomic number) as another atom but a different number of neutrons.
Relationship between science and technology:	Science builds principles or theories while technology is the practical application of those principles or theories.
Scale:	Relates concepts and ideas to one another by some measurement (e.g., quantitative, numeral, abstract, ideological); provides a measure of size and/or incremental change.
Science:	Search for understanding the natural world using inquiry and experimentation.
System:	A group of related objects that work together to achieve a desired result.
Open Loop system:	A group of related objects that do not have feedback and cannot modify themselves.
Closed Loop system:	A group of related objects that have feedback and can modify themselves.

Subsystem:	A group of related objects that make up a larger system (e.g., automobiles have electrical systems, fuel systems).
Technology education:	The application of tools, materials, processes and systems to solve problems and extend human capabilities.
Technological design process:	Recognizing the problem, proposing a solution, implementing the solution, evaluating the solution and communicating the problem, design and solution.
Theory:	Systematically organized knowledge applicable in a relatively wide variety of circumstances; especially, a system of assumptions, accepted principles and rules of procedure devised to analyze, predict or otherwise explain the nature or behavior of a specified set of phenomena.
Theory of evolution:	A theory that the various types of animals and plants have their origin in other preexisting types and that the distinguishable differences are due to modification in successive generations.
Topographic map:	A representation of a region on a sufficient scale to show detail, selected man-made and natural features of a portion of the land surface including its relief and certain physical and cultural features; the portrayal of the position, relation, size, shape and elevation of the area.
Transportation systems:	A group of related parts that function together to perform a major task in any form of transportation.
Transportation technology:	The physical ways humans move materials, goods and people.
Tool:	Any device used to extend human capability including computer-based tools.

Academic Standards for Environment and Ecology

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XI. INTRODUCTION

This document includes Environment and Ecology standards that describe what students should know and be able to do in these areas:

- 4.1. Watersheds and Wetlands
- 4.2. Renewable and Nonrenewable Resources
- 4.3. Environmental Health
- 4.4. Agriculture and Society
- 4.5. Integrated Pest Management
- 4.6. Ecosystems and their Interactions
- 4.7. Threatened, Endangered and Extinct Species
- 4.8. Humans and the Environment
- 4.9. Environmental Laws and Regulations

The Declaration of Rights, Article 1 of the Pennsylvania Constitution states in Section 27: “The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and aesthetic values of the environment. Pennsylvania’s public natural resources are the common property of all people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.” To this end it is our responsibility to develop a citizenry that is aware of and concerned about the total environment and has the knowledge and skills to work toward solutions to current problems and the prevention of new ones.

Environment and Ecology is grounded in the complexity of the world we live in and our impact on its sustainability. The human interactions with the ecosystem and the results of human decisions are the main components of this academic area. Environment and Ecology examines the world with respect to the economic,

cultural, political and social structure as well as natural processes and systems. This integration across systems is what sets this academic area apart from all others.

Environment and Ecology places its main emphasis in the real world. It allows students to understand, through a sound academic content base, how their everyday lives evolve around their use of the natural world and the resources it provides. As we move into a more technologically driven society, it is crucial for every student to be aware of his/her dependence on a healthy environment. The 21st century will demand a more sophisticated citizen capable of making sound decisions that will impact our natural systems forever.

These standards establish the essential elements of what students should know and be able to do at the end of grades four, seven, ten and twelve. The sequential nature of this document reflects the need for rigorous academic content that students will be expected to achieve. The standards will help students understand decision-making processes, the art of compromise and problem solving skills. The document reinforces all areas across the grade levels with increasing degrees of difficulty as the students mature intellectually.

Environment and Ecology is a very engaging academic area that captivates students' innate interests in their surroundings of the natural and built environment. The skills and knowledge that are addressed in this area of study will serve as tools for student participation in a democratic world of constantly evolving issues and concerns. As they achieve these standards, students will become aware of the role they play in the community in reaching decisions related to the environment.

The study of Environment and Ecology will allow students to be active participants and problem solvers in real issues that affect them, their homes, schools and communities.

A glossary is included to assist the reader in understanding terminology contained in the standards.

4.1. Watersheds and Wetlands			
4.1.4. GRADE 4	4.1.7. GRADE 7	4.1.10. GRADE 10	4.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Identify various types of water environments.</p> <ul style="list-style-type: none"> • Identify the lotic system (e.g., creeks, rivers, streams). • Identify the lentic system (e.g., ponds, lakes, swamps). 	<p>A. Explain the role of the water cycle within a watershed.</p> <ul style="list-style-type: none"> • Explain the water cycle. • Explain the water cycle as it relates to a watershed. 	<p>A. Describe changes that occur from a stream's origin to its final outflow.</p> <ul style="list-style-type: none"> • Identify Pennsylvania's major watersheds and their related river systems. • Describe changes by tracing a specific river's origin back to its headwaters including its major tributaries. 	<p>A. Categorize stream order in a watershed.</p> <ul style="list-style-type: none"> • Explain the concept of stream order. • Identify the order of watercourses within a major river's watershed. • Compare and contrast the physical differences found in the stream continuum from headwater to mouth.

4.1. Watersheds and Wetlands			
4.1.4. GRADE 4	4.1.7. GRADE 7	4.1.10. GRADE 10	4.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
B. Explain the differences between moving and still water. <ul style="list-style-type: none">• Explain why water moves or does not move.• Identify types of precipitation.	B. Understand the role of the watershed. <ul style="list-style-type: none">• Identify and explain what determines the boundaries of a watershed.• Explain how water enters a watershed.• Explain factors that affect water quality and flow through a watershed.	B. Explain the relationship among landforms, vegetation and the amount and speed of water. <ul style="list-style-type: none">• Analyze a stream's physical characteristics.• Describe how topography influences streams.• Explain the influence of mountains on precipitation.• Explain how vegetation affects storm water runoff.• Delineate the boundaries of a watershed.• Describe factors that affect the quality of groundwater.• Explain how the speed of water and vegetation cover relates to erosion.	B. Explain the relationships that exist within watersheds in the United States. <ul style="list-style-type: none">• Understand that various ecosystems may be contained in a watershed.• Examine and describe the ecosystems contained within a specific watershed.• Identify and describe the major watersheds in the United States.

4.1. Watersheds and Wetlands			
4.1.4. GRADE 4	4.1.7. GRADE 7	4.1.10. GRADE 10	4.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Identify living things found in water environments.</p> <ul style="list-style-type: none"> • Identify fish, insects and amphibians that are found in fresh water. • Identify plants found in fresh water. 	<p>C. Explain the effects of water on the life of organisms in a watershed.</p> <ul style="list-style-type: none"> • Explain how water is necessary for all life. • Explain how the physical components of aquatic systems influence the organisms that live there in terms of size, shape and physical adaptations. • Describe the life cycle of organisms that depend on water. • Identify organisms that have aquatic stages of life and describe those stages. 	<p>C. Describe the physical characteristics of a stream and determine the types of organisms found in aquatic environments.</p> <ul style="list-style-type: none"> • Describe and explain the physical factors that affect a stream and the organisms living there. • Identify terrestrial and aquatic organisms that live in a watershed. • Categorize aquatic organisms found in a watershed continuum from headwater to mouth (e.g., shredder, predator, decomposer). • Identify the types of organisms that would live in a stream based on the stream's physical characteristics. • Explain the habitat needs of specific aquatic organisms. 	<p>C. Analyze the parameters of a watershed.</p> <ul style="list-style-type: none"> • Interpret physical, chemical and biological data as a means of assessing the environmental quality of a watershed. • Apply appropriate techniques in the analysis of a watershed (e.g., water quality, biological diversity, erosion, sedimentation).

4.1. Watersheds and Wetlands			
4.1.4. GRADE 4	4.1.7. GRADE 7	4.1.10. GRADE 10	4.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>D. Identify a wetland and the plants and animals found there.</p> <ul style="list-style-type: none"> • Identify different kinds of wetlands. • Identify plants and animals found in wetlands. • Explain wetlands as habitats for plants and animals. <p>E. Recognize the impact of watersheds and wetlands on animals and plants.</p> <ul style="list-style-type: none"> • Explain the role of watersheds in everyday life. • Identify the role of watersheds and wetlands for plants and animals. 	<p>D. Explain and describe characteristics of a wetland.</p> <ul style="list-style-type: none"> • Identify specific characteristics of wetland plants and soils. • Recognize the common types of plants and animals. • Describe different types of wetlands. • Describe the different functions of a wetland. <p>E. Describe the impact of watersheds and wetlands on people.</p> <ul style="list-style-type: none"> • Explain the impact of watersheds and wetlands in flood control, wildlife habitats and pollution abatement. • Explain the influence of flooding on wetlands. 	<p>D. Describe the multiple functions of wetlands.</p> <ul style="list-style-type: none"> • Describe wetlands in terms of their effects (e.g., habitat, flood, buffer zones, prevention areas, nurseries, food production areas). • Explain how a wetland influences water quality, wildlife and water retention. • Analyze wetlands through their indicators (e.g., soils, plants, hydrology). <p>E. Identify and describe natural and human events on watersheds and wetlands.</p> <ul style="list-style-type: none"> • Describe how natural events affect a watershed (e.g., drought, floods). • Identify the effects of humans and human events on watersheds. 	<p>D. Analyze the complex and diverse ecosystems of wetlands.</p> <ul style="list-style-type: none"> • Explain the functions of habitat, nutrient production, migration stopover and groundwater recharge as it relates to wetlands. • Explain the dynamics of a wetland ecosystem. • Describe and analyze different types of wetlands. <p>E. Evaluate the trade-offs, costs and benefits of conserving watersheds and wetlands.</p> <ul style="list-style-type: none"> • Evaluate the effects of natural events on watersheds and wetlands. • Evaluate the effects of human activities on watersheds and wetlands.

4.2. Renewable and Nonrenewable Resources			
4.2.4. GRADE 4	4.2.7. GRADE 7	4.2.10. GRADE 10	4.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Identify needs of people.</p> <ul style="list-style-type: none"> • Identify plants, animals, water, air, minerals and fossil fuels as natural resources. • Explain air, water and nutrient cycles. • Identify how the environment provides for the needs of people. 	<p>A. Know that raw materials come from natural resources.</p> <ul style="list-style-type: none"> • Identify resources used to provide humans with energy, food, housing and water. • Explain how plants and animals may be classified as natural resources. • Compare means of growing or acquiring food. • Identify fiber and other raw materials used in clothing and shelter production. • Identify types of minerals and fossil fuels used by humans. 	<p>A. Explain that renewable and nonrenewable resources supply energy and materials.</p> <ul style="list-style-type: none"> • Identify alternative sources of energy. • Identify and compare fuels used in industrial and agricultural societies. • Compare and contrast the cycles of various natural resources. • Explain food and fiber as renewable resources. 	<p>A. Analyze the use of renewable and nonrenewable resources.</p> <ul style="list-style-type: none"> • Explain the effects on the environment and sustainability through the use of nonrenewable resources. • Evaluate the advantages and disadvantages of reusing our natural resources.

4.2. Renewable and Nonrenewable Resources			
4.2.4. GRADE 4	4.2.7. GRADE 7	4.2.10. GRADE 10	4.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>B. Identify products derived from natural resources.</p> <ul style="list-style-type: none"> • Identify products made from trees. • Identify by-products of plants and animals. • Identify the sources of manmade products (e.g., plastics, metal, aluminum, fabrics, paper, cardboard). 	<p>B. Examine the renewability of the resources.</p> <ul style="list-style-type: none"> • Identify renewable resources and describe their uses. • Identify nonrenewable resources and describe their uses. • Compare finished products to their original raw material. • Identify the waste derived from the use of renewable and nonrenewable resources. • Determine how consumption may impact the availability of resources. • Compare the time spans of renewability for fossil fuels and alternative fuels. 	<p>B. Evaluate factors affecting availability of natural resources.</p> <ul style="list-style-type: none"> • Describe natural occurrences that may affect the natural resources. • Analyze technologies that affect the use of our natural resources. • Evaluate the effect of consumer desires on various natural resources. 	<p>B. Analyze factors affecting the availability of renewable and nonrenewable resources.</p> <ul style="list-style-type: none"> • Evaluate the use of natural resources and offer approaches for using them while diminishing waste. • Compare the economics of different areas based on the availability and accessibility of the natural resources.

4.2. Renewable and Nonrenewable Resources			
4.2.4. GRADE 4	4.2.7. GRADE 7	4.2.10. GRADE 10	4.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Know that some natural resources have limited life spans.</p> <ul style="list-style-type: none"> • Identify renewable and nonrenewable resources used in the local community. • Identify various means of conserving natural resources. • Know that natural resources have varying life spans. 	<p>C. Explain natural resource distribution.</p> <ul style="list-style-type: none"> • Distinguish between readily available and less accessible resources. • Identify the locations of different concentrations of fossil fuels and mineral resources. • Analyze the effects of management practices on air, land and water in forestry, agriculture, fisheries, wildlife, mining and food and fiber production that is unique to different climates. 	<p>C. Analyze how man-made systems have impacted the management and distribution of natural resources.</p> <ul style="list-style-type: none"> • Explain the complete cycle of a natural resource, from extraction to disposal, detailing its uses and effects on the environment. • Analyze energy uses and energy conservation in different regions. • Examine conservation practices in different countries. • Analyze the costs and benefits of different man-made systems and how they use renewable and nonrenewable natural resources. • Analyze the impact of information systems on management and distribution of natural resources. 	<p>C. Analyze factors that influence the availability of natural resources.</p> <ul style="list-style-type: none"> • Compare the use of natural resources in different countries. • Determine how delivery systems influence the availability of resources at the local, regional and national level.

4.2. Renewable and Nonrenewable Resources			
4.2.4. GRADE 4	4.2.7. GRADE 7	4.2.10. GRADE 10	4.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
D. Identify by-products and their use of natural resources. <ul style="list-style-type: none"> • Understand the waste stream. • Identify those items that can be recycled and those that can not. • Identify use of reusable products. • Identify the use of compost, landfills and incinerators. 	D. Describe the role of recycling and waste management. <ul style="list-style-type: none"> • Identify materials that can be recycled in the community. • Explain the process of closing the loop in recycling. • Compare the decomposition rates of different organic materials. • Describe methods that could be used to reuse materials for new products. • Evaluate the costs and benefits of disposable products. 	D. Explain different management alternatives involved in recycling and solid waste management. <ul style="list-style-type: none"> • Analyze the manufacturing process (before, during and after) with consideration for resource recovery. • Compare various methods dealing with solid waste (e.g., incineration, compost, land application). • Differentiate between pre/post-consumer and raw materials. • Illustrate how one natural resource can be managed through reduction, recycling, reuse or use. 	D. Evaluate solid waste management practices. <ul style="list-style-type: none"> • Examine and explain the path of a recyclable material from collection to waste, reuse or recycling identifying the market forces. • Understand current regulations concerning recycling and solid waste. • Research new technologies in the use, reuse or recycling of materials.

4.3. Environmental Health			
4.3.4. GRADE 4	4.3.7. GRADE 7	4.3.10. GRADE 10	4.3.12. GRADE 12
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i></p>			
<p>A. Know that plants, animals and humans are dependent on air and water.</p> <ul style="list-style-type: none"> • Know that all living things need air and water to survive. • Describe potentially dangerous pest controls used in the home. • Identify things that cause sickness when put into the air, water or soil. • Identify different areas where health can be affected by air, water or land pollution. • Identify actions that can prevent or reduce waste pollution. 	<p>A. Identify environmental health issues.</p> <ul style="list-style-type: none"> • Identify various examples of long-term pollution and explain their effects on environmental health. • Identify diseases that have been associated with poor environmental quality. • Describe different types of pest controls and their effects on the environment. • Identify alternative products that can be used in life to reduce pollution. 	<p>A. Describe environmental health issues.</p> <ul style="list-style-type: none"> • Identify the effects on human health of air, water and soil pollution and the possible economic costs to society. • Describe how indoor pollution may affect human health (e.g., dust mites, fumes, cat dandruff). • Explain the costs and benefits of cleaning up contaminants. • Explain how common household cleaning products are manufactured and how to dispose of their by-products after use. 	<p>A. Analyze the complexity of environmental health issues.</p> <ul style="list-style-type: none"> • Identify environmental health issues and explain how they have been addressed on a worldwide level. • Analyze efforts to prevent, control and/or reduce pollution through cost and benefit analysis and risk management. • Describe the impact of occupational exposures as they relate to environmental health issues. • Identify invisible pollutants and explain their effects on human health. • Explain the relationship between wind direction and velocity as it relates to dispersal and occurrence of pollutants. • Explain the different disposal methods used for toxic and hazardous waste.

4.3. Environmental Health			
4.3.4. GRADE 4	4.3.7. GRADE 7	4.3.10. GRADE 10	4.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>B. Identify how human actions affect environmental health.</p> <ul style="list-style-type: none"> • Identify pollutants. • Identify sources of pollution. • Identify litter and its effect on the environment. • Describe how people can reduce pollution. 	<p>B. Describe how human actions affect the health of the environment.</p> <ul style="list-style-type: none"> • Identify land use practices and their relation to environmental health. • Explain how natural disasters affect environmental health. • Identify residential and industrial sources of pollution and their effects on environmental health. • Explain the difference between point and nonpoint source pollution. • Explain how nonpoint source pollution can affect the water supply and air quality. • Explain how acid deposition can affect water, soil and air quality. • Explain the relationship between resource use, reuse, recycling and environmental health. 	<p>B. Explain how multiple variables determine the effects of pollution on environmental health, natural processes and human practices.</p> <ul style="list-style-type: none"> • Explain how human practices affect the quality of the water and soil. • Identify evidence of natural events around the world and their effects on environmental health (e.g., Yellowstone National Park fires). • Identify local and state environmental regulations and their impact on environmental health. • Analyze data and explain how point source pollution can be detected and eliminated. • Identify and explain ways of detecting pollution by using state-of-the-art technologies. 	<p>B. Analyze the local, regional and national impacts of environmental health.</p> <ul style="list-style-type: none"> • Analyze the cost of natural disasters in both dollars and loss of natural habitat. • Research and analyze the local, state and national laws that deal with point and nonpoint source pollution; evaluate the costs and benefits of these laws. • Explain mitigation and its role in environmental health. • Explain industry's initiatives to meet state and federal mandates on clean air and water. • Describe the impacts of point and nonpoint source pollution on the Chesapeake Bay. • Identify and evaluate the costs and benefits of laws regulating air and water quality and waste disposal.

4.3. Environmental Health			
4.3.4. GRADE 4	4.3.7. GRADE 7	4.3.10. GRADE 10	4.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Understand that the elements of natural systems are interdependent.</p> <ul style="list-style-type: none"> • Identify some of the organisms that live together in an ecosystem. • Understand that the components of a system all play a part in a healthy natural system. • Identify the effects of a healthy environment on the ecosystem. 	<p>C. Explain biological diversity.</p> <ul style="list-style-type: none"> • Explain the complex, interactive relationships among members of an ecosystem. • Explain how diversity affects ecological integrity of the natural resources. 	<p>C. Explain biological diversity as an indicator of a healthy environment.</p> <ul style="list-style-type: none"> • Explain species diversity. • Analyze the effects of species extinction on the health of an ecosystem. 	<p>C. Analyze the need for a healthy environment.</p> <ul style="list-style-type: none"> • Research the relationship of some chronic diseases to an environmental pollutant. • Explain how man-made systems may affect the environment.

4.4. Agriculture and Society			
4.4.4. GRADE 4	4.4.7. GRADE 7	4.4.10. GRADE 10	4.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Know the importance of agriculture to humans.</p> <ul style="list-style-type: none"> • Identify people's basic needs. • Explain the influence of agriculture on food, clothing, shelter and culture from one area to another. • Know how people depend on agriculture. 	<p>A. Explain society's standard of living in relation to agriculture.</p> <ul style="list-style-type: none"> • Compare and contrast agricultural changes that have been made to meet society's needs. • Compare and contrast how animals and plants affect agricultural systems. • Compare several technological advancements and their effect(s) on the historical growth of agriculture. • Compare different environmental conditions related to agricultural production, cost and quality of the product. 	<p>A. Describe the importance of agriculture to society.</p> <ul style="list-style-type: none"> • Identify the major cash crops of Pennsylvania. • Identify what percentage of the United States' population is involved in the food and fiber industry. • Compare and contrast the influence of agriculture on a nation's culture, standard of living and foreign trade. • Identify laws that affect conservation and management of food and fiber production in the local area and analyze their impact. • Compare a contemporary economic issue in agriculture to its historical origin. 	<p>A. Analyze the management practices in the agriculture business.</p> <ul style="list-style-type: none"> • Define the components of an agriculture system that would result in a minimal waste of resources. • Identify the diversity in crop production and analyze the advantages and disadvantages of such diversity. • Research and analyze environmental practices related to agricultural systems. • Analyze the effects of agricultural practices on the economy. • Analyze the impact of nutrient management laws on Pennsylvania agriculture. • Assess the role of agriculture cooperatives.

4.4. Agriculture and Society			
4.4.4. GRADE 4	4.4.7. GRADE 7	4.4.10. GRADE 10	4.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>B. Identify the role of the sciences in Pennsylvania agriculture.</p> <ul style="list-style-type: none"> • Identify common animals found on Pennsylvania farms. • Identify common plants found on Pennsylvania farms. • Identify the parts of important agricultural related plants (i.e., corn, soybeans, barley). • Identify a fiber product from Pennsylvania farms. 	<p>B. Investigate how agricultural science has recognized the various soil types found in Pennsylvania.</p> <ul style="list-style-type: none"> • Explain the importance of particle sizes in different soil types. • Determine how water has influenced the development of Pennsylvania soil types. • Investigate how soil types have influenced the plant types used on Pennsylvania farms • Analyze how soil types and geographic regions have impacted the profitability of Pennsylvania farms. 	<p>B. Assess the influence of agricultural science on farming practices.</p> <ul style="list-style-type: none"> • Compare the practices of no-till farming to traditional soil preparation (e.g., plow, disc). • Analyze and explain the various practices of nutrient management on the farm. • Analyze and explain how farm efficiencies have changed human nutrition. 	<p>B. Describe how agricultural science has influenced biotechnology.</p> <ul style="list-style-type: none"> • Investigate how bioengineered crops may influence the food supply. • Analyze the use of specific bacteria for the control of agricultural pests. • Evaluate the use of feed additives in shifting metabolism to increase muscle mass and reduce fat in farm animals.

4.4. Agriculture and Society			
4.4.4. GRADE 4	4.4.7. GRADE 7	4.4.10. GRADE 10	4.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Know that food and fiber originate from plants and animals.</p> <ul style="list-style-type: none"> • Define and identify food and fiber. • Identify what plants and animals need to grow. • Identify agricultural products that are local and regional. • Identify an agricultural product based on its origin. • Describe several products and tell their origins. • Describe the journey of a local agricultural product from production to the consumer. 	<p>C. Explain agricultural systems' use of natural and human resources.</p> <ul style="list-style-type: none"> • Analyze the needs of plants and animals as they relate to climate and soil conditions. • Identify the plants and animals that can be raised in the area and explain why. • Identify natural resources necessary for agricultural systems. • Compare the need for crop production to the need for animal production. • Define issues associated with food and fiber production. 	<p>C. Explain the functions of the components of the food and fiber system.</p> <ul style="list-style-type: none"> • Compare and analyze growing conditions in the United States to determine which plants and animals are most suitable to each region. • Compare the management practices needed for a commodity (i.e., production, processing, research and development, marketing, distribution and regulations). • Identify a commodity, its origin and its steps of production. • Compare and analyze the cost of a commodity to its production cost. • Identify and describe how food safety issues have impacted production in agriculture. 	<p>C. Analyze and research the social, political and economic factors that affect agricultural systems.</p> <ul style="list-style-type: none"> • Analyze the costs and benefits associated with agriculture practices and how they affect economic and human needs. • Analyze the costs and benefits of agriculture research practices in society. • Research the use of by-products that are the results of agriculture production (e.g., manure handling, bird feathers).

4.4. Agriculture and Society			
4.4.4. GRADE 4	4.4.7. GRADE 7	4.4.10. GRADE 10	4.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>D. Identify technology and energy use associated with agriculture.</p> <ul style="list-style-type: none"> • Identify the various tools and machinery necessary for farming. • Identify the types of energy used in producing food and fiber. • Identify tools and machinery used in the production of agricultural products. 	<p>D. Explain the improvement of agricultural production through technology.</p> <ul style="list-style-type: none"> • Compare the technologies that have advanced agricultural production. • Explain how energy sources have changed to meet agricultural technology. 	<p>D. Analyze the efforts of increased efficiency in agriculture through technology.</p> <ul style="list-style-type: none"> • Compare various technological advancements and analyze each for its contribution toward labor and cost efficiency. • Compare the current market value of both natural and alternative energy sources involved in the production of food and fiber. 	<p>D. Analyze research and development activities as they relate to agriculture.</p> <ul style="list-style-type: none"> • Analyze the role of research, development and technology as it relates to the food and fiber system. • Research and analyze energy sources used and/or generated by producing, processing and marketing agricultural products.

4.5. Integrated Pest Management			
4.5.4. GRADE 4	4.5.7. GRADE 7	4.5.10. GRADE 10	4.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Know types of pests.</p> <ul style="list-style-type: none"> • Identify classifications of pests. • Identify and categorize pests. • Know how pests fit into a food chain. 	<p>A. Explain benefits and harmful effects of pests.</p> <ul style="list-style-type: none"> • Identify different examples of pests and explain the beneficial or harmful effects of each. • Identify several locations where pests can be found and compare the effects the pests have on each location. 	<p>A. Identify similar classifications of pests that may or may not have similar effects on different regions.</p> <ul style="list-style-type: none"> • Identify environmental effect(s) of pests on different regions of the world. • Identify introduced species that are classified as pests in their new environments. 	<p>A. Research integrated pest management systems.</p> <ul style="list-style-type: none"> • Analyze the threshold limits of pests and the need for intervention in a managed environment. • Research the types of germicides and analyze their effects on homes, industry, hospitals and institutions. • Design and explain an integrated pest management plan that uses a range of pest controls.

4.5. Integrated Pest Management			
4.5.4. GRADE 4	4.5.7. GRADE 7	4.5.10. GRADE 10	4.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>B. Explain pest control.</p> <ul style="list-style-type: none"> • Know reasons why people control pests. • Identify different methods for controlling specific pests in the home, school and community. • Identify chemical labels (e.g., caution, poison, warning). 	<p>B. Explain how pest management affects the environment.</p> <ul style="list-style-type: none"> • Explain issues related to integrated pest management including biological technology, resistant varieties, chemical practices, medical technology and monitoring techniques. • Describe how integrated pest management and related technology impact human activities. • Identify issues related to integrated pest management that affect the environment. 	<p>B. Analyze health benefits and risks associated with integrated pest management.</p> <ul style="list-style-type: none"> • Identify the health risks associated with chemicals used in common pesticides. • Assess various levels of control within different integrated pest management practices including increased immunity to pesticides, food safety, sterilization, nutrient management and weed control. 	<p>B. Research and analyze integrated pest management practices globally.</p> <ul style="list-style-type: none"> • Research worldwide integrated pest management systems and evaluate the level of impact. • Research and analyze the international regulations that exist related to integrated pest management. • Explain the complexities associated with moving from one level of control to the next with different integrated pest management practices and compare the related costs of each system.

4.5. Integrated Pest Management			
4.5.4. GRADE 4	4.5.7. GRADE 7	4.5.10. GRADE 10	4.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Understand society's need for integrated pest management.</p> <ul style="list-style-type: none"> • Identify integrated pest management practices in the home. • Identify integrated pest management practices outside the home. 	<p>C. Explain various integrated pest management practices used in society.</p> <ul style="list-style-type: none"> • Compare and contrast integrated pest management monitoring methods utilized in different community settings. • Compare integrated pest management to past practices. • Compare and analyze the long-term effects of using integrated pest management products. 	<p>C. Determine the effects of integrated pest management practices on society over time.</p> <ul style="list-style-type: none"> • Analyze the risks to the environment and society associated with alternative practices used in integrated pest management. • Analyze the benefits to the environment and society associated with alternative practices used in integrated pest management. 	<p>C. Analyze the historical significance of integrated pest management on society.</p> <ul style="list-style-type: none"> • Explain the dynamics of integrated pest management practices and their relative effects upon society. • Identify historic events affecting integrated pest management and cite the practices used (e.g., avian flu, bubonic plague, potato blight). • Research and analyze the long-term effects of pest management practices on the environment.

4.6. Ecosystems and their Interactions			
4.6.4. GRADE 4	4.6.7. GRADE 7	4.6.10. GRADE 10	4.6.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Understand that living things are dependent on nonliving things in the environment for survival.</p> <ul style="list-style-type: none"> Identify and categorize living and nonliving things. Describe the basic needs of an organism. Identify basic needs of a plant and an animal and explain how their needs are met. Identify plants and animals with their habitat and food sources. Identify environmental variables that affect plant growth. Describe how animals interact with plants to meet their needs for shelter. Describe how certain insects interact with soil for their needs. Understand the components of a food chain. 	<p>A. Explain the flows of energy and matter from organism to organism within an ecosystem.</p> <ul style="list-style-type: none"> Identify and explain the characteristics of biotic and abiotic. Describe and explain the adaptations of plants and animals to their environment. Demonstrate the dependency of living components in the ecosystem on the nonliving components. Explain energy flow through a food web. Explain the importance of the predator/prey relationship and how it maintains the balances within ecosystems. Understand limiting factors and predict their effects on an organism. 	<p>A. Explain the biotic and abiotic components of an ecosystem and their interaction.</p> <ul style="list-style-type: none"> Identify the major biomes and explain their similarities and differences. Compare and contrast the interactions of biotic and abiotic components in an ecosystem. Analyze the effects of abiotic factors on specific ecosystems. Describe how the availability of resources affects organisms in an ecosystem. Explain energy flow in a food chain through an energy pyramid. Evaluate the efficiency of energy flow in a food chain. Explain the concept of carrying capacity in an ecosystem. Explain trophic levels. 	<p>A. Analyze the interdependence of an ecosystem.</p> <ul style="list-style-type: none"> Analyze the relationships among components of an ecosystem. Evaluate the efficiency of energy flow within an ecosystem. Explain limiting factors and their impact on carrying capacity. Understand how biological diversity impacts the stability of an ecosystem. Analyze the positive or negative impacts of outside influences on an ecosystem. Analyze how different land use practices can affect the quality of soils.

4.6. Ecosystems and their Interactions			
4.6.4. GRADE 4	4.6.7. GRADE 7	4.6.10. GRADE 10	4.6.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<ul style="list-style-type: none"> • Identify a local ecosystem and its living and nonliving components. • Identify a simple ecosystem and its living and nonliving components. • Identify common soil textures. • Identify animals that live underground. 	<ul style="list-style-type: none"> • Identify niches for producers, consumers and decomposers within an ecosystem. • Compare and contrast the major ecosystems of Pennsylvania. • Identify the major characteristics of a biome. • Compare and contrast different biomes and their characteristics. • Identify the relationship of abiotic and biotic components and explain their interaction in an ecosystem. • Explain how different soil types determine the characteristics of ecosystems. 	<ul style="list-style-type: none"> • Identify a specific environmental impact and predict what change may take place to affect homeostasis. • Examine and explain how organisms modify their environments to sustain their needs. • Assess the effects of latitude and altitude on biomes. • Interpret possible causes of population fluctuations. • Explain how erosion and sedimentation have changed the quality of soil related habitats. 	

4.6. Ecosystems and their Interactions			
4.6.4. GRADE 4	4.6.7. GRADE 7	4.6.10. GRADE 10	4.6.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>B. Understand the concept of cycles.</p> <ul style="list-style-type: none"> • Explain the water cycle. • Explain the carbon dioxide/oxygen cycle (photosynthesis). <p>C. Identify how ecosystems change over time.</p>	<p>B. Explain the concepts of cycles.</p> <ul style="list-style-type: none"> • Identify and explain cycles within an ecosystem. • Analyze the role of different cycles within an ecosystem. <p>C. Explain how ecosystems change over time.</p> <ul style="list-style-type: none"> • Explain how ecosystems change. • Identify the succession stages of a given ecosystem. • Explain how specific organisms may change an ecosystem. • Explain a change in an ecosystem that relates to humans. 	<p>B. Explain how cycles affect the balance in an ecosystem.</p> <ul style="list-style-type: none"> • Describe an element cycle and its role in an ecosystem. • Explain the consequences of interrupting natural cycles. <p>C. Analyze how ecosystems change over time.</p> <ul style="list-style-type: none"> • Identify and explain the succession stages in an ecosystem. • Identify causes of succession. • Analyze consequences of interrupting natural cycles. 	<p>B. Analyze the impact of cycles on the ecosystem.</p> <ul style="list-style-type: none"> • Evaluate the materials necessary for natural cycles. • Explain the processes involved in the natural cycles. <p>C. Analyze how human action and natural changes affect the balance within an ecosystem.</p> <ul style="list-style-type: none"> • Analyze the effects of substances that move through natural cycles. • Analyze the effects of natural occurrences and their effects on ecosystems. • Analyze effects of human action on an ecosystem. • Compare the stages of succession and how they influence the cycles existing in an ecosystem.

4.7. Threatened, Endangered and Extinct Species			
4.7.4. GRADE 4	4.7.7. GRADE 7	4.7.10. GRADE 10	4.7.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Identify differences in living things.</p> <ul style="list-style-type: none"> • Explain why plants and animals are different colors, shapes and sizes and how these differences relate to their survival. • Identify characteristics that living things inherit from their parents. • Explain why each of the four elements in a habitat is essential for survival. • Identify local plants or animals and describe their habitat. 	<p>A. Describe diversity of plants and animals in ecosystems.</p> <ul style="list-style-type: none"> • Select an ecosystem and describe different plants and animals that live there. • Identify adaptations in plants and animals. • Recognize that adaptations are developed over long periods of time and are passed on from one generation to the next. • Understand levels of ecosystem organization (e.g., individuals, populations, species). 	<p>A. Explain the significance of diversity in ecosystems.</p> <ul style="list-style-type: none"> • Explain the role that specific organisms have in their ecosystem. • Identify a species and explain what effects its increase or decline might have on the ecosystem. • Identify a species and explain how its adaptations are related to its niche in the environment. 	<p>A. Analyze biological diversity as it relates to the stability of an ecosystem.</p> <ul style="list-style-type: none"> • Examine and explain what happens to an ecosystem as biological diversity changes. • Explain the relationship between species' loss and bio-diversity. • Examine and explain how a specialized interaction between two species may affect the survival of both species.

4.7. Threatened, Endangered and Extinct Species			
4.7.4. GRADE 4	4.7.7. GRADE 7	4.7.10. GRADE 10	4.7.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>B. Know that adaptations are important for survival.</p> <ul style="list-style-type: none"> • Explain how specific adaptations can help a living organism to survive. • Explain what happens to a living thing when its food, water, shelter or space is changed. 	<p>B. Explain how species of living organisms adapt to their environment.</p> <ul style="list-style-type: none"> • Explain the role of individual variations in natural selection. • Explain how an adaptation is an inherited structure or behavior that helps an organism survive and reproduce. • Describe how a particular trait may be selected over time and account for a species' adaptation. • Compare and contrast animals and plants that have very specific survival requirements with those that have more general requirements for survival. • Explain how living things respond to changes in their environment. • Explain how one species may survive an environmental change while another might not. 	<p>B. Explain how structure, function and behavior of plants and animals affect their ability to survive.</p> <ul style="list-style-type: none"> • Describe an organism's adaptations for survival in its habitat. • Compare adaptations among species. 	<p>B. Examine the effects of extinction, both natural and human caused, on the environment.</p> <ul style="list-style-type: none"> • Predict how human or natural action can produce change to which organisms cannot adapt. • Identify species that became extinct through natural causes and explain how that occurred. • Identify a species that became extinct due to human actions and explain what occurred.

4.7. Threatened, Endangered and Extinct Species			
4.7.4. GRADE 4	4.7.7. GRADE 7	4.7.10. GRADE 10	4.7.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Define and understand extinction.</p> <ul style="list-style-type: none"> • Identify plants and animals that are extinct. • Explain why some plants and animals are extinct. • Know that there are local and state laws regarding plants and animals. 	<p>C. Explain natural or human actions in relation to the loss of species.</p> <ul style="list-style-type: none"> • Identify natural or human impacts that cause habitat loss. • Explain how habitat loss can affect the interaction among species and the population of a species. • Analyze and explain the changes in an animal population over time. • Explain how a habitat management practice affects a population. • Explain the differences among threatened, endangered and extinct species. • Identify Pennsylvania plants and animals that are on the threatened or endangered list. 	<p>C. Identify and explain why adaptations can lead to specialization.</p> <ul style="list-style-type: none"> • Explain factors that could lead to a species' increase or decrease. • Explain how management practices may influence the success of specific species. • Identify and explain criteria used by scientists for categorizing organisms as threatened, endangered or extinct. 	<p>C. Analyze the effects of threatened, endangered or extinct species on human and natural systems.</p> <ul style="list-style-type: none"> • Identify and explain how a species' increase, decline or elimination affects the ecosystem and/or human social, cultural and economic structures. • Explain why natural populations do not remain constant. • Analyze management strategies regarding threatened or endangered species. • Identify laws, agreements or treaties at national or international levels regarding threatened or endangered species. • Analyze the role of zoos and wildlife preserves on species that have been identified as threatened or endangered.

4.7. Threatened, Endangered and Extinct Species			
4.7.4. GRADE 4	4.7.7. GRADE 7	4.7.10. GRADE 10	4.7.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
	<ul style="list-style-type: none"> Describe state laws passed regarding threatened and endangered species in Pennsylvania. Explain why one species may be more susceptible to becoming endangered than another species. 		<ul style="list-style-type: none"> Examine the influence of wildlife management in preserving different species in Pennsylvania (e.g., bobcat, elk, bald eagle).

4.8. Humans and the Environment			
4.8.4. GRADE 4	4.8.7. GRADE 7	4.8.10. GRADE 10	4.8.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
A. Identify the biological requirements of humans. <ul style="list-style-type: none">• Explain how a dynamically changing environment provides for sustainability of living systems.• Identify several ways that people use natural resources.	A. Describe how the development of civilization relates to the environment. <ul style="list-style-type: none">• Explain how people use natural resources in their environment.• Locate and identify natural resources in different parts of the world.• Compare and contrast how people use natural resources throughout the world.	A. Analyze how society's needs relate to the sustainability of natural resources. <ul style="list-style-type: none">• Explain why some societies have been unable to meet their natural resource needs.• Compare and contrast the use of natural resources and the environmental conditions in several countries.• Describe how uses of natural resources impact sustainability.	A. Explain how technology has influenced the sustainability of natural resources over time. <ul style="list-style-type: none">• Describe how technology has changed the use of natural resources by business and industry.• Analyze the effect of natural resource conservation on a product over time (e.g., automobile manufacturing, aluminum can recycling, paper products).

4.8. Humans and the Environment			
4.8.4. GRADE 4	4.8.7. GRADE 7	4.8.10. GRADE 10	4.8.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>B. Know that environmental conditions influence where and how people live.</p> <ul style="list-style-type: none"> • Identify how regional natural resources influence what people use. • Explain the influence of climate on how and where people live. 	<p>B. Explain how people use natural resources.</p> <ul style="list-style-type: none"> • Describe how natural resources are used for survival. • Explain how natural resources and technological changes have affected the development of civilizations. • Explain how climate and extreme weather events (e.g., drought, flood) influence people's lives. 	<p>B. Analyze the relationship between the use of natural resources and sustaining our society.</p> <ul style="list-style-type: none"> • Explain the role of natural resources in sustaining society. • Analyze the effects of a natural resource's availability on a community or region. 	<p>B. Analyze technology's role on natural resource sustainability.</p> <ul style="list-style-type: none"> • Explain how technology has decreased the use of raw natural resources. • Explain how technology has impacted the efficiency of the use of natural resources. • Analyze the role of technology in the reduction of pollution.

4.8. Humans and the Environment			
4.8.4. GRADE 4	4.8.7. GRADE 7	4.8.10. GRADE 10	4.8.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Explain how human activities may change the environment.</p> <ul style="list-style-type: none"> • Identify everyday human activities and how they affect the environment. • Identify examples of how human activities within a community affect the natural environment. 	<p>C. Explain how human activities may affect local, regional and national environments.</p> <ul style="list-style-type: none"> • Describe what effect consumption and related generation of wastes have on the environment. • Explain how a particular human activity has changed the local area over the years. 	<p>C. Analyze how human activities may cause changes in an ecosystem.</p> <ul style="list-style-type: none"> • Analyze and evaluate changes in the environment that are the result of human activities. • Compare and contrast the environmental effects of different industrial strategies (e.g., energy generation, transportation, logging, mining, agriculture). 	<p>C. Analyze how pollution has changed in quality, variety and toxicity as the United States developed its industrial base.</p> <ul style="list-style-type: none"> • Analyze historical pollution trends and project them for the future. • Compare and contrast historical and current pollution levels at a given location.

4.8. Humans and the Environment			
4.8.4. GRADE 4	4.8.7. GRADE 7	4.8.10. GRADE 10	4.8.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>D. Know the importance of natural resources in daily life.</p> <ul style="list-style-type: none"> • Identify items used in daily life that come from natural resources. • Identify ways to conserve our natural resources. • Identify major land uses in the community. 	<p>D. Explain the importance of maintaining the natural resources at the local, state and national levels.</p> <ul style="list-style-type: none"> • Explain how human activities and natural events have affected ecosystems. • Explain how conservation practices have influenced ecosystems. • Define the roles of Pennsylvania agencies that deal with natural resources. 	<p>D. Explain how the concept of supply and demand affects the environment.</p> <ul style="list-style-type: none"> • Identify natural resources for which societal demands have been increasing. • Identify specific resources for which human consumption has resulted in scarcity of supply (e.g., buffalo, lobsters). • Describe the relationship between population density and resource use and management. 	<p>D. Analyze the international implications of environmental occurrences.</p> <ul style="list-style-type: none"> • Identify natural occurrences that have international impact (e.g., El Nino, volcano eruptions, earthquakes). • Analyze environmental issues and their international implications.

4.9. Environmental Laws and Regulations			
4.9.4. GRADE 4	4.9.7. GRADE 7	4.9.10. GRADE 10	4.9.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Know that there are laws and regulations for the environment.</p> <ul style="list-style-type: none"> • Identify local and state laws and regulations regarding the environment. • Explain how the recycling law impacts the school and home. • Identify and describe the role of a local or state agency that deals with environmental laws and regulations. 	<p>A. Explain the role of environmental laws and regulations.</p> <ul style="list-style-type: none"> • Identify and explain environmental laws and regulations (e.g., Clean Air Act, Clean Water Act, Recycling and Waste Reduction Act, Act 26 on Agricultural Education). • Explain the role of local and state agencies in enforcing environmental laws and regulations (e.g., Department of Environmental Protection, Department of Agriculture, Game Commission). 	<p>A. Explain why environmental laws and regulations are developed and enacted.</p> <ul style="list-style-type: none"> • Explain the positive and negative impacts associated with passing environmental laws and regulations. • Understand conflicting rights of property owners and environmental laws and regulations. • Analyze the roles that local, state and federal governments play in the development and enforcement of environmental laws. • Identify local and state environmental regulations and their impact on environmental health. • Explain the positive and negative impacts of the Endangered Species Act. 	<p>A. Analyze environmental laws and regulations as they relate to environmental issues.</p> <ul style="list-style-type: none"> • Analyze and explain how issues lead to environmental law or regulation (e.g., underground storage tanks, regulation of water discharges, hazardous, solid and liquid industrial waste, endangered species). • Compare and contrast environmental laws and regulations that may have a positive or negative impact on the environment and the economy. • Research and describe the effects of an environmental law or regulation and how it has impacted the environment.

Academic Standards for Environment and Ecology**XII. GLOSSARY**

Abiotic:	A nonliving factor or element (e.g., light, water, heat, rock, energy, mineral).
Acid deposition:	Precipitation with a pH less than 5.6 that forms in the atmosphere when certain pollutants mix with water vapor.
Biological diversity:	The variety and complexity of species present and interacting in an ecosystem and the relative abundance of each.
Biotic:	An environmental factor related to or produced by living organisms.
Closing the loop:	A link in the circular chain of recycling events that promotes the use of products made with recycled materials.
Commodities:	Economic goods or products before they are processed and/or given a brand name, such as a product of agriculture.
Composting:	The process of mixing decaying leaves, manure and other nutritive matter to improve and fertilize soil.
Consumer:	1) Those organisms that obtain energy by feeding on other organisms and their remains. 2) A person buying goods or services for personal needs or to use in the production of other goods for resale.
Decomposer:	An organism, often microscopic in size, that obtains nutrients by consuming dead organic matter, thereby making nutrients accessible to other organisms; examples of decomposers include fungi, scavengers, rodents and other animals.
Delineate:	To trace the outline; to draw; to sketch; to depict or picture.
Ecosystem:	A community of living organisms and their interrelated physical and chemical environment.
Endangered Species:	A species that is in danger of extinction throughout all or a significant portion of its range.

Environment:	The total of the surroundings (air, water, soil, vegetation, people, wildlife) influencing each living being's existence, including physical, biological and all other factors; the surroundings of a plant or animal, including other plants or animals, climate and location.
Equilibrium:	The ability of an ecosystem to maintain stability among its biological resources (e.g., forest, fisheries, crops) so that there is a steady optimum yield.
Extinction:	The complete elimination of a species from the earth.
Groundwater:	Water that infiltrates the soil and is located in underground reservoirs called aquifers.
Hazardous waste:	A solid that, because of its quantity or concentration or its physical, chemical or infectious characteristics, may cause or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed.
Homeostasis:	The tendency for a system by resisting change to remain in a state of equilibrium.
Incinerating:	Burning to ashes; reducing to ashes.
Integrated pest management:	A variety of pest control methods that include repairs, traps, bait, poison, etc. to eliminate pests.
Lentic:	Relating to or living in still water.
Lotic:	Relating to or living in actively moving water.
Mitigation:	The policy of constructing or creating man-made habitats, such as wetlands, to replace those lost to development.
Niche (ecological):	The role played by an organism in an ecosystem; its food preferences, requirements for shelter, special behaviors and the timing of its activities (e.g., nocturnal, diurnal), interaction with other organisms and its habitat.
Nonpoint source pollution:	Contamination that originates from many locations that all discharge into a location (e.g., a lake, stream, land area).

Nonrenewable resources:	Substances (e.g., oil, gas, coal, copper, gold) that, once used, cannot be replaced in this geological age.
Point source pollution:	Pollutants discharged from a single identifiable location (e.g., pipes, ditches, channels, sewers, tunnels, containers of various types).
Pest:	A label applied to an organism when it is in competition with humans for some resource.
Recycling:	Collecting and reprocessing a resource or product to make into new products.
Regulation:	A rule or order issued by an executive authority or regulatory agency of a government and having the force of law.
Renewable:	A naturally occurring raw material or form of energy that will be replenished through natural ecological cycles or sound management practices (e.g., the sun, wind, water, trees).
Risk management:	A strategy developed to reduce or control the chance of harm or loss to one's health or life; the process of identifying, evaluating, selecting and implementing actions to reduce risk to human health and to ecosystems.
Shredder:	Through chewing and/or grinding, microorganisms feed on non-woody coarse particulate matter, primarily leaves.
Stream order:	Energy and nutrient flow that increases as water moves toward the oceans (e.g., the smallest stream (primary) that ends when rivers flow into oceans).
Succession:	The series of changes that occur in an ecosystem with the passing of time.
Sustainability:	The ability to keep in existence or maintain. A sustainable ecosystem is one that can be maintained.
Trophic levels:	The role of an organism in nutrient and energy flow within an ecosystem (e.g., herbivore, carnivore, decomposer).
Waste stream:	The flow of (waste) materials from generation, collection and separation to disposal.

- Watershed:** The land area from which surface runoff drains into a stream, channel, lake, reservoir or other body of water; also called a drainage basin.
- Wetlands:** Lands where water saturation is the dominant factor determining the nature of the soil development and the plant and animal communities (e.g., sloughs, estuaries, marshes).

APPENDIX C
Academic Standards for Civics and Government and Economics and Geography and History

Academic Standards for Civics and Government

Source

The provisions of this Appendix C adopted January 10, 2003, effective January 12, 2003, 33 Pa.B. 283, unless otherwise noted.

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XIV. INTRODUCTION

This document includes Academic Standards for Civics and Government that describe what students should know and be able to do in four areas:

- 5.1. Principles and Documents of Government
- 5.2. Rights and Responsibilities of Citizenship
- 5.3. How Government Works
- 5.4. How International Relationships Function

The Civics and Government Academic Standards describe what students should know and be able to do at four grade levels (third, sixth, ninth and twelfth). Throughout the standard statements, concepts found in lower grades must be developed more fully throughout higher grade levels.

The Pennsylvania Constitution of 1790 was the basis for the Free Public School Act of 1834 that is the underpinning of today’s system of schools operating throughout the Commonwealth. These schools were created to educate children to be useful citizens, loyal to the principles upon which our Republic was founded, and aware of their duties as citizens to maintain those ideals.

The Academic Standards for Civics and Government are based on the Public School Code of 1949 which directs “. . . teaching and presentation of the principles and ideals of the American republican representative form of government as portrayed and experienced by the acts and policies of the framers of the Declaration of Independence and framers of the Constitution of the United States and

Bill of Rights. . .”. The intent of the Code is that such instruction “shall have for its purpose also instilling into every boy and girl who comes out of public, private and parochial schools their solemn duty and obligation to exercise intelligently their voting privilege and to understand the advantages of the American republican form of government as compared with various other forms of governments.”

The Academic Standards for Civics and Government consist of four standard categories (designated as 5.1., 5.2., 5.3., and 5.4.). Each category has a number of standards statements designated by a capital letter. Some standard statements have bulleted items known as standard descriptors. The standard descriptors are items within the document to illustrate and enhance the standard statement. The categories, statements and descriptors are regulations. The descriptors may be followed by an “e.g.”. The “e.g.’s” are examples to clarify what type of information could be taught. These are suggestions and the choice of specific content is a local decision as is the method of instruction.

Civics and Government along with Economics, Geography and History are identified as Social Studies in Chapter 4. This identification is consistent with citizenship education in Chapter 49 and Chapter 354. Based on these regulations, Social Studies/Citizenship Programs should include the four sets of standards as an entity in developing a scope and sequence for curriculum and planned instruction.

A glossary is included to assist the reader in clarifying terminology contained in the standards.

5.1. Principles and Documents of Government			
5.1.3. GRADE 3	5.1.6. GRADE 6	5.1.9. GRADE 9	5.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Describe what government is.</p> <p>B. Explain the purposes of rules and laws and why they are important in the classroom, school, community, state and nation.</p> <p>C. Define the principles and ideals shaping government.</p> <ul style="list-style-type: none"> • Justice • Truth • Diversity of people and ideas • Patriotism • Common good • Liberty • Rule of law • Leadership • Citizenship 	<p>A. Explain the purpose of government.</p> <p>B. Explain the importance of the rule of law for the protection of individual rights and the common good in the community, state, nation and world.</p> <p>C. Describe the principles and ideals shaping government.</p> <ul style="list-style-type: none"> • Equality • Majority rule/Minority rights • Popular sovereignty • Privacy • Checks and balances • Separation of powers 	<p>A. Identify and explain the major arguments advanced for the necessity of government.</p> <p>B. Describe historical examples of the importance of the rule of law.</p> <ul style="list-style-type: none"> • Sources • Purposes • Functions <p>C. Analyze the principles and ideals that shape government.</p> <ul style="list-style-type: none"> • Constitutional government • Liberal democracy • Classical republicanism • Federalism 	<p>A. Evaluate the major arguments advanced for the necessity of government.</p> <p>B. Analyze the sources, purposes and functions of law.</p> <p>C. Evaluate the importance of the principles and ideals of civic life.</p>

5.1. Principles and Documents of Government			
5.1.3. GRADE 3	5.1.6. GRADE 6	5.1.9. GRADE 9	5.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
D. Identify the document which created Pennsylvania.	D. Explain the basic principles and ideals within documents of Pennsylvania government. <ul style="list-style-type: none"> • Charter of 1681 • Charter of Privileges • Pennsylvania Constitution • Pennsylvania Declaration of Rights 	D. Interpret significant changes in the basic documents shaping the government of Pennsylvania. <ul style="list-style-type: none"> • The Great Law of 1682 • Constitution of 1776 • Constitution of 1790 • Constitution of 1838 • Constitution of 1874 • Constitution of 1968 	D. Analyze the principles and ideals that shape the government of Pennsylvania and apply them to the government. <ul style="list-style-type: none"> • The Charter of 1681 • Charter of Privileges • PA Constitution, its revisions and Amendments

5.1. Principles and Documents of Government			
5.1.3. GRADE 3	5.1.6. GRADE 6	5.1.9. GRADE 9	5.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
E. Identify documents of United States government. <ul style="list-style-type: none"> • Declaration of Independence • Constitution of the United States • Bill of Rights 	E. Explain the basic principles and ideals within documents of United States government.	E. Analyze the basic documents shaping the government of the United States. <ul style="list-style-type: none"> • Magna Carta • English Bill of Rights • Mayflower Compact • Articles of Confederation • Declaration of Independence • Federalist papers • Anti-federalist writings • United States Constitution 	E. Evaluate the principles and ideals that shape the United States and compare them to documents of government.

5.1. Principles and Documents of Government			
5.1.3. GRADE 3	5.1.6. GRADE 6	5.1.9. GRADE 9	5.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
F. Explain the meaning of a preamble. <ul style="list-style-type: none"> • Constitution of the United States • Pennsylvania Constitution G. Describe the purpose of the United States Flag, The Pledge of Allegiance and The National Anthem.	F. Explain the meaning of the Preamble to the Constitution of the Commonwealth of Pennsylvania and compare it to the Preamble of the Constitution of the United States. G. Describe the proper use, display and respect for the United States Flag and explain the significance of patriotic activities. <ul style="list-style-type: none"> • Reciting The Pledge of Allegiance • Standing for The National Anthem 	F. Contrast the individual rights created by the Pennsylvania Constitution and those created by the Constitution of the United States. G. Describe the procedures for proper uses, display and respect for the United States Flag as per the National Flag Code.	F. Analyze and assess the rights of the people as listed in the Pennsylvania Constitution and the Constitution of the United States. G. Analyze and interpret the role of the United States Flag in civil disobedience and in patriotic activities.

5.1. Principles and Documents of Government			
5.1.3. GRADE 3	5.1.6. GRADE 6	5.1.9. GRADE 9	5.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>H. Identify framers of documents of governments.</p> <ul style="list-style-type: none"> • Pennsylvania • United States <p>I. Explain why government is necessary in the classroom, school, community, state and nation and the basic purposes of government in Pennsylvania and the United States.</p> <p>J. Explain the importance of respect for the property and the opinions of others.</p>	<p>H. Describe the roles played by the framers of the basic documents of governments of Pennsylvania and the United States.</p> <p>I. Describe and compare the making of rules by direct democracy and by republican form of government.</p> <p>J. Describe how the government protects individual and property rights and promotes the common good.</p>	<p>H. Explain and interpret the roles of framers of basic documents of government from a national and Pennsylvania perspective.</p> <p>I. Explain the essential characteristics of limited and unlimited governments and explain the advantages and disadvantages of systems of government.</p> <ul style="list-style-type: none"> • Confederal • Federal • Unitary <p>J. Explain how law protects individual rights and the common good.</p>	<p>H. Analyze the competing positions held by the framers of the basic documents of government of Pennsylvania and United States.</p> <p>I. Analyze historical examples of the importance of the rule of law explaining the sources, purposes and functions of law.</p> <p>J. Analyze how the law promotes the common good and protects individual rights.</p>

5.1. Principles and Documents of Government			
5.1.3. GRADE 3	5.1.6. GRADE 6	5.1.9. GRADE 9	5.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
K. Identify symbols and political holidays. <ul style="list-style-type: none"> • Pennsylvania (e.g., Charter Day, Liberty Bell, Keystone State) • United States (e.g., Presidents' Day, Statue of Liberty, White House) 	K. Describe the purpose of symbols and holidays.	K. Explain why symbols and holidays were created and the ideals they commemorate.	K. Analyze the roles of symbols and holidays in society.
L. Identify ways courts resolve conflicts involving principles and ideals of government.	L. Explain the role of courts in resolving conflicts involving the principles and ideals of government. <ul style="list-style-type: none"> • Local • State • Federal 	L. Interpret Pennsylvania and United States court decisions that have impacted the principles and ideals of government.	L. Analyze Pennsylvania and United States court decisions that have affected principles and ideals of government in civic life. <ul style="list-style-type: none"> • Civil rights • Commerce • Judicial review • Federal supremacy

5.1. Principles and Documents of Government			
5.1.3. GRADE 3	5.1.6. GRADE 6	5.1.9. GRADE 9	5.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
M. Identify portions of famous speeches and writings that reflect the basic principles and ideals of government (e.g., "I have a dream," Reverend Martin Luther King; "One small step for man," Neil Armstrong).	M. Explain the basic principles and ideals found in famous speeches and writings (e.g., "Governments, like clocks, go from the motion people give them," William Penn; "A date that will live in infamy," Franklin D. Roosevelt).	M. Interpret the impact of famous speeches and writings on civic life (e.g., <i>The Gospel of Wealth</i> , <i>Declaration of Sentiments</i>).	M. Evaluate and analyze the importance of significant political speeches and writings in civic life (e.g., <i>Diary of Anne Frank</i> , <i>Silent Spring</i>).
Basic concepts found in lower grades for standard statements and their descriptors must be developed more fully throughout higher grade levels.			

5.2. Rights and Responsibilities of Citizenship			
5.2.3. GRADE 3	5.2.6. GRADE 6	5.2.9. GRADE 9	5.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Identify examples of the rights and responsibilities of citizenship.</p> <ul style="list-style-type: none"> • Personal rights • Political rights • Economic rights • Personal responsibilities • Civic responsibilities <p>B. Identify personal rights and responsibilities.</p>	<p>A. Compare rights and responsibilities of citizenship.</p> <ul style="list-style-type: none"> • Political rights • Economic rights • Personal responsibilities of the individual and to society • Civic responsibilities of the individual and to society • Traits of character of individuals and to a republican form of government <p>B. Explain the relationship between rights and responsibilities.</p>	<p>A. Contrast the essential rights and responsibilities of citizens in systems of government.</p> <ul style="list-style-type: none"> • Autocracy • Democracy • Oligarchy • Republic <p>B. Analyze citizens' rights and responsibilities in local, state and national government.</p>	<p>A. Evaluate an individual's civic rights, responsibilities and duties in various governments.</p> <p>B. Evaluate citizen's participation in government and civic life.</p>

5.2. Rights and Responsibilities of Citizenship			
5.2.3. GRADE 3	5.2.6. GRADE 6	5.2.9. GRADE 9	5.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
C. Identify sources of conflict and disagreement and different ways conflicts can be resolved.	C. Explain ways citizens resolve conflicts in society and government.	C. Analyze skills used to resolve conflicts in society and government.	C. Interpret the causes of conflict in society and analyze techniques to resolve those conflicts.
D. Identify the importance of political leadership and public service in the school, community, state and nation.	D. Describe the importance of political leadership and public service.	D. Analyze political leadership and public service in a republican form of government.	D. Evaluate political leadership and public service in a republican form of government.
E. Describe ways citizens can influence the decisions and actions of government.	E. Identify examples of the rights and responsibilities of citizenship.	E. Explain the importance of the political process to competent and responsible participation in civic life.	E. Analyze how participation in civic and political life leads to the attainment of individual and public goals.
F. Explain the benefits of following rules and laws and the consequences of violating them.	F. Describe the impact of the consequences of violating rules and laws in a civil society.	F. Analyze the consequences of violating laws of Pennsylvania compared to those of the United States.	F. Evaluate how individual rights may conflict with or support the common good.
G. Identify ways to participate in government and civic life.	G. Explain the importance of participating in government and civic life.	G. Analyze political and civic participation in government and society.	G. Evaluate what makes a competent and responsible citizen.

5.2. Rights and Responsibilities of Citizenship			
5.2.3. GRADE 3	5.2.6. GRADE 6	5.2.9. GRADE 9	5.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
Basic concepts found in lower grades for standard statements and their descriptors must be developed more fully throughout higher grade levels.			

5.3. How Government Works			
5.3.3. GRADE 3	5.3.6. GRADE 6	5.3.9. GRADE 9	5.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Identify the elected representative bodies responsible for making local, Pennsylvania and United States laws.</p> <p>B. Identify the role of the three branches of government.</p> <ul style="list-style-type: none"> • Executive • Legislative • Judicial <p>C. Identify reasons for rules and laws in the school and community.</p>	<p>A. Compare the structure, organization and operation of local, state and national governments.</p> <p>B. Describe the responsibilities and powers of the three branches of government.</p> <p>C. Explain how government actions affect citizens' daily lives.</p>	<p>A. Explain the structure, organization and operation of the local, state and national governments including domestic and national policy-making.</p> <p>B. Compare the responsibilities and powers of the three branches within the national government.</p> <p>C. Explain how a bill becomes a law on a federal, state, and local level.</p>	<p>A. Analyze and evaluate the structure, organization and operation of the local, state and national governments including domestic and national policy-making.</p> <p>B. Analyze the responsibilities and powers of the national government.</p> <p>C. Evaluate the process of how a bill becomes the law on a federal, state, and local levels.</p>

5.3. How Government Works			
5.3.3. GRADE 3	5.3.6. GRADE 6	5.3.9. GRADE 9	5.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
D. Identify services performed by the local, state and national governments.	D. Describe how local, state and national governments implement their services.	D. Explain how independent government agencies create, amend and enforce regulatory policies. <ul style="list-style-type: none">• Local (e.g., Zoning Board)• State (e.g., Pennsylvania Public Utility Commission)• National (e.g., Federal Communications Commission)	D. Evaluate how independent government agencies create, amend and enforce regulations.
E. Identify positions of authority at school and in local, state and national governments.	E. Identify major leaders of local, state and national governments, their primary duties and their political party affiliation.	E. Explain how citizens participate in choosing their leaders through political parties, campaigns and elections.	E. Evaluate the roles of political parties in election campaigns.

5.3. How Government Works			
5.3.3. GRADE 3	5.3.6. GRADE 6	5.3.9. GRADE 9	5.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
F. Explain what an election is.	F. Describe the voting process. <ul style="list-style-type: none"> • Pennsylvania • United States 	F. Explain the election process. <ul style="list-style-type: none"> • Voter registration • Primary Elections • Caucuses • Political party conventions • General Elections • Electoral College 	F. Evaluate the elements of the election process.
G. Explain why being treated fairly is important.	G. Describe how the government protects individual rights. <ul style="list-style-type: none"> • Presumption of Innocence • Right to Counsel • Trial by Jury • Bill of Rights 	G. Explain how the government protects individual rights. <ul style="list-style-type: none"> • Equal protection • Habeas Corpus • Right Against Self Incrimination • Double Jeopardy • Right of Appeal • Due Process 	G. Evaluate how the government protects or curtails individual rights and analyze the impact of supporting or opposing those rights.

5.3. How Government Works			
5.3.3. GRADE 3	5.3.6. GRADE 6	5.3.9. GRADE 9	5.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
H. Identify individual interests and explain ways to influence others. I. Explain why taxes are necessary and identify who pays them. J. Identify the role of the media in society. K. Identify different ways people govern themselves.	H. Identify individual interests and how they impact government. I. Describe why and how government raises money to pay for its operations and services. J. Describe the influence of media in reporting issues. K. Describe forms of government. • Limited • Unlimited	H. Analyze how interest groups provide opportunities for citizens to participate in the political process. I. Analyze how and why government raises money to pay for its operation and services. J. Analyze the importance of freedom of the press. K. Identify and explain systems of government. • Autocracy • Democracy • Oligarchy • Republic	H. Evaluate the impact of interest groups on the political process. I. Evaluate how and why government raises money to pay for its operations and services. J. Evaluate the role of media in political life in the United States and explain the role of the media in setting the public agenda. K. Evaluate the strengths and weaknesses of various systems of government. • Autocracy • Democracy • Oligarchy • Republic
Basic concepts found in lower grades for standard statements and their descriptors must be developed more fully throughout higher grade levels.			

5.4. How International Relationships Function			
5.4.3. GRADE 3	5.4.6. GRADE 6	5.4.9. GRADE 9	5.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Identify how customs and traditions influence governments.</p> <p>B. Recognize that the world is divided into various political units.</p> <p>C. Identify ways in which countries interact with the United States.</p>	<p>A. Explain the concept of nation-states.</p> <p>B. Describe how nation-states coexist in the world community.</p> <p>C. Describe the governments of the countries bordering the United States and their relationships with the United States.</p>	<p>A. Explain how the United States is affected by policies of nation-states, governmental and non-governmental organizations.</p> <p>B. Explain the role of the United States in world affairs.</p> <p>C. Explain the effects United States political ideas have had on other nations.</p>	<p>A. Analyze the impact of international economic, technological and cultural developments on the government of the United States.</p> <p>B. Analyze the United States' interaction with other nations and governmental groups in world events.</p> <p>C. Compare how past and present United States' policy interests have changed over time and analyze the impact on future international relationships.</p>

5.4. How International Relationships Function			
5.4.3. GRADE 3	5.4.6. GRADE 6	5.4.9. GRADE 9	5.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>D. Identify treaties and other agreements between or among nations.</p> <p>E. Identify how nations work together to solve problems.</p>	<p>D. Describe the processes that resulted in a treaty or agreement between the United States and another nation-state.</p> <p>E. Explain how nations work together on common environmental problems, natural disasters and trade.</p>	<p>D. Contrast how the three branches of federal government function in foreign policy.</p> <p>E. Explain the development and the role of the United Nations and other international organizations, both governmental and non-governmental.</p>	<p>D. Explain how foreign policy is developed and implemented.</p> <p>E. Compare the purposes and functions of international organizations.</p> <ul style="list-style-type: none"> • Governmental (e.g., NATO, World Court, OAS) • Nongovernmental (e.g., International Red Cross, Amnesty International, World Council of Churches)

XV. GLOSSARY

Amendment (Constitutional):	Changes in, or additions to, a constitution. Proposed by a two-thirds vote of both houses of Congress or by a convention called by Congress at the request of two-thirds of the state legislatures. Ratified by approval of three-fourths of the state.
Articles of Confederation:	First framework of government of the United States, 1781. Created a weak national government, replaced in 1789 by the Constitution of the United States.
Authority:	Right to control or direct the actions of others, legitimized by law, morality, custom or consent.
Autocracy:	A government in which one person possesses unlimited power.
Bill of Rights:	First Ten Amendments to the Constitution. Ratified in 1791, these amendments limit government power and protect basic rights and liberties of individuals.
Caucuses:	A private meeting of members of a political party to plan action or to select delegates for a nominating convention. The term also refers to distinct groups, either official or unofficial, in Congress, as in the black caucus in the House of Representatives.
Checks and balances:	Constitutional mechanisms that authorize each branch of government to share powers with the other branches and thereby check their activities. For example, the president may veto legislation passed by Congress, the Senate must confirm major executive appointments and the courts may declare acts of Congress unconstitutional.
Citizen:	Member of a political society who therefore owes allegiance to and is entitled to protection by and from the government.
Citizenship:	Status of being a member of a state; one who owes allegiance to the government and is entitled to protection by and from the government.

Civic life:	A manner of existence of an individual concerned with the affairs of communities and the common good rather than solely in pursuit of private and personal interests.
Civic responsibilities:	Obligation of citizens to take part in the governance of the school, community, tribe, state or nation.
Civil disobedience:	Refusal to obey laws. This tactic is usually passive and nonviolent, aimed at bringing injustices to the attention of lawmakers and the public at large. An example of civil disobedience was the American Civil Rights Movement in the 1950s and 1960s.
Civil rights:	Protections and privileges given to all United States citizens by the Constitution and Bill of Rights.
Civil society:	The spheres of voluntary individual, social and economic relationships and organizations that although limited by law are not part of governmental institutions.
Classical republicanism:	Refers to government that seeks the public or common good rather than the good of a particular group or class of society.
Common or public good:	Benefit or interest of a politically organized society as a whole.
Confederal:	Relating to a league of independent states.
Constitutional government:	A form of authority in which a legal structure details the powers available to each branch of government and the rights of the individual in relation to the government. Any action by government that is not in accord with the Constitution is considered illegitimate.
Democracy:	Form of government in which political control is exercised by the people, either directly or through their elected representatives.
Diplomacy:	The art and practice of conducting negotiations between nations.

Direct democracy:	Form of government in which the people completely exercise political decisions.
Diversity:	State of being different; variety.
Documents of government:	Papers necessary for the organization and powers of government.
Double jeopardy:	A concept established by law that says a person cannot be tried twice for the same offense. It is part of the Fifth Amendment, which states that “no person shall . . . be subject for the same offense to be twice put in jeopardy of life or limb.”
Due process of law:	Right of every citizen to be protected against arbitrary action by government.
Economic rights:	Financial choices and privileges that individuals may select without government prohibition. Economic rights would include: right to own property, change employment, operate a business and join a labor union.
Electoral College:	The group of presidential electors that casts the official votes for president after the presidential election. Each state has a number of electors equal to the total of its members in the Senate and House of Representatives.
Enumerated powers:	Powers that are specifically granted to Congress by Article I, Section 8 of the Constitution.
Equal protection:	An idea that no individual or group may receive special privileges from nor be unjustly discriminated against by the political authority of the legal system.
Equality:	The condition of possessing substantially the same rights, privileges and immunities, and being substantially responsible for the same duties as other members of society.

Federal Supremacy Clause:	Article VI of the Constitution provides that the Constitution and all federal laws and treaties shall be the “Supreme Law of the Land.” Therefore, all federal laws take precedence over state and local laws.
Federal system (or Federalism):	Form of political organization in which governmental power is divided between a central government and territorial subdivisions (e.g., in the United States—the national, state and local governments).
Federalism:	The distribution of power in a government between a central authority and states and the distribution of power among states with most powers retained by central government.
Foreign Policy:	Actions of the federal government directed to matters beyond United States’ borders, especially relations with other countries.
Government:	Institutions and procedures through which a territory and its people are ruled.
Habeas Corpus:	Court order demanding that the individual in custody be brought into court and shown the cause for detention. Habeas corpus is guaranteed by the Constitution and can be suspended only in the case of rebellion or invasion.
Individual responsibility:	Fulfilling the moral and legal obligations of membership in society.
Individual rights:	Just claims due a person by law, morality or tradition as opposed to those due to groups.
Interest group:	Organized body of individuals who share same goals and try to influence public policy to meet those goals.
International organizations:	Groups formed by nation-states to achieve common political, social or economic goals.

Judicial Review:	Doctrine that permits the federal courts to declare unconstitutional, and thus null and void, acts of the Congress, the executive branch and the states. The precedent for judicial review was established in the 1803 case of <i>Marbury v. Madison</i> .
Justice:	That which may be obtained through fair distribution of benefits and burdens, fair correction of wrongs and injuries, or use of fair procedures in gathering information and making decisions.
Leadership:	State or condition of one who guides or governs.
Liberal Democracy:	Government that recognizes that the individual has rights that exist independently of government and which ought to be protected by and against government.
Liberty:	Freedom from restraint under conditions essential to the equal enjoyment of the same right by others.
Limited government:	A legal structure where officials in authority do not have enormous power. The Constitution of the United States limits government through methods of checks and balances.
Majority rule:	Decision by more than half of those participating in the decision-making process.
Minority rights:	Opportunities that a member is entitled to have, or to receive from others within the limits of the law, even though he/she may not be part of the controlling group.
Nation-state:	Divisions of the world in which each state claims sovereignty over defined territory and jurisdiction over everyone within it. These states interact using diplomacy, formal agreements and sanctions that may be peaceful or may involve the use of force.

NATO:	North Atlantic Treaty Organization, an international transatlantic partnership consisting of various European states, the United States and Canada, which was designed through cooperation, consultation and collective defense to maintain peace and promote stability throughout Europe.
Non-governmental organization:	A group in a free society that is not a part of any government institution and does not derive its power from government.
OAS:	Organization of American States, an international governmental organization formed by the states of North and South America for security and the protection of mutual interests.
Oligarchy:	A government in which a small group exercises control. These systems are usually based on wealth, military power or social position.
Patriotism:	A feeling of pride in and respect for one's country.
Personal rights:	Private legal privileges and decisions that individuals are free to participate in without intervention from government. Personal rights would include the right to vote, petition, assemble, and seek public office.
Political party:	Any group, however loosely organized, that seeks to elect government officials under a given label.
Political rights:	Legal claims by citizens to participate in government and be treated fairly. Political rights would include the right to vote, petition, assemble, and seek public office.
Popular sovereignty:	The concept that ultimate political authority rests with the people to create, alter or abolish governments.
Presumption of innocence:	The legal concept that a criminal defendant is not guilty until the prosecution proves every element of the crime, beyond a reasonable doubt.
Privacy:	The right to be left alone; the right of an individual to withhold one's self and one's property from public scrutiny if one so chooses.

Public service:	Action of benefit to local, state or national communities through appointed or elected office.
Representative Democracy:	Form of government in which power is held by the voters and is exercised indirectly through elected representatives who make decisions.
Republic:	Form of government in which political control is exercised through elected representatives.
Republican form of government:	System of government in which power is held by the voters and is exercised by elected representatives responsible for promoting the common welfare.
Right against self-incrimination:	Individual right found in the Fifth Amendment to the United States Constitution that prevents an individual from being forced to testify against himself or herself.
Right of appeal:	The right to seek review by a superior court of an injustice done or error committed by an inferior court, whose judgment or decision the court above is called upon to correct or reverse.
Right to counsel:	Individual right found in the Sixth Amendment to the Constitution that requires criminal defendants to have access to legal representation.
Rule of Law:	Principle that every member of a society, even a ruler, must follow the law.
Separation of powers:	Distribution among the branches of government to ensure that the same person or group will not make the law, enforce the law and interpret the law.
State:	A commonwealth; a nation; a civil power.
Treaty:	Formal agreement between or among sovereign nations to create or restrict rights and responsibilities. In the United States all treaties must be approved by a two-thirds vote in the Senate.

Trial by jury:	Individual right found in the Sixth and Seventh Amendment of the Constitution that guarantees a person an impartial jury.
Truth:	Agreement of thought and reality that can eventually be verified.
Unitary government:	An authoritative system in which all regulatory power is vested in a central government from which regional and local governments derive their powers (e.g., Great Britain and France as well as the American states within their spheres of authority).
United Nations:	International organization comprising most of the nation-states of the world. It was formed in 1945 to promote peace, security and economic development.
Unlimited government:	A legal structure where officials in authority have unrestricted power. Examples of unlimited governments would be authoritarian or totalitarian systems without restraints on their power.
World Court:	Court in the Hague, the Netherlands, set up by the United Nations treaty to which nations may voluntarily submit disputes.

Academic Standards for Economics

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XVII. INTRODUCTION

This document includes Academic Standards for Economics that describe what students should know and be able to do in five areas:

- 6.1. Economic Systems
- 6.2. Markets and the Functions of Governments
- 6.3. Scarcity and Choice
- 6.4. Economic Interdependence
- 6.5. Work and Earnings

The Economic Standards describe what students should know and be able to do at four grade levels (third, sixth, ninth and twelfth). They reflect the increasing complexity and sophistication that students are expected to achieve as they

progress through school. This document attempts to avoid repetition and makes obvious progression across grade levels. Topics and concepts in Economics directly relate to Environment and Ecology Standard 4.2 and Geography Standard 7.3. As a social science, Economics Standards should be Cross-Walked and related to the Civics and Government, Geography and History Standards to create an interdisciplinary view of the world.

Economics is concerned with the behavior of individuals and institutions engaged in the production, exchange and consumption of goods and services. As technology helps to reshape the economy, knowledge of how the world works is critical. People entering the workforce cannot function effectively without a basic knowledge of the characteristics of economic systems, how markets establish prices, how scarcity and choice affect the allocation of resources, the global nature of economic interdependence and how work and earnings impact productivity.

A Pennsylvania governor remarked, “Among the freedoms we enjoy in America in our pursuit of happiness is the freedom to be independent, creative, visionary and entrepreneurial. We are free to pursue dreams. . .” To succeed, however, every student must know how to manage resources, prepare for the workforce, make wise investments and be informed about public policy. These standards are intended to provide direction in learning how economic activity impacts the forces of everyday life.

The academic standards for Economics consist of five standard categories (designated as 6.1., 6.2., 6.3., 6.4. and 6.5.). Each category has a number of standards statements designated by a capital letter. Some standard statements have bulleted items known as standard descriptors. The standard descriptors are items within the document to illustrate and enhance the standard statement. The categories, statements and descriptors are regulations. The descriptors may be followed by an “e.g.” The “e.g.’s” are examples to clarify what type of information could be taught. These are suggestions and the choice of specific content is a local decision as is the method of instruction.

Economics along with Civics and Government, Geography, and History are identified as Social Studies in Chapter 4. This identification is consistent with citizenship education in Chapter 49 and Chapter 354. Based on these regulations, social studies/citizenship programs should include four sets of standards as an entity in developing a scope and sequence for curriculum and planned instruction.

A glossary is included to assist the reader in clarifying terminology contained in the standards.

6.1. Economic Systems			
6.1.3. GRADE 3	6.1.6. GRADE 6	6.1.9. GRADE 9	6.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Describe how individuals, families and communities with limited resources make choices.</p> <p>B. Describe alternative methods of allocating goods and services and advantages and disadvantages of each.</p> <p>C. Identify local economic activities.</p> <ul style="list-style-type: none"> • Employment • Output <p>D. Identify examples of local businesses opening, closing, expanding or contracting.</p>	<p>A. Describe and identify the characteristics of traditional, command and market systems.</p> <p>B. Explain the three basic questions that all economic systems attempt to answer.</p> <ul style="list-style-type: none"> • What goods and services should be produced? • How will goods and services be produced? • Who will consume goods and services? <p>C. Define measures of economic activity and relate them to the health of the economy.</p> <ul style="list-style-type: none"> • Prices • Employment • Output <p>D. Explain the importance of expansion and contraction on individual businesses (e.g., gourmet food shops, auto repair shops, ski resorts).</p>	<p>A. Analyze the similarities and differences in economic systems.</p> <p>B. Explain how traditional, command and market economies answer the basic economic questions.</p> <p>C. Explain how economic indicators reflect changes in the economy.</p> <ul style="list-style-type: none"> • Consumer Price Index (CPI) • Gross Domestic Product (GDP) • Unemployment rate <p>D. Describe historical examples of expansion, recession and depression in the United States.</p>	<p>A. Evaluate the strengths and weaknesses of traditional, command and market economics.</p> <p>B. Analyze the impact of traditional, command and market economies on the United States economy.</p> <p>C. Assess the strength of the regional, national and/or international economy and compare it to another time period based upon economic indicators.</p> <p>D. Describe historical examples of expansion, recession, and depression internationally.</p>

6.2. Markets and the Functions of Governments			
6.2.3. GRADE 3	6.2.6. GRADE 6	6.2.9. GRADE 9	6.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Define and identify goods, services, consumers and producers.</p> <p>B. Identify ways local businesses compete to get customers.</p> <p>C. Identify and compare means of payment.</p> <ul style="list-style-type: none"> • Barter • Money <p>D. Identify groups of competing producers in the local area.</p>	<p>A. Describe market transactions in terms of goods, services, consumers and producers.</p> <p>B. Describe the costs and benefits of competition to consumers in markets.</p> <p>C. Explain the function of money and its use in society.</p> <p>D. Define economic institutions (e.g., banks, labor unions).</p>	<p>A. Explain the flow of goods, services and resources in a mixed economy.</p> <p>B. Analyze how the number of consumers and producers affects the level of competition within a market.</p> <p>C. Explain the structure and purpose of the Federal Reserve System.</p> <p>D. Analyze the functions of economic institutions (e.g., corporations, not-for-profit institutions).</p>	<p>A. Analyze the flows of products, resources and money in a mixed economy.</p> <p>B. Evaluate the operation of noncompetitive markets.</p> <p>C. Analyze policies designed to raise or lower interest rates and how the Federal Reserve Board influences interest rates.</p> <p>D. Evaluate changes in economic institutions over time (e.g. stock markets, nongovernment organizations).</p>

6.2. Markets and the Functions of Governments			
6.2.3. GRADE 3	6.2.6. GRADE 6	6.2.9. GRADE 9	6.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
E. Identify who supplies a product and who demands a product.	E. Explain how the interaction of buyers and sellers determines prices and quantities exchanged.	E. Explain the laws of supply and demand and how these affect the prices of goods and services.	E. Predict how changes in supply and demand affect equilibrium price and quantity sold.
F. Define price and identify the prices of different items.	F. Describe how prices influence both buyers and sellers and explain why prices may vary for similar products.	F. Analyze how competition among producers and consumers affects price, costs, product quality, service, product design and variety and advertising.	F. Identify and analyze forces that can change price. <ul style="list-style-type: none"> • Government actions • Weather conditions • International events
G. Define what a tax is and identify a tax paid by most families.	G. Explain how taxes affect the price of goods and services.	G. Contrast the largest sources of tax revenue with where most tax revenue is spent in Pennsylvania.	G. Evaluate types of tax systems. <ul style="list-style-type: none"> • Progressive • Proportional • Regressive

6.2. Markets and the Functions of Governments			
6.2.3. GRADE 3	6.2.6. GRADE 6	6.2.9. GRADE 9	6.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
H. Identify government involvement in local economic activities.	H. Describe the Pennsylvania and United States governments' roles in monitoring economic activities.	H. Analyze the economic roles of governments in market economies. <ul style="list-style-type: none"> • Economic growth and stability • Legal frameworks • Other economic goals (e.g., environmental protection, competition) 	H. Evaluate the economic roles of governments. <ul style="list-style-type: none"> • Macroeconomics (e.g., tariffs and quotas, exchange rates, trade balance) • Microeconomics (e.g., price controls, monopolies, cartels)
I. Identify goods and services produced by the government (e.g., postal service, food inspection).	I. Identify and describe public goods.	I. Explain how government provides public goods.	I. Evaluate government decisions to provide public goods.
J. Explain the relationship between taxation and government services.	J. Explain the cost and benefits of taxation.	J. Contrast the taxation policies of the local, state and national governments in the economy.	J. Evaluate the social, political and economic changes in tax policy using cost/benefit analysis.
K. Identify forms of advertising designed to influence personal choice.	K. Explain how advertisements influence perceptions of the costs and benefits of economic decisions.	K. Interpret how media reports can influence perceptions of the costs and benefits of decisions.	K. Analyze the impact of media on decision-making of consumers, producers and policymakers.

6.2. Markets and the Functions of Governments			
6.2.3. GRADE 3	6.2.6. GRADE 6	6.2.9. GRADE 9	6.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
L. Explain why most countries create their own form of money.	L. Explain what an exchange rate is.	L. Explain how the price of one currency is related to the price of another currency (e.g., Japanese yen in American dollar, Canadian dollar in Mexican nuevo peso).	L. Analyze how policies and international events may change exchange rates.

6.3. Scarcity and Choice			
6.3.3. GRADE 3	6.3.6. GRADE 6	6.3.9. GRADE 9	6.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
A. Define scarcity and identify limited resources scarcity.	A. Explain how scarcity influences choices and behaviors. <ul style="list-style-type: none"> • Personal decision-making • Family decision-making • Community decision-making 	A. Describe ways to deal with scarcity. <ul style="list-style-type: none"> • Community • Pennsylvania • United States 	A. Analyze actions taken as a result of scarcity issues in the regional, national and international economies.
B. Define and identify wants of different people.	B. Explain how limited resources and unlimited wants cause scarcity.	B. Analyze how unlimited wants and limited resources affect decision-making.	B. Evaluate the economic reasoning behind a choice.
C. Identify and define natural, human and capital resources.	C. Describe the natural, human and capital resources used to produce a specific good or service.	C. Explain how resources can be used in different ways to produce different goods and services.	C. Evaluate the allocation of resources used to produce goods and services.
D. Identify costs and benefits associated with an economic decision.	D. Explain the costs and benefits of an economic decision.	D. Explain marginal analysis and decision-making.	D. Evaluate regional, national or international economic decisions using marginal analysis.
E. Explain what is given up when making a choice.	E. Define opportunity cost and describe the opportunity cost of a personal choice.	E. Explain the opportunity cost of a public choice from different perspectives.	E. Analyze the opportunity cost of decisions by individuals, businesses, communities and nations.

6.3. Scarcity and Choice			
6.3.3. GRADE 3	6.3.6. GRADE 6	6.3.9. GRADE 9	6.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
F. Explain how self interest influences choice.	F. Explain how negative and positive incentives affect choices.	F. Explain how incentives affect the behaviors of workers, savers, consumers and producers.	F. Evaluate in terms of marginal analysis how incentives influence decisions of consumers, producers and policy makers.

6.4. Economic Interdependence			
6.4.3. GRADE 3	6.4.6. GRADE 6	6.4.9. GRADE 9	6.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Define specialization and the concept of division of labor.</p> <p>B. Explain why people trade.</p> <p>C. Explain why goods, services and resources come from all over the nation and the world.</p> <p>D. Identify local resources.</p> <ul style="list-style-type: none"> • Natural (renewable, nonrenewable and flow resources) • Human • Capital 	<p>A. Explain the advantages and disadvantages of specialization and division of labor.</p> <p>B. Explain how specialization leads to more trade between people and nations.</p> <p>C. Identify and define imports, exports, inter-regional trade and international trade.</p> <p>D. Explain how the locations of resources, transportation and communication networks and technology have affected Pennsylvania economic patterns.</p> <ul style="list-style-type: none"> • Agriculture (e.g., farms) • Forestry (e.g., logging) • Mining and mineral extraction (e.g., coal fields) • Manufacturing (e.g., steel mills) • Wholesale and retail (e.g., super stores, internet) 	<p>A. Explain why specialization may lead to increased production and consumption.</p> <p>B. Explain how trade may improve a society's standard of living.</p> <p>C. Explain why governments sometimes restrict or subsidize trade.</p> <p>D. Explain how the locations of resources, transportation and communication networks and technology have affected United States economic patterns.</p> <ul style="list-style-type: none"> • Labor markets (e.g., migrant workers) • Interstate highway system and sea and inland ports (e.g., movement of goods) • Communication technologies (e.g., facsimile transmission, satellite-based communications) 	<p>A. Analyze how specialization may increase the standard of living.</p> <p>B. Analyze the relationships between trade, competition and productivity.</p> <p>C. Evaluate how a nation might benefit by lowering or removing trade barriers.</p> <p>D. Explain how the locations of resources, transportation and communication networks and technology have affected international economic patterns.</p>

6.4. Economic Interdependence			
6.4.3. GRADE 3	6.4.6. GRADE 6	6.4.9. GRADE 9	6.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>E. Define specialization and identify examples of interdependence.</p> <p>F. Explain why some products are produced locally while others are not.</p> <p>G. Identify local geographic patterns of economic activities.</p> <ul style="list-style-type: none"> • Agriculture • Travel and tourism • Mining and mineral extraction • Manufacturing • Wholesale and retail • Health services 	<p>E. Explain how specialization and trade lead to interdependence.</p> <p>F. Explain how opportunity costs influence where goods and services are produced locally and regionally.</p> <p>G. Describe geographic patterns of economic activities in Pennsylvania.</p> <ul style="list-style-type: none"> • Agriculture • Travel and tourism • Mining and mineral extraction • Manufacturing • Wholesale and retail • Health services 	<p>E. Analyze how Pennsylvania consumers and producers participate in the global production and consumption of goods or services.</p> <p>F. Explain how opportunity cost can be used to determine the product for which a nation has a comparative advantage.</p> <p>G. Describe geographic patterns of economic activities in the United States.</p> <ul style="list-style-type: none"> • Primary—extractive industries (i.e., farming, fishing, forestry, mining) • Secondary—materials processing industries (i.e., manufacturing) • Tertiary—service industries (e.g., retailing, wholesaling, finance, real estate, travel and tourism, transportation) 	<p>E. Analyze how United States consumers and producers participate in the global production and consumption of goods or services.</p> <p>F. Evaluate how trade is influenced by comparative advantage and opportunity costs.</p> <p>G. Evaluate characteristics and distribution of international economic activities.</p> <ul style="list-style-type: none"> • Primary—extractive industries (i.e., farming, fishing, forestry, mining) • Secondary—materials processing industries (i.e., manufacturing) • Tertiary—service industries (e.g., retailing, wholesaling, finance, real estate, travel and tourism, transportation)

6.5. Work and Earnings			
6.5.3. GRADE 3	6.5.6. GRADE 6	6.5.9. GRADE 9	6.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
A. Explain why people work to get goods and services.	A. Recognize that the availability of goods and services is the result of work by members of the society.	A. Define wages and explain how wages are determined by the supply of and demand of workers.	A. Analyze the factors influencing wages. <ul style="list-style-type: none"> • Demand for goods and services produced • Labor unions • Productivity • Education/skills
B. Identify different occupations.	B. Explain the concept of labor productivity.	B. Describe how productivity is measured and identify ways in which a person can improve his or her productivity.	B. Evaluate how changes in education, incentives, technology and capital investment alter productivity.
C. Describe businesses that provide goods and businesses that provide services.	C. Compare the number of employees at different businesses.	C. Identify and explain the characteristics of the three types of businesses. <ul style="list-style-type: none"> • Sole Proprietorship • Partnership • Corporation 	C. Analyze the costs and benefits of organizing a business as a sole proprietorship, partnership or corporation.
D. Define profit and loss.	D. Explain how profits and losses serve as incentives.	D. Analyze how risks influence business decision-making	D. Analyze the role of profits and losses in the allocation of resources in a market economy.

6.5. Work and Earnings			
6.5.3. GRADE 3	6.5.6. GRADE 6	6.5.9. GRADE 9	6.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
E. Identify examples of assets. <ul style="list-style-type: none"> • Tangible (e.g., houses, cars, jewelry) • Financial assets (e.g., stocks, bonds, savings accounts) F. Define entrepreneurship and identify entrepreneurs in the local community.	E. Describe how people accumulate tangible and financial assets through income, saving, and financial investment. F. Identify entrepreneurs in Pennsylvania. <ul style="list-style-type: none"> • Historical • Contemporary 	E. Define wealth and describe its distribution within and among the political divisions of the United States. F. Identify leading entrepreneurs in Pennsylvania and the United States and describe the risks they took and the rewards they received.	E. Compare distribution of wealth across nations. F. Assess the impact of entrepreneurs on the economy.

6.5. Work and Earnings			
6.5.3. GRADE 3	6.5.6. GRADE 6	6.5.9. GRADE 9	6.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
G. Define saving and explain why people save.	G. Identify the costs and benefits of saving. <ul style="list-style-type: none"> • Piggy banks • Savings accounts • U.S. Savings Bonds 	G. Explain the differences among stocks, bonds and mutual funds.	G. Analyze the risks and returns of various investments. <ul style="list-style-type: none"> • Stocks • Bonds • Mutual funds • Savings bonds • Retirement savings (e.g., Individual Retirement Account (IRA), Keogh, 401K) • Savings accounts (e.g., passbook, certificate of deposit)
H. Explain how banks bring savers and borrowers together.	H. Describe why there is a difference between interest rates for saving and borrowing.	H. Explain the impact of higher or lower interest rates for savers, borrowers, consumers and producers.	H. Evaluate benefits and costs of changes in interest rates to individuals and society.

XVIII. GLOSSARY

Barter:	The direct exchange of goods or services between people.
Bond:	A financial promise for an investment issued by a corporation or government with regular interest payments and repayment at a later date.
Capital resources:	The physical equipment used in the production of goods and services.
Cartels:	A group of sellers acting together in the market.
Circular flow:	The movement of resources, goods, and services through an economy. As a diagram, it can show how households and business firms interact with each other in the product and resource markets.
Command economy:	A system in which decisions are made largely by an authority such as a feudal lord or government planning agency.
Comparative advantage:	Economic theory that a country/individual should sell goods and services which it can produce at relatively lower costs and buy goods and services which it can produce at relatively higher costs.
Competition:	The rivalry among people and/or business firms for resources and/or consumers.
Consumer:	One who buys or rents goods or services and uses them.
Consumer Price Index:	The price index most commonly used to measure the impact of changes in prices on households; this index is based on a standard market basket of goods and services purchased by a typical urban family.
Corporation:	A business firm that is owned by stockholders and is a legal entity with rights to buy, sell and make contracts. Its chief advantage is that each owner's liability is limited to the amount of money he or she has invested in the company.
Cost:	What is given up when a choice is made; monetary and/or non monetary.

Cost/benefit analysis:	The process of weighing all predicted costs against the predicted benefits of an economic choice.
Deflation:	A general decline in the price level.
Demand:	The different quantities of a resource, good or service that potential buyers are willing and able to purchase at various possible prices during a specific time period.
Depression:	A severe recession in terms of magnitude or length, or both.
Division of labor:	A method of organizing production whereby each worker specializes in part of the productive process.
Economic growth:	An increase in a society's output.
Economic systems:	The ways societies organize to determine what goods and services should be produced, how goods and services should be produced and who will consume goods and services. Examples include traditional, command and market.
Economics:	The study of the behavior of individuals and institutions engaged in the production, distribution and consumption of goods and services.
Entrepreneur:	Individual who begins, manages and bears the risks of a business (e.g., Milton Hershey, F.W. Woolworth).
Equilibrium price:	The outlay at which quantity demanded equals quantity supplied; market clearing price.
Exchange rate:	The price of one country's currency measured in terms of another country's currency (e.g., American dollar in German mark, Japanese yen in Canadian dollar).
Federal Reserve System:	The "Central Bank" of the United States (consisting of the Board of Governors and 12 district banks) which controls monetary policy; sometimes referred to as "The Fed" or Federal Reserve.

Fiscal policy:	Government decisions on taxation and spending to achieve economic goals.
Flow resources:	Temporal energy forces that are neither renewable nor nonrenewable, but must be used as, when and where they occur or they are lost (e.g., wind, sunlight).
Gross Domestic Product:	The market value of the total output of final goods and services produced by an economy in a given time period, usually 1 year.
Goods:	Objects that can satisfy people's wants.
Household:	The group of people living together under one roof; a group of individuals whose economic decision making is interrelated.
Human resources:	People's intellectual and physical abilities.
Incentives:	Factors that motivate or influence human behavior.
Income:	Payments earned by people in exchange for providing resources used to produce goods and services.
Inflation:	A general rise in the price level.
Interdependence:	Ideas, goods and services in one area affect decisions and events in other areas reducing self-sufficiency.
Interest:	Payment made for the use of borrowed money.
Interest rate:	The price of borrowed money.
Labor force:	That part of the population which is employed or actively seeking employment.
Labor union:	An organization of workers who seek to improve their common interests.
Labor productivity:	The total output divided by the quantity of labor employed to produce it.
Law of demand:	The lower the price of a good or service, the greater the quantity that people will buy, all else held constant (e.g., incomes, tastes).

Law of supply:	The higher the price of a good or service, the greater the quantity that business will sell, all else held constant (e.g., resource costs, technology).
Loss:	The difference that arises when a firm's total revenues are less than its total costs.
Macroeconomics:	Study of aggregate economic activity including how the economy works as a whole. Seeks to identify levels of National income, output, employment and prices.
Marginal analysis:	A decision making tool that weighs additional costs and benefits.
Market:	A place or process through which goods and services are exchanged.
Market economy:	An economic system in which decisions are made largely by the interactions of buyers and sellers.
Microeconomics:	Study of the behaviors of consumers, firms and determination of the market prices.
Mixed economy:	An economic system in which decisions are made by markets, government and tradition.
Monetary policy:	Government decisions on money supply and interest rates to achieve economic goals.
Money:	A medium of exchange.
Money supply:	The amount of liquid assets which exists in the economy at a given time (e.g., currency, checkable deposits, travelers' checks).
Mutual fund:	An investment option that uses cash from a pool of savers to buy a wide range of securities.
Natural resources:	Anything found in nature that can be used to produce a product (e.g., land, water, coal).
Nonrenewable resources:	Finite elements that cannot be replaced once they are used (e.g., petroleum, minerals).
Opportunity cost:	The highest valued alternative given up when a decision is made.
Output:	The total amount of a commodity produced.

Partnership:	A business in which ownership is shared by two or more people who receive all the profits and rewards and bear all the losses and risks.
Price:	The amount people pay in exchange for unit of a particular good or service.
Price control:	Government restraint of prices to keep the cost of living down. It most usually happens in time of war, but there are also instances in peacetime.
Price index:	A measure of the average level of costs at one time compared to the average level of costs at another time.
Producer:	One who makes goods or services.
Productivity:	Amount of output per unit of input over a period of time. It is used to measure the efficiency with which inputs can be used.
Profit:	Total revenue minus total costs.
Progressive tax:	A levy for which the percentage of income used to pay the levy increases as the taxpayer's income increases.
Proportional tax:	A levy for which the percentage of income used to pay the levy remains the same as the taxpayer's income increases.
Public goods:	Goods and services provided by the government rather than by the private sector. Goods and services that more than one person can use without necessarily preventing others from using them.
Public policy:	A government's course of action that guides present and future decisions.
Quantity demanded:	The amount of a good or service people are willing and able to purchase at a given price during a specific time period.
Quantity supplied:	The amount of a good or service people are willing and able to sell at a given price during a specific time period.

Quota:	A form of import protectionism where the total quantity of imports of a particular commodity is limited.
Recession:	A contraction in National production that lasts 6 months or longer. A recession might be marked by job layoffs and high unemployment, stagnant wages, reductions in retail sales and slowing of housing and car markets.
Regressive tax:	A levy for which the percentage of income used to pay the levy decreases as the taxpayer's income increases.
Renewable resources:	Substances that can be regenerated if used carefully (e.g., fish, timber).
Resources:	Inputs used to produce goods and services; categories include natural, human and capital.
Scarcity:	An economic condition that exists when demand is greater than supply.
Services:	Actions that are valued by others.
Sole proprietorship:	A business owned by an individual who receives all the profits and rewards and bears all the losses and risks.
Specialization:	A form of division of labor in which each individual or firm concentrates its productive efforts on a single or limited number of activities.
Standard of living:	A measurement of an individual's quality of life. A larger consumption of goods, services, and leisure is often assumed to indicate a higher standard of living.
Stock:	A certificate representing a share of ownership in a company.
Supply:	The different quantities of a resource, good or service that potential sellers are willing and able to sell at various possible prices during a specific time period.

Tariff:	A surcharge placed on imported goods and services. The purpose of a tariff is to protect domestic products from foreign competition.
Tertiary:	The third level of economic activity. It includes service and service-related industries.
Trade:	Voluntary exchange between two parties in which both parties benefit.
Trade balance:	The payments of a nation that deal with merchandise imports or exports.
Traditional economy:	An economic system in which decisions are made largely by repeating the actions from an earlier time or generation.
Unemployment rate:	The percentage of the labor force that is actively seeking employment.
Wants:	Desires that can be satisfied by consuming goods, services or leisure activities.

Academic Standards for Geography

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XX. INTRODUCTION

This document includes Academic Standards for Geography that describe what students should know and be able to do in four areas:

- 7.1. Basic Geographic Literacy
- 7.2. The Physical Characteristics of Places and Regions
- 7.3. The Human Characteristics of Places and Regions
- 7.4. The Interactions Between People and Places

The Geography Standards describe what students should know and be able to do at four grade levels (third, sixth, ninth and twelfth). They reflect the increasingly complex and sophisticated understanding of geography that students are expected to achieve as they progress through school. Throughout the standards, all grade levels must address the local-to-global progression (scales). Basic concepts found in lower grade levels must be developed more fully at higher grade levels.

Geography is the science of space and place on Earth’s surface. Its subject matter is the physical and human phenomena that make up the world’s environments and places. These standards build on using geographic tools as a means for asking and answering geographic questions; setting information into a range of spatial contexts; recognizing places and regions as human concepts; understanding the physical processes that have shaped Earth’s surface and the patterns resulting from those processes; identifying the relationships between people and environments; recognizing the characteristics and distribution of people and cultures on Earth’s surface; focusing on the spatial patterns of settlements and their resulting political structures; and exploring the networks of economic interdependence and the importance of resources.

At each grade level, instructional content should be selected to support the development of geographic understanding. In the primary grade levels (1-3), the emphasis should be on identifying the basic characteristics of the world (answering the what question); at the intermediate grade levels (4-6), the emphasis should be on describing spatial patterns of phenomena (answering the where and when questions); at the middle grade levels (7-9), the emphasis should be on explaining spatial patterns of phenomena (answering the how question); and at high school grade levels (10-12), the emphasis should be on analyzing spatial patterns of phenomena (answering the why question). Although the emphasis may focus on specific questions, these questions may be encountered at any grade level.

Geography is an integrative discipline that enables students to apply geography skills and knowledge to life situations at home, at work and in the community. Therefore, these standards should be cross-walked with those in Civics and Government, Economics and History to create an interdisciplinary view of the world. Topics and concepts in geography directly relate to standard statements in Environment and Ecology, Economics, Mathematics, Science and Technology and Civics and Government.

Teachers should employ the Five Fundamental Themes of Geography while proceeding through the Academic Standards for Geography. The relationship between the themes and the standards is clear. The standards describe what students should know and be able to do while the themes provide a clear conceptual basis for teachers and students to use in organizing their knowledge.

These are the Five Fundamental Themes of Geography:

<i>Theme</i>	<i>Description</i>
Location	The absolute and relative position of a place on Earth's surface
Place	How physical and human characteristics define and distinguish a place
Human-Environment Interactions	How humans modify and adapt to natural settings
Movement	How people, ideas and materials move between and among locations
Regions	How an area displays unity in terms of physical and human characteristics

The academic standards for Geography consist of four standard categories (designated as 7.1., 7.2., 7.3., and 7.4.). Each category has two to five standard statements (designated by a capital letter). Most standard statements have bulleted items known as standard descriptors. The standard descriptors are items within the document to illustrate and enhance the standard statement. The categories, statements and descriptors are regulations. The descriptors may be followed by an "e.g." The "e.g.'s" are examples to clarify what type of information could be taught. These are suggestions and the choice of specific content is a local decision as is the method of instruction.

Geography along with Civics and Government, Economics, and History are identified as Social Studies in Chapter 4. This identification is consistent with

citizenship education in Chapter 49 and Chapter 354. Based on these regulations, Social Studies/Citizenship programs should include the four sets of standards as an entity in developing a scope and sequence for curriculum and planned instruction.

A glossary is included to assist the reader in clarifying terminology contained in the standards.

7.1. Basic Geographic Literacy			
7.1.3. GRADE 3	7.1.6. GRADE 6	7.1.9. GRADE 9	7.1.12. GRADE 12
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i></p>			
<p>A. Identify geographic tools and their uses.</p> <ul style="list-style-type: none"> • Characteristics and purposes of different geographic representations • Maps and basic map elements • Globes • Graphs • Diagrams • Photographs • Geographic representations to display spatial information <ul style="list-style-type: none"> • Sketch maps • Thematic maps • Mental maps to describe the human and physical features of the local area 	<p>A. Describe geographic tools and their uses.</p> <ul style="list-style-type: none"> • Basis on which maps, graphs and diagrams are created <ul style="list-style-type: none"> • Aerial and other photographs • Reference works • Field observations • Surveys • Geographic representations to display spatial information <ul style="list-style-type: none"> • Absolute location • Relative location • Flows (e.g., goods, people, traffic) • Topography • Historic events • Mental maps to organize an understanding of the human and physical features of Pennsylvania and the home county • Basic spatial elements for depicting the patterns of physical and human features 	<p>A. Explain geographic tools and their uses.</p> <ul style="list-style-type: none"> • Development and use of geographic tools <ul style="list-style-type: none"> • Geographic information systems [GIS] • Population pyramids • Cartograms • Satellite-produced images • Climate graphs • Access to computer-based geographic data (e.g., Internet, CD-ROMs) • Construction of maps <ul style="list-style-type: none"> • Projections • Scale • Symbol systems • Level of generalization • Types and sources of data • Geographic representations to track spatial patterns <ul style="list-style-type: none"> • Weather • Migration • Environmental change (e.g., tropical forest reduction, sea-level changes) 	<p>A. Analyze data and issues from a spatial perspective using the appropriate geographic tools.</p> <ul style="list-style-type: none"> • Spatial patterns of human features that change over time (e.g., intervening opportunity, distance decay, central place theory, locational preference) • Physical patterns of physical features that change over time (e.g., climate change, erosion, ecological invasion and succession) • Human and physical features of the world through mental maps

7.1. Basic Geographic Literacy			
7.1.3. GRADE 3	7.1.6. GRADE 6	7.1.9. GRADE 9	7.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
	<ul style="list-style-type: none"> • Point, line, area, location, distance, scale • Map grids • Alpha-numeric system • Cardinal and intermediate directions 	<ul style="list-style-type: none"> • Mental maps to organize and understand the human and physical features of the United States 	

7.1. Basic Geographic Literacy			
7.1.3. GRADE 3	7.1.6. GRADE 6	7.1.9. GRADE 9	7.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>B. Identify and locate places and regions.</p> <ul style="list-style-type: none"> Physical features <ul style="list-style-type: none"> Continents and oceans Major landforms, rivers and lakes in North America Local community Human features <ul style="list-style-type: none"> Countries (i.e., United States, Mexico, Canada) States (i.e., Pennsylvania, Delaware, Maryland, New Jersey, New York, Ohio, West Virginia) Cities (i.e., Philadelphia, Erie, Altoona, Pittsburgh, Scranton, Harrisburg, Johnstown, Allentown, Washington D.C., Baltimore, New York, Toronto, Cleveland) Local community Regions as areas with unifying geographic characteristics <ul style="list-style-type: none"> Physical regions (e.g., landform regions, climate regions, river basins) 	<p>B. Describe and locate places and regions.</p> <ul style="list-style-type: none"> Coordinate systems (e.g., latitude and longitude, time zones) Physical features <ul style="list-style-type: none"> In the United States (e.g., Great Lakes, Rocky Mountains, Great Plains) In Pennsylvania (e.g., Coastal Plain, Piedmont, Appalachians) Human features <ul style="list-style-type: none"> Countries (e.g., United Kingdom, Argentina, Egypt) Provinces (e.g., Ontario, Quebec, Nova Scotia) Major human regions (e.g., Mid Atlantic, New England, Southwest) States (e.g., California, Massachusetts, Florida) Major cities (e.g., London, Los Angeles, Tokyo) Counties (e.g., Lancaster, Lackawanna, Jefferson) 	<p>B. Explain and locate places and regions.</p> <ul style="list-style-type: none"> How regions are created to interpret Earth's complexity (i.e., the differences among formal regions, functional regions, perceptual regions) How characteristics contribute to regional changes (e.g., economic development, accessibility, demographic change) How culture and experience influence perceptions of places and regions How structures and alliances impact regions <ul style="list-style-type: none"> Development (e.g., First vs. Third World, North vs. South) Trade (e.g., NAFTA, the European Union) International treaties (e.g., NATO, OAS) 	<p>B. Analyze the location of places and regions.</p> <ul style="list-style-type: none"> Changing regional characteristics (e.g., short- and long-term climate shifts; population growth or decline; political instability) Criteria to define a region (e.g., the reshaping of south Florida resulting from changing migration patterns; the US-Mexico border changes as a function of NAFTA; metropolitan growth in the Philadelphia region) Cultural change (e.g., influence on people's perceptions of places and regions)

7.1. Basic Geographic Literacy			
7.1.3. GRADE 3	7.1.6. GRADE 6	7.1.9. GRADE 9	7.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<ul style="list-style-type: none">• Human regions (e.g., neighborhoods, cities, states, countries)	<ul style="list-style-type: none">• Townships (e.g., Dickinson, Lower Mifflin, Southampton)<ul style="list-style-type: none">• Ways in which different people view places and regions (e.g., places to visit or to avoid)• Community connections to other places<ul style="list-style-type: none">• Dependence and interdependence• Access and movement	<ul style="list-style-type: none">• How regions are connected (e.g., watersheds and river systems, patterns of world trade, cultural ties, migration)	
Basic Geography Literacy must include local-to-global progression (scales) for all students at all grade levels for the standard statements and their descriptors. Basic concepts introduced in lower grade levels must be developed more fully throughout higher grade levels. Portions of Basic Geography Literacy relate directly to the Mathematics Standards.			

7.2 The Physical Characteristics of Places and Regions			
7.2.3. GRADE 3	7.2.6. GRADE 6	7.2.9. GRADE 9	7.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .</i>			
<p>A. Identify the physical characteristics of places and regions.</p> <ul style="list-style-type: none"> • Physical properties <ul style="list-style-type: none"> • Landforms (e.g., plains, hills, plateaus and mountains) • Bodies of water (e.g., rivers, lakes, seas and oceans) • Weather and climate • Vegetation and animals • Earth's basic physical systems <ul style="list-style-type: none"> • Lithosphere • Hydrosphere • Atmosphere • Biosphere 	<p>A. Describe the physical characteristics of places and regions.</p> <ul style="list-style-type: none"> • Components of Earth's physical systems (e.g., clouds, storms, relief and elevation [topography], tides, biomes, tectonic plates) • Comparison of the physical characteristics of different places and regions (e.g., soil, vegetation, climate, topography) • Climate types (e.g., marine west coast, humid continental, tropical wet and dry) 	<p>A. Explain the physical characteristics of places and regions including spatial patterns of Earth's physical systems.</p> <ul style="list-style-type: none"> • Climate regions • Landform regions 	<p>A. Analyze the physical characteristics of places and regions including the interrelationships among the components of Earth's physical systems.</p> <ul style="list-style-type: none"> • Biomes and ecosystem regions • Watersheds and river basins • World patterns of biodiversity

7.2 The Physical Characteristics of Places and Regions			
7.2.3. GRADE 3	7.2.6. GRADE 6	7.2.9. GRADE 9	7.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. . .</i>			
B. Identify the basic physical processes that affect the physical characteristics of places and regions. <ul style="list-style-type: none"> • Earth-sun relationships (i.e., seasons and length of daylight, weather and climate) • Extreme physical events (e.g., earthquakes, floods, hurricanes, tornadoes) 	B. Describe the physical processes that shape patterns on Earth's surface. <ul style="list-style-type: none"> • Earth-sun relationships (i.e., differences between equinoxes and solstices, reasons they occur and their relationship to latitude) • Climate influences (e.g., elevation, latitude, nearby ocean currents) • Climate change, (e.g., global warming/cooling, decertification, glaciations) • Plate tectonics • Hydrologic cycle 	B. Explain the dynamics of the fundamental processes that underlie the operation of Earth's physical systems. <ul style="list-style-type: none"> • Wind systems • Water cycle • Erosion/deposition cycle • Plate tectonics • Ocean currents • Natural hazards 	B. Analyze the significance of physical processes in shaping the character of places and regions. <ul style="list-style-type: none"> • Circulation of the oceans • Ecosystem processes • Atmospheric systems • Extreme natural events
The Physical Characteristics of Places and Regions must include local-to-global progression (scales) for all students at all grade levels for the standard statements and their descriptors. Basic concepts must be developed more fully throughout higher grade levels. Portions of Physical Characteristics of Places and Regions relate directly to Science and Technology and Environment and Ecology standards.			

7.3 The Human Characteristics of Places and Regions			
7.3.3. GRADE 3	7.3.6. GRADE 6	7.3.9. GRADE 9	7.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. .</i>			
<p>A. Identify the human characteristics of places and regions by their population characteristics.</p> <ul style="list-style-type: none"> • The number and distribution of people in the local community • Human movement in the local community (e.g., mobility in daily life, migration) 	<p>A. Describe the human characteristics of places and regions by their population characteristics.</p> <ul style="list-style-type: none"> • Spatial distribution, size, density and demographic characteristics of population at the county and state level. • Causes of human movement <ul style="list-style-type: none"> • Mobility (e.g., shopping, commuting, recreation) • Migration models (e.g., push/pull factors, barriers to migration) 	<p>A. Explain the human characteristics of places and regions by their population characteristics.</p> <ul style="list-style-type: none"> • Spatial distribution, size, density and demographic characteristics of population at the state and National level • Demographic structure of a population (e.g., life expectancy, fertility rate, mortality rate, infant mortality rate, population growth rate, the demographic transition model) • Effects of different types and patterns of human movement <ul style="list-style-type: none"> • Mobility (e.g., travel for business) • Migration (e.g., rural to urban, short term vs. long term, critical distance) 	<p>A. Analyze the significance of human activity in shaping places and regions by their population characteristics:</p> <ul style="list-style-type: none"> • Spatial distribution, size, density and demographic characteristics of population at the international level • Demographic trends and their impacts on patterns of population distribution (e.g., carrying capacity, changes in fertility, changes in immigration policy, the mobility transition model) • Impact of movement on human systems (e.g., refugees, guest workers, illegal aliens)

7.3 The Human Characteristics of Places and Regions			
7.3.3. GRADE 3	7.3.6. GRADE 6	7.3.9. GRADE 9	7.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . .</i>			
<p>B. Identify the human characteristics of places and regions by their cultural characteristics.</p> <ul style="list-style-type: none"> • Components of culture (e.g., language, belief systems and customs, social organizations, foods, ethnicity) • Ethnicity of people in the local community (e.g., customs, celebrations, languages, religions) 	<p>B. Describe the human characteristics of places and regions by their cultural characteristics.</p> <ul style="list-style-type: none"> • Ethnicity of people at the county and state levels (e.g., customs, celebrations, languages, religions) • Spatial arrangement of cultures creates distinctive landscapes (e.g., cultural regions based on languages, customs, religion, building styles as in the Pennsylvania German region) 	<p>B. Explain the human characteristics of places and regions by their cultural characteristics.</p> <ul style="list-style-type: none"> • Ethnicity of people at national levels (e.g., customs, celebrations, languages, religions) • Culture distribution (e.g., ethnic enclaves and neighborhoods) • Cultural diffusion (e.g., acculturation and assimilation, cultural revivals of language) 	<p>B. Analyze the significance of human activity in shaping places and regions by their cultural characteristics.</p> <ul style="list-style-type: none"> • Cultural conflicts (e.g., over language (Canada), over political power (Spain), over economic opportunities (Mexico)) • Forces for cultural convergence (e.g., the diffusion of foods, fashions, religions, language)

7.3 The Human Characteristics of Places and Regions			
7.3.3. GRADE 3	7.3.6. GRADE 6	7.3.9. GRADE 9	7.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to. .</i>			
<p>C. Identify the human characteristics of places and regions by their settlement characteristics.</p> <ul style="list-style-type: none"> • Types of settlements (e.g., villages, towns, suburbs, cities, metropolitan areas) • Factors that affect where people settle (e.g., water, resources, transportation) 	<p>C. Describe the human characteristics of places and regions by their settlement characteristics.</p> <ul style="list-style-type: none"> • Current and past settlement patterns in the local area • Factors that affect the growth and decline of settlements (e.g., immigration, transportation development, depletion of natural resources, site and situation) 	<p>C. Explain the human characteristics of places and regions by their settlement characteristics.</p> <ul style="list-style-type: none"> • Current and past settlement patterns in Pennsylvania and the United States • Forces that have re-shaped modern settlement patterns (e.g., central city decline, suburbanization, the development of transport systems) • Internal structure of cities (e.g., manufacturing zones, inner and outer suburbs, the location of infrastructure) 	<p>C. Analyze the significance of human activity in shaping places and regions by their settlement characteristics.</p> <ul style="list-style-type: none"> • Description of current and past settlement patterns at the international scale (e.g., global cities) • Use of models of the internal structure of cities (e.g., concentric zone, sector, multiple nuclei) • Forces that have reshaped settlement patterns (e.g., commuter railroads, urban freeways, the development of megalopolis and edge cities)

7.3 The Human Characteristics of Places and Regions			
7.3.3. GRADE 3	7.3.6. GRADE 6	7.3.9. GRADE 9	7.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . .</i>			
<p>D. Identify the human characteristics of places and regions by their economic activities.</p> <ul style="list-style-type: none"> • Location factors in the spatial distribution of economic activities (e.g., market, transportation, workers, materials) • Producers of consumer products and services (e.g., bread, pizza, television, shopping malls) • Products of farms and factories at the local and regional level (e.g., mushrooms, milk, snack foods, furniture) • Spatial distribution of resources <ul style="list-style-type: none"> • Non-renewable resources • Renewable resources • Flow resources (e.g., water power, wind power) 	<p>D. Describe the human characteristics of places and regions by their economic activities.</p> <ul style="list-style-type: none"> • Spatial distribution of economic activities in the local area (e.g., patterns of agriculture, forestry, mining, retailing, manufacturing, services) • Factors that influence the location and spatial distribution of economic activities (e.g., market size for different types of business, accessibility, modes of transportation used to move people, goods and materials) • Spatial distribution of resources and their relationship to population distribution <ul style="list-style-type: none"> • Historical settlement patterns and natural resource use (e.g., 	<p>D. Explain the human characteristics of places and regions by their economic activities.</p> <ul style="list-style-type: none"> • Spatial distribution of economic activities in Pennsylvania and the United States (e.g., patterns of agriculture, forestry, mining, retailing, manufacturing, services) • Factors that shape spatial patterns of economic activity both Nationally and internationally (e.g., comparative advantage in location of economic activities; changes in resource trade; disruption of trade flows) • Technological changes that affect the definitions of, access to, and use of natural resources (e.g., the role of exploration, extraction, use and depletion of resources) 	<p>D. Analyze the significance of human activity in shaping places and regions by their economic characteristics.</p> <ul style="list-style-type: none"> • Changes in spatial distribution of economic activities at the global scale (e.g., patterns of agriculture, forestry, mining, retailing, manufacturing, services) • Forces that are reshaping business (e.g., the information economy, business globalization, the development of off-shore activities) • Effects of changes and movements in factors of production (e.g., resources, labor, capital)

7.3 The Human Characteristics of Places and Regions			
7.3.3. GRADE 3	7.3.6. GRADE 6	7.3.9. GRADE 9	7.3.12. GRADE 12
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to.</i></p>			
<p>E. Identify the human characteristics of places and regions by their political activities.</p> <ul style="list-style-type: none"> Type of political units (e.g., townships, boroughs, towns, cities, counties, states, countries (nation-state)) Political units in the local area 	<p>waterpower sites along the FallLine)</p> <ul style="list-style-type: none"> Natural resource-based industries (e.g., agriculture, mining, fishing, forestry) <p>E. Describe the human characteristics of places and regions by their political activities.</p> <ul style="list-style-type: none"> Spatial pattern of political units in Pennsylvania Functions of political units (e.g., counties, municipalities, townships, school districts, PA General Assembly districts (House and Senate), U.S. Congressional districts, states) 	<p>E. Explain the human characteristics of places and regions by their political activities.</p> <ul style="list-style-type: none"> Spatial pattern of political units in the United States Geographic factors that affect decisions made in the United States (e.g., territorial expansion, boundary delineation, allocation of natural resources) Political and public policies that affect geography (e.g., open space, urban development) 	<p>E. Analyze the significance of human activity in shaping places and regions by their political characteristics:</p> <ul style="list-style-type: none"> Spatial pattern of political units in the global system Role of new political alliances on the international level (e.g., multinational organizations, worker's unions, United Nations' organizations) Impact of political conflicts (e.g., secession, fragmentation, insurgencies, invasions)
<p>The Human Characteristics of Places and Regions must include local-to-global progression (scales) for all students at all grade levels for the standard statements and their descriptors. Basic concepts found in lower grade levels must be developed more fully throughout higher grade levels. Portions of Human Characteristics of Places and Regions relate directly to the Civics and Government and Economics Standards.</p>			

7.4 The Interactions Between People and Places			
7.4.3. GRADE 3	7.4.6. GRADE 6	7.4.9. GRADE 9	7.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Identify the impacts of physical systems on people.</p> <ul style="list-style-type: none"> • How people depend on, adjust to and modify physical systems on a local scale (e.g., soil quality and agriculture, snowfall and daily activities, drought and water use) • Ways in which natural hazards affect human activities (e.g., storms, lightning, flooding) 	<p>A. Describe the impacts of physical systems on people.</p> <ul style="list-style-type: none"> • How people depend on, adjust to and modify physical systems on regional scale (e.g., coastal industries, development of coastal communities, flood control) • Ways in which people adjust to life in hazard-prone areas (e.g., California and earthquakes, Florida and hurricanes, Oklahoma and tornadoes) 	<p>A. Explain the impacts of physical systems on people.</p> <ul style="list-style-type: none"> • How people depend on, adjust to and modify physical systems on National scale (e.g., soil conservation programs, projects of The Corps of Engineers) • Ways in which people in hazard-prone areas adjust their ways of life (e.g., building design in earthquake areas, dry-farming techniques in drought-prone areas) 	<p>A. Analyze the impacts of physical systems on people.</p> <ul style="list-style-type: none"> • How people depend on, adjust to and modify physical systems on international scales (e.g., resource development of oil, coal, timber) • Ways in which people modify ways of life to accommodate different environmental contexts (e.g., building in permafrost areas; the role of air-conditioning in the United States South and Southwest; the development of enclosed spaces for movement in cold climates)

7.4 The Interactions Between People and Places			
7.4.3. GRADE 3	7.4.6. GRADE 6	7.4.9. GRADE 9	7.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>B. Identify the impacts of people on physical systems.</p> <ul style="list-style-type: none"> • Effects of energy use (e.g., water quality, air quality, change in natural vegetation) • Ways humans change local ecosystems (e.g., land use, dams and canals on waterways, reduction and extinction of species) 	<p>B. Describe the impacts of people on physical systems.</p> <ul style="list-style-type: none"> • Changing spatial patterns on Earth's surface that result from human activities (e.g., lake desiccation as in the Aral Sea, construction of dikes, dams and storm surge barriers in the Netherlands, designation of State parks and forests throughout Pennsylvania) • Ways humans adjust their impact on the habitat (e.g., Endangered Species Act, replacement of wetlands, logging and replanting trees) 	<p>B. Explain the impacts of people on physical systems.</p> <ul style="list-style-type: none"> • Forces by which people modify the physical environment (e.g., increasing population; new agricultural techniques; industrial processes and pollution) • Spatial effects of activities in one region on another region (e.g., scrubbers on power plants to clean air, transportation systems such as Trans-Siberian Railroad, potential effects of fallout from nuclear power plant accidents) 	<p>B. Analyze the impacts of people on physical systems.</p> <ul style="list-style-type: none"> • How people develop international agreements to manage environmental issues (e.g., Rio de Janeiro Agreement, the Law of the Sea, the Antarctica Treaty) • How local and regional processes can have global effects (e.g., wind and hydroelectric power transmitted across regions, water use and irrigation for crop production) • Sustainability of resources (e.g., reforestation, conservation) • World patterns of resource distribution and utilization (e.g., oil trade, regional electrical grids)
<p>The Interactions Between People and Places must include local to global scales for all students at all grade levels for the standard statements and their descriptors. Basic concepts found in lower grade levels must be developed more fully throughout higher grade levels.</p>			

XXI. GLOSSARY

Absolute location:	The position of a point on Earth's surface that can usually be described by latitude and longitude. Another example of absolute location would be the use of a nine digit zip code and street address.
Acculturation:	The process of adopting the traits of a cultural group.
Assimilation:	The acceptance, by one culture group or community, of cultural traits associated with another.
Atmosphere:	The body of gases, aerosols and other materials that surrounds Earth and is held close by gravity. It extends about twelve miles from Earth's surface.
Barriers to migration:	Factors that keep people from moving (e.g., lack of information about potential destination, lack of funds to cover the costs of moving, regulations that control migration).
Basic map elements:	Materials included on geographic representations. These include title, directions, date of map, mapmaker's name, a legend and scale. Often a geographic grid, the source of information and sometimes an index of places on the map are also included.
Biomes:	A community of living organisms of a single major ecological region.
Biosphere:	The domain of Earth that includes all plant and animal life forms.
Boundary:	The limit or extent within which a system exists or functions, including a social group, a state or physical features.

Capital:	One of the factors of production of goods and services. Capital can be goods (e.g., factories and equipment, highways, information, communications systems) and/or funds (investment and working capital) used to increase production and wealth. Other factors are land, water and labor.
Cardinal directions:	The four main points of the compass; north, east, south and west.
Carrying capacity:	Maximum population that an area can support over time depending upon environmental conditions, human interventions and interdependence.
Central Place Theory:	The conceptual framework that explains the size, spacing and distribution of settlements and their economic relationships with their market areas.
Climate:	Long-term patterns and trends in weather elements and atmospheric conditions.
Climate graph (climagraph):	A diagram that combines average monthly temperature and precipitation data for a particular place.
Comparative advantage:	The specialization by a given area in the production of one or a few commodities for which it has a particular edge (e.g., labor quality, resources availability, production costs).
Concentric Zone Model:	A framework that proposes that urban functions and the associated land uses are arranged in rings that grow outward from a central area. One of three models developed to explain how cities and metropolitan areas are arranged internally. The other models are the Sector and the Multiple Nuclei.
Country:	Unit of political space often referred to as a state or nation-state.

Culture:	Learned behavior of people, which includes their belief systems and languages, their social relationships, their institutions and organizations and their material goods—food, clothing, buildings, tools and machines.
Cultural diffusion:	The spread of cultural elements from one culture to another.
Cultural landscape:	The human imprint on the physical environment; the humanized image as created or modified by people.
Demographic change:	Variation in population size, composition, rates of growth, density, fertility and mortality rates and patterns of migration.
Density:	The population or number of objects per unit area (e.g., per square kilometer or mile).
Decertification:	The spread of desert conditions in arid and semiarid regions resulting from a combination of climatic changes and increasing human pressures (e.g., overgrazing, removal of vegetation, cultivation of marginal land).
Desiccation:	See lake desiccation.
Developed country:	An area of the world that is technologically advanced, highly urbanized and wealthy and has generally evolved through both economic and demographic transitions.
Diffusion:	The spread of people, ideas, technology and products among places.
Distance decay:	The tendency for the acceptance of new ideas and technologies to decrease with distance from their source.
Earthquake:	Vibrations and shock waves caused by the sudden movement of tectonic plates along fracture zones, called faults, in Earth's crust.

Ecosystem (ecological system):	A network formed by the interaction of all living organisms (plants, animals, humans) with each other and with the physical and chemical factors of the environment in which they live.
Elevation:	Height of a point or place above sea level (e.g., Mount Everest has an elevation of 29,028 feet above sea level).
Enclaves:	A country, territorial or culturally distinct unit enclosed within a larger country or community.
Environment:	Everything in and on Earth's surface and its atmosphere within which organisms, communities or objects exist.
Equilibrium:	The point in the operation of a system when driving forces and resisting forces are in balance.
Equinoxes:	The two days during the calendar year (usually September 23 and March 21) when all latitudes have twelve hours of both daylight and darkness and the sun is directly overhead at the Equator.
Erosional processes:	The removal and transportation of weathered (loose) rock material by water, wind, waves and glaciers. Deposition is the end result of erosion and occurs when transported material is dropped.
Fall line:	A linear connection joining the waterfalls on numerous rivers and streams that marks the point where each river and stream descends from the upland and the limit of the navigability of each river (e.g., the narrow boundary zone between the coastal plain and the Piedmont in the Eastern United States where there are falls and rapids on streams and rivers as they drop from the more resistant rocks of the Piedmont onto the softer rocks of the coastal plain).
Fertility rate:	A measure of the number of children a woman will have during her child-bearing years (15 to 49 years of age) in comparison to the adult female population in a particular place.

Formal region:	An area defined by the uniformity or homogeneity of certain characteristics (e.g., precipitation, landforms, subculture).
Functional region:	An area united by a strong core (node) or center of human population and activity (e.g., banking linkages between large cities and smaller cities and towns).
Geographic Information System:	A geographic database that contains information about the distribution of physical and human characteristics of places. In order to test hypotheses, maps of one characteristic or a combination can be produced from the database to analyze the data relationships.
Geographic scale:	The size of Earth's surface being studied. Study areas vary from local to regional to global. Scale also refers to the relationship between the size of space on a map and the size of that space on Earth's surface. Maps are referred to as large scale if they are of smaller (local) areas and small scale if they represent much or all of the Earth's surface. Map scale is expressed as a bar graph or representative fraction.
Global warming:	The theory that Earth's atmosphere is gradually warming due to the buildup of certain gases, including carbon dioxide and methane, which are released by human activities. The increased levels of these gases cause added heat energy from Earth to be absorbed by the atmosphere instead of being lost in space.
Globe:	A scale model of Earth that correctly represents area, relative size and shape of physical features, distance between points and true compass direction.
Grid:	A pattern of lines on a chart or map, such as those representing latitude and longitude, which helps determine absolute location and assists in the analysis of distribution patterns.

Human features:	Tangible and intangible ideas associated with the culture, society and economy of places or areas. These include the spatial arrangement of land uses including transportation, the design of buildings and the nature and timing of activities that people conduct in these spaces.
Hydroelectric power:	Electrical energy generated by the force of falling water which rotates turbines housed in power plants in dams on rivers.
Hydrosphere:	The water realm of Earth which includes water contained in the oceans, lakes, rivers, ground, glaciers and water vapor in the atmosphere.
Infant mortality rate:	The annual number of deaths among infants under 1 year of age for every 1,000 live births. It usually provides an indication of health care levels. The United States, for example, has a 1994 rate of 8.3 infant deaths per 1,000 live births while Angola has a rate of 137 infant deaths per 1,000 births.
Interdependence:	Ideas, goods and services in one area affect decisions and events in other areas reducing self-sufficiency.
Intermediate directions:	The points of the compass that fall between north and east, north and west, south and east, south and west (e.g., NE, NW, SE, SW).
Intervening opportunity:	An alternate area that is a source of a product or service or a destination in the case of migration.
Lake desiccation:	The reduction in water level (drying out) of an inland water body.
Landform:	The shape, form or nature of a specific physical feature of Earth's surface (e.g., plain, hill, plateau, mountain).
Land use:	The range of uses of Earth's surface made by humans. Uses are classified as urban, rural, agricultural, forested, etc. with more specific sub-classifications useful for specific purposes (e.g., low-density residential, light industrial, nursery crops).

Life expectancy:	The average number of remaining years a person can expect to live under current mortality levels in a society. Life expectancy at birth is the most common use of this measure.
Lithosphere:	The uppermost portion of the solid Earth including soil, land and geologic formations.
Location:	The position of a point on Earth's surface expressed by means of a grid (absolute) or in relation (relative) to the position of other places.
Map:	A graphic representation of a portion of Earth that is usually drawn to scale on a flat surface.
Materials:	Raw or processed substances that are used in manufacturing (secondary economic activities). Most substances used in factories are already manufactured to some degree and come from other factories rather than from sources of raw materials.
Megalopolis:	The intermingling of two or more large metropolitan areas into a continuous or almost continuous built-up urban complex; sometimes referred to as a conurbation.
Mental map:	A geographic representation which conveys the cognitive image a person has of an area, including knowledge of features and spatial relationships as well as the individual's perceptions and attitudes regarding the place; also known as a cognitive map.
Metropolitan area:	The Federal Office of Management and Budget's designation for the functional area surrounding and including a central city; has a minimum population of 50,000; is contained in the same county as the central city; and includes adjacent counties having at least 15% of their residents working in the central city's county.
Migration:	The act or process of people moving from one place to another with the intent of staying at the destination permanently or for a relatively long period of time.

Multinational organizations:	An association of nations aligned around a common economic or political cause (e.g., the Organization of Petroleum Exporting Countries, the Organization of American States).
Multiple Nuclei Model:	A representation of urban structure based on the idea that the functional areas (land use) of cities develop around various points rather than just one in the Central Business District.
Municipality:	A political unit incorporated for local self-government (e.g., Pennsylvania's boroughs, townships).
NAFTA:	North American Free Trade Agreement. NAFTA is an accord to establish clear and mutually advantageous rules governing commerce among Canada, Mexico and the United States.
NATO:	North Atlantic Treaty Organization. An international transatlantic partnership consisting of various European states, the United States and Canada, which was designed through cooperation, consultation and collective defense to maintain peace and promote stability throughout Europe.
Nation:	A cultural concept for a group of people bound together by a strong sense of shared values and cultural characteristics including language, religion and common history.
Natural hazard:	An event in the physical environment, such as a hurricane or earthquake, that is destructive to human life and property.
Natural resource:	An element of the physical environment that people value and use to meet a need for fuel, food, industrial product or something else of value.
Nonrenewable resource:	A finite element that cannot be replaced once it is used (e.g., petroleum, minerals).
Ocean currents:	The regular and consistent horizontal flow of water in the oceans, usually in response to persistent patterns of circulation in the atmosphere.

OAS:	Organization of American States. An international governmental organization formed by the nation-states of North America and South America for security and the protection of mutual interests.
OPEC:	The Organization of Petroleum Exporting Countries; international cartel of thirteen nations designed to promote collective pricing of petroleum, unified marketing policies and regulation of petroleum extraction.
Perceptual region:	Ideas that people have about the character of areas based on impressions from a variety of sources of information including other individuals and media. Mental maps can be used to access these ideas to find out what people think about particular areas.
Physical feature:	An aspect of a place or area that derives from the physical environment.
Physical process:	A course or method of operation that produces, maintains or alters Earth's physical system (e.g., glacial eroding, depositing landforms).
Place:	An area with distinctive human and physical characteristics; these characteristics give it meaning and character and distinguish it from other areas.
Plate tectonics:	The theory that Earth's surface is composed of rigid slabs or plates (see tectonic plates). The divergence, convergence and slipping side-by-side of the different plates is responsible for present-day configurations of continents, ocean basins and major mountain ranges and valley systems.
Pollution:	The direct or indirect process resulting from human action by which any part of the environment is made potentially or actually unhealthy, unsafe or hazardous to the welfare of the organisms which live in it.
Population density:	The number of individuals occupying an area derived from dividing the number of people by the area they occupy (e.g., 2,000 people divided by ten square miles = 200 people per square mile).

Population pyramid:	A bar graph showing the distribution by gender and age of a country's population.
Primary economic activity:	The production of naturally existing or culturally improved resources (i.e., agriculture, ranching, forestry, fishing, extraction of minerals and ores).
Pull factors:	In migration theory, the social, political, economic and environmental attractions of new areas that draw people away from their previous location.
Push factors:	In migration theory, the social, political, economic and environmental forces that drive people from their previous location.
Region:	An area with one or more common characteristics or features that give it a measure of consistency and make it different from surrounding areas.
Relative location:	The site of a place or region in relation to other places or regions (e.g., northwest, downstream).
Renewable resource:	A substance that can be regenerated if used carefully (e.g., fish, timber).
Resource:	An aspect of the physical environment that people value and use to meet a need for fuel, food, industrial product or something else of value.
Satellite image:	A representation produced by a variety of sensors (e.g., radar, microwave detectors, scanners) that measure and record electromagnetic radiation. The collected data are turned into digital form for transmission to ground receiving stations. The data can be reconverted into imagery in a form resembling a photograph.
Scale:	On maps the relationship or ratio between a linear measurement on a map and the corresponding distance on Earth's surface. For example, the scale 1:1,000,000 means one unit (inch or centimeter) on the map represents 1,000,000 of the same units on Earth's surface. Also refers to the size of places or regions being studied.

Sector Model:	A theory of urban structure that recognizes the impact of transportation on land prices within the city and the resulting tendency for functional areas to be organized into sectors.
Secondary economic activity:	Processing of raw and manufactured materials into products with added value.
Settlement pattern:	The spatial distribution and arrangement of human habitations (e.g., rural, urban).
Site:	The specific location where something may be found including its physical setting (e.g., on a floodplain).
Situation:	The general location of something in relation to other places or features of a larger region (e.g., in the center of a group of cities).
Soil:	Unconsolidated material found at the surface of Earth, which is divided into layers (or horizons) characterized by the accumulation or loss of organic and inorganic compounds. Loam types and depths vary greatly over Earth's surface and are very much influenced by climate, organisms, rock type, local relief, time and human activity.
Spatial:	Pertains to space on Earth's surface.
Spatial distribution:	The distribution of physical and human elements on Earth's surface.
Spatial organization:	The arrangement on Earth's surface of physical and human elements.
Suburbanization:	The shift in population from living in higher density urban areas to lower density developments on the edge of cities.
System:	A collection of entities that are linked and interrelated (e.g., the hydrologic cycle, cities, transportation modes).
Technology:	Application of knowledge to meet the goals, goods and services needed and desired by people.

- Tectonic plates:** Sections of Earth’s rigid crust that move as distinct units on a plastic-like ledge (mantle) on which they rest. As many as twenty different plates have been identified, but only seven are considered to be major (e.g., Eurasian Plate, South American Plate).
- Thematic map:** A geographic representation of a specific spatial distribution, theme or topic (e.g., population density, cattle production, climates of the world).
- Time zone:** A division of Earth, usually 15 degrees longitude, within which the time at the central meridian of the division represents the whole division.
- Topography:** The shape of Earth’s surface.
- Water cycle:** The continuous circulation of water from the oceans, through the air, to the land and back to the sea. Water evaporates from oceans, lakes, rivers and the land surfaces and transpires from vegetation. It condenses into clouds in the atmosphere that may result in precipitation returning water to the land. Water then seeps into the soil or flows out to sea completing the circulation. Also known as Hydrologic Cycle.

Academic Standards for History

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XXIII. INTRODUCTION

This document includes Academic Standards for History that describe what students should know and be able to do in four areas:

- 8.1. Historical Analysis and Skills Development
- 8.2. Pennsylvania History
- 8.3. United States History
- 8.4. World History

The History Standards describe what students should know and be able to do at four grade levels (third, sixth, ninth and twelfth). They reflect an understanding of chronological events and the application of historical thinking skills in viewing the human record. These academic standards provide an organizing content for schools.

The Academic Standards for History are grounded in the Public School Code of 1949 which directs "... study in the history and government of that portion of America which has become the United States of America, and of the Commonwealth of Pennsylvania . . .". Chapter 4—Academic Standards and Assessment in § 4.21 (relating to elementary education; primary and intermediate levels) reinforces the School Code by indicating that the history of the United States and the history of the Commonwealth must be taught once by the end of elementary school. In addition, § 4.22 (relating to middle level education) indicates that planned instruction in the history and cultures of the United States, the Commonwealth and world shall be provided. Chapter 4 also states that planned instruction shall be provided in the history and cultures of the United States, the Commonwealth and world in § 4.23 (relating to high school education).

To support the intent of the Public School Code and Chapter 4, this document creates four standard categories. The four standard categories were designed to meld historical thinking (8.1. Historical Analysis and Skills Development) with historical understanding (8.2. Pennsylvania History, 8.3. United States History, and 8.4. World History) to describe what students should know and be able to do.

Standard category 8.1. Historical Analysis and Skill Development provides the basis for learning the content within the other three standard categories. The intent of the history standards is to instill in each student an ability to comprehend chronology, develop historical comprehension, evaluate historical interpretation and to understand historical research. One should not view these standards as a list of facts to recall, rather as stated in the opening phrase to the Pennsylvania, United States and World standard categories, “Pennsylvania’s public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze the interaction of cultural, economic, geographic, political and social relations.”

These standards provide a history framework to permit every school and teacher to create planned instruction. The content within this document is general and does not represent a course or even a portion thereof. Every school is encouraged to move beyond these standards. These standards are merely a starting point for the study of history. Planned instruction to meet these standards is required; however, the methodology, resources and time are not recommended nor implied.

History is a discipline that interprets and analyzes the past. It is a narrative—a story. In order to tell the story it is not sufficient to simply recall facts; it is also necessary to understand the context of the time and place and to apply historical thinking skills. It is with this concept established, that the content delineated in Pennsylvania, United States and World histories should be approached. Having established the need to move beyond recall, it is the intent of these standards to give students throughout Pennsylvania a common cultural literacy.

Pennsylvania, United States, and World History standard categories use the same four standard statements to guide teachers in developing planned instruction. The four standard statements are: (A) Political and Cultural Contributions of Individuals and Groups; (B) Primary Documents, Material Artifacts and Historical Places; (C) How Continuity and Change Has Influenced History; (D) Conflict and Cooperation Among Social Groups and Organizations. The chart, Four Standard Statements within the Academic Standards for History: An Overview outlines standard statements and descriptors.

Although the standard statements are similar across grade levels and standard categories, the degree of comprehension, changes in content and shifts in chronology differ. Although different grade levels outline different chronological periods within the standards, it is intended that the specified chronological eras be linked to past learnings and that all eras be linked to the present. Linking to past learnings and the present is important, but so is addressing the standard statements in more depth. Therefore the following chronological time periods for the standard categories are established for the standard categories.

Pennsylvania and United States History		World History	
Grades 1-3	Beginnings to Present	Grades 1-3	Beginnings to Present
Grades 4-6	Beginnings to 1824	Grades 4-6	Beginnings to Present
Grades 7-9	1787 to 1914	Grades 7-9	Beginnings to 1500
Grades 10-12	1890 to Present	Grades 10-12	1450 to Present

Districts are encouraged to delineate each chronological period into less expansive historical eras within their planned instruction. The content listed in grade levels 1-3, 4-6, 7-9 and 10-12 should be age appropriate for the students in those grade levels and the reader should interpret each standard descriptor in that manner.

The Academic Standards for History consist of four standard categories (designated as 8.1., 8.2., 8.3., and 8.4.). Each category has four standard statements (designated A, B, C, and D). Most standard statements have bulleted items known as standard descriptors. The standard descriptors are items within the document to illustrate and enhance the standard statement. The categories, statements and descriptors are the regulations. The descriptors many times are followed by an “e.g.” The “e.g.’s” are examples to clarify what type of information could be taught. These are suggestions and the choice of specific content is a local decision as is the method of instruction.

History along with civics and government, economics and geography are identified as social studies in Chapter 4. This identification is consistent with citizenship education in Chapters 49 and 354 (relating to certification of professional personnel; and preparation of professional educators). Based on these regulations, social studies/citizenship programs should include the four sets of standards as an entity in developing a scope and sequence for curriculum and planned instruction.

A glossary is included to assist the reader in understanding terminology contained in the standards.

Four Standard Statements within the Academic Standards for History: An Overview	
<p>Political and Cultural Contributions of Individuals and Groups</p> <ul style="list-style-type: none"> • Inhabitants (cultures, subcultures, groups) • Political Leaders (monarchs, governors, elected officials) • Military Leaders (generals, noted military figures) • Cultural and Commercial Leaders (entrepreneurs, corporate executives, artists, entertainers, writers) • Innovators and Reformers (inventors, philosophers, religious leaders, social change agents, improvers of technology) 	<p>How Continuity and Change Have Influenced History</p> <ul style="list-style-type: none"> • Belief Systems and Religions (ideas, beliefs, values) • Commerce and Industry (jobs, trade, environmental change, labor systems, entertainment) • Innovations (ideas, technology, methods and processes) • Politics (political party systems, administration of government, rules, regulations and laws, political and judicial interpretation) • Transportation (methods of moving people and goods over time, transportation routes, circulation systems) • Settlement Patterns and Expansion (population density and diversity, settlement types, land use, colonization) • Social Organization (social structure, identification of social groups, families, groups and communities, education, school population, suffrage, civil rights) • Women’s Movement (changing roles of women, social and political movements, breaking barriers, role models)

Four Standard Statements within the Academic Standards for History: An Overview	
<p>Primary Documents, Material Artifacts and Historical Places</p> <ul style="list-style-type: none"> • Documents, Writings and Oral Traditions (government documents, letters and diaries, fiction and non-fiction works, newspapers and other media, folklore) • Artifacts, Architecture and Historic Places (historic sites and places, museums and museum collections, official and popular cultural symbols, material culture) 	<p>Conflict and Cooperation Among Social Groups and Organizations</p> <ul style="list-style-type: none"> • Domestic Instability (political unrest, natural and man-made disasters, genocide) • Ethnic and Racial Relations (racism and xenophobia, ethnic and religious prejudices, collective and individual actions) • Immigration and Migration (causes of population shifts, xenophobia, intercultural activity) • Labor Relations (strikes and collective bargaining, working conditions over time, labor/management identity) • Military Conflicts (causes, conduct and impact of military conflicts, wars and rebellions)
<p>Each standard statement outlines its respective standard descriptors. Each standard descriptor suggests content that may be addressed. These are not all encompassing and local planned instruction is <i>not</i> limited to these examples.</p>	

8.1. Historical Analysis and Skills Development			
8.1.3. GRADE 3	8.1.6. GRADE 6	8.1.9. GRADE 9	8.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Understand chronological thinking and distinguish between past, present and future time.</p> <ul style="list-style-type: none"> • Calendar time • Time lines • Continuity and change • Events (time and place) <p>B. Develop an understanding of historical sources.</p> <ul style="list-style-type: none"> • Data in historical maps • Visual data from maps and tables • Mathematical data from graphs and tables • Author or historical source 	<p>A. Understand chronological thinking and distinguish between past, present and future time.</p> <ul style="list-style-type: none"> • Calendar time • Time lines • People and events in time • Patterns of continuity and change • Sequential order • Context for events <p>B. Explain and analyze historical sources.</p> <ul style="list-style-type: none"> • Literal meaning of a historical passage • Data in historical and contemporary maps, graphs and tables • Author or historical source • Multiple historical perspectives • Visual evidence • Mathematical data from graphs and tables 	<p>A. Analyze chronological thinking.</p> <ul style="list-style-type: none"> • Difference between past, present and future • Sequential order of historical narrative • Data presented in time lines • Continuity and change • Context for events <p>B. Analyze and interpret historical sources.</p> <ul style="list-style-type: none"> • Literal meaning of historical passages • Data in historical and contemporary maps, graphs, and tables • Different historical perspectives • Data from maps, graphs and tables • Visual data presented in historical evidence 	<p>A. Evaluate chronological thinking.</p> <ul style="list-style-type: none"> • Sequential order of historical narrative • Continuity and change • Context for events knowledge and skills needed to . . . <p>B. Synthesize and evaluate historical sources.</p> <ul style="list-style-type: none"> • Literal meaning of historical passages • Data in historical and contemporary maps, graphs and tables • Different historical perspectives • Data presented in maps, graphs and tables • Visual data presented in historical evidence

8.1. Historical Analysis and Skills Development			
8.1.3. GRADE 3	8.1.6. GRADE 6	8.1.9. GRADE 9	8.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>C. Understand fundamentals of historical interpretation.</p> <ul style="list-style-type: none"> • Difference between fact and opinion • The existence of multiple points of view • Illustrations in historical stories • Causes and results 	<p>C. Explain the fundamentals of historical interpretation.</p> <ul style="list-style-type: none"> • Difference between fact and opinion • Multiple points of view • Illustrations in historical stories • Causes and results • Author or source of historical narratives 	<p>C. Analyze the fundamentals of historical interpretation.</p> <ul style="list-style-type: none"> • Fact versus opinion • Reasons/causes for multiple points of view • Illustrations in historical documents and stories • Causes and results • Author or source used to develop historical narratives • Central issue 	<p>C. Evaluate historical interpretation of events.</p> <ul style="list-style-type: none"> • Impact of opinions on the perception of facts • Issues and problems in the past • Multiple points of view • Illustrations in historical stories and sources • Connections between causes and results • Author or source of historical narratives' points of view • Central issue

8.1. Historical Analysis and Skills Development			
8.1.3. GRADE 3	8.1.6. GRADE 6	8.1.9. GRADE 9	8.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
D. Understand historical research. <ul style="list-style-type: none"> • Event (time and place) • Facts, folklore and fiction • Formation of historical question • Primary sources • Secondary sources • Conclusions (e.g., storytelling, role playing, diorama) 	D. Describe and explain historical research. <ul style="list-style-type: none"> • Historical events (time and place) • Facts, folklore and fiction • Historical questions • Primary sources • Secondary sources • Conclusions (e.g., simulations, group projects, skits and plays) 	D. Analyze and interpret historical research. <ul style="list-style-type: none"> • Historical event (time and place) • Facts, folklore and fiction • Historical questions • Primary sources • Secondary sources • Conclusions (e.g., History Day projects, mock trials, speeches) • Credibility of evidence 	D. Synthesize historical research. <ul style="list-style-type: none"> • Historical event (time and place) • Facts, folklore and fiction • Historical questions • Primary sources • Secondary sources • Conclusions (e.g., Senior Projects, research papers, debates) • Credibility of evidence Pennsylvania History, 8.3. United States History and 8.4. World History.
Historical Analysis and Skill Development are learned through and applied to the standards statements and their descriptors for 8.2 Pennsylvania History, 8.3 United States History and 8.4 World History			

8.2. Pennsylvania History			
8.2.3. GRADE 3	8.2.6. GRADE 6	8.2.9. GRADE 9	8.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i>			
<p>A. Understand the political and cultural contributions of individuals and groups to Pennsylvania history.</p> <ul style="list-style-type: none"> • William Penn • Benjamin Franklin • Pennsylvanians impacting American Culture (e.g., John Chapman, Richard Allen, Betsy Ross, Mary Ludwig Hayes, Rachel Carson, Elizabeth Jane Cochran, Marian Anderson) • Local historical figures in municipalities and counties. 	<p>A. Identify and explain the political and cultural contributions of individuals and groups to Pennsylvania history from Beginnings to 1824.</p> <ul style="list-style-type: none"> • Inhabitants (e.g., Native Americans, Europeans, Africans) • Military Leaders (e.g., Anthony Wayne, Oliver H. Perry, John Muhlenberg) • Political Leaders (e.g., William Penn, Hannah Penn, Benjamin Franklin) • Cultural and Commercial Leaders (e.g., Robert Morris, John Bartram, Albert Gallatin) • Innovators and Reformers (e.g., Society of Friends, Richard Allen, Sybilla Masters) 	<p>A. Analyze the political and cultural contributions of individuals and groups to Pennsylvania history from 1787 to 1914.</p> <ul style="list-style-type: none"> • Political Leaders (e.g., James Buchanan, Thaddeus Stevens, Andrew Curtin) • Military Leaders (e.g., George Meade, George McClellan, John Hartranft) • Cultural and Commercial Leaders (e.g., John J. Audubon, Rebecca Webb Lukens, Stephen Foster) • Innovators and Reformers (e.g., George Westinghouse, Edwin Drake, Lucretia Mott) 	<p>A. Evaluate the political and cultural contributions of individuals and groups to Pennsylvania history from 1890 to Present.</p> <ul style="list-style-type: none"> • Political Leaders (e.g., Gifford Pinchot, Genevieve Blatt, K. Leroy Irvis) • Military Leaders (e.g., Tasker H. Bliss, Henry “Hap” Arnold, George C. Marshall) • Cultural and Commercial Leaders (e.g., Milton Hershey, Marian Anderson, Fred Rogers) • Innovators and Reformers (e.g., Frank Conrad, Rachel Carson, Joseph Rothrock)

8.2. Pennsylvania History			
8.2.3. GRADE 3	8.2.6. GRADE 6	8.2.9. GRADE 9	8.2.12. GRADE 12
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i></p>			
<p>B. Identify and describe primary documents, material artifacts and historic sites important in Pennsylvania history.</p> <ul style="list-style-type: none"> • Documents, Writings and Oral Traditions (e.g., Penn’s Charter, Pennsylvania “Declaration of Rights’) • Artifacts, Architecture and Historic Places (e.g., Local historical sites, museum collections, Independence Hall) • Liberty Bell • Official Commonwealth symbols (e.g., tree, bird, dog, insect) 	<p>B. Identify and explain primary documents, material artifacts and historic sites important in Pennsylvania history from Beginnings to 1824.</p> <ul style="list-style-type: none"> • Documents, Writings and Oral Traditions (e.g., Charter of Privileges, The Gradual Abolition of Slavery Act of 1780, <i>Letters from a Pennsylvania Farmer</i>) • Artifacts, Architecture and Historic Places (e.g., Conestoga Wagon, Pennsylvania rifle, Brig Niagara) 	<p>B. Identify and analyze primary documents, material artifacts and historic sites important in Pennsylvania history from 1787 to 1914.</p> <ul style="list-style-type: none"> • Documents, Writings and Oral Traditions (e.g., Pennsylvania Constitutions of 1838 and 1874, The “Gettysburg Address,” <i>The Pittsburgh Survey</i>) • Artifacts, Architecture and Historic Places (e.g., Gettysburg, Eckley Miners’ Village, Drake’s Well) 	<p>B. Identify and evaluate primary documents, material artifacts and historic sites important in Pennsylvania history from 1890 to Present.</p> <ul style="list-style-type: none"> • Documents, Writings and Oral Traditions (e.g., Constitution of 1968, <i>Silent Spring</i> by Rachel Carson, Pennsylvania historical markers) • Artifacts, Architecture and Historic Places (e.g., 28th Division Shrine, Fallingwater, Levittown, Allegheny Ridge heritage corridor)

8.2. Pennsylvania History			
8.2.3. GRADE 3	8.2.6. GRADE 6	8.2.9. GRADE 9	8.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i>			
<p>C. Identify and describe how continuity and change have influenced Pennsylvania history.</p> <ul style="list-style-type: none"> • Belief Systems and Religions (e.g., Native Americans, early settlers, contemporary religions) • Commerce and Industry (e.g., jobs, trade, environmental change) • Innovations (e.g., technology, ideas, processes) • Politics (e.g., rules, regulations, laws) • Settlement Patterns (e.g., farms, towns, rural communities, cities) • Social Organization (e.g., relationships of individuals, families, groups, communities; ability to be educated) • Transportation (e.g., methods of moving people and goods over time) • Women's Movement (e.g., changes in roles and rights over time) 	<p>C. Identify and explain how continuity and change have influenced Pennsylvania history from the Beginnings to 1824.</p> <ul style="list-style-type: none"> • Belief Systems and Religions (e.g., Native Americans, Quakers) • Commerce and Industry (e.g., iron production, sailing, fur trade) • Innovations (e.g., steam boat, Conestoga Wagon) • Politics (e.g., The Mason-Dixon Line, Pennsylvania's acquisition and detachment of the "lower three counties," movements of State capital) • Settlement Patterns (e.g., native settlements, Westward expansion, development of towns) • Social Organization (e.g., trade and development of cash economy, African Methodist Episcopal Church founded, schools in the colony) 	<p>C. Identify and analyze how continuity and change have influenced Pennsylvania history from 1787 to 1914.</p> <ul style="list-style-type: none"> • Belief Systems and Religions (e.g., Ephrata Cloister, Harmonists, Amish, immigrant influences) • Commerce and Industry (e.g., mining coal, producing iron, harvesting timber) • Innovations (e.g., John Roebbling's steel cable, steel-tipped plow, improved techniques for making iron, steel and glass) • Politics (e.g., Fugitive Slave Act reaction, canal system legislation, The Free School Act of 1834) • Settlement Patterns (e.g., farms and growth of urban centers) 	<p>C. Identify and evaluate how continuity and change have influenced Pennsylvania history from the 1890s to Present.</p> <ul style="list-style-type: none"> • Belief Systems and Religions (e.g., Buddhism, Christianity, Hinduism, Islam, Judaism) • Commerce and Industry (e.g., work of defense industries, rise and decline of the steel industry, increase of service industries) • Innovations (e.g., polio vaccine, air pollution examined, nuclear power plants) • Politics (e.g., Great Depression special legislative session, creation of the state income tax) • Settlement Patterns (e.g., growth and decline of cities, coal towns, Pittsburgh Renaissance)

8.2. Pennsylvania History			
8.2.3. GRADE 3	8.2.6. GRADE 6	8.2.9. GRADE 9	8.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i>			
	<ul style="list-style-type: none"> • Transportation (e.g., trade routes, turnpikes, post roads) • Women's Movement (e.g., voting qualifications, role models) 	<ul style="list-style-type: none"> • Social Organization (e.g., the Philadelphia Centennial Exposition of 1876, prohibition of racial discrimination in schools) • Transportation (e.g., canals, National Road, Thompson's Horseshoe Curve) • Women's Movement (e.g., work of the Equal Rights League of Pennsylvania) 	<ul style="list-style-type: none"> • Social Organization (e.g., creation of the State Soil Conservation Commission, First Amendment challenges to education, social services) • Transportation (e.g., Pennsylvania Turnpike, Interstate highways, international airports) • Women's Movement (e.g., League of Women Voters, Commission for Women)

8.2. Pennsylvania History			
8.2.3. GRADE 3	8.2.6. GRADE 6	8.2.9. GRADE 9	8.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i>			
<p>D. Identify and describe conflict and cooperation among social groups and organizations in Pennsylvania history.</p> <ul style="list-style-type: none"> • Domestic Instability (e.g., political, economic and geographic impact on daily activities) • Ethnic and Racial Relations (e.g., treatment of various ethnic and racial groups in history) • Labor Relations (e.g., working conditions, over time) • Immigration (e.g., diverse groups inhabiting the state) • Military Conflicts (e.g., struggle for control) 	<p>D. Identify and explain conflict and cooperation among social groups and organizations in Pennsylvania history from Beginnings to 1824.</p> <ul style="list-style-type: none"> • Domestic Instability (e.g., religious diversity, toleration and conflicts, incursion of the Iroquois) • Ethnic and Racial Relations (e.g., Penn's Treaties with Indians, the Underground Railroad, the abolition of slavery) • Labor Relations (e.g., indentured servants, working conditions) • Immigration (e.g., Germans, Irish) • Military Conflicts (e.g., Dutch, Swedish and English struggle for control of land, Wyoming Massacre, The Whiskey Rebellion) 	<p>D. Identify and analyze conflict and cooperation among social groups and organizations in Pennsylvania history from 1787 to 1914.</p> <ul style="list-style-type: none"> • Domestic Instability (e.g., impact of war, 1889 Johnstown Flood) • Ethnic and Racial Relations (e.g., Christiana riots, disenfranchisement and restoration of suffrage for African-Americans, Carlisle Indian School) • Labor Relations (e.g., National Trade Union, The "Molly Maguires," Homestead steel strike) • Immigration (e.g., Anti-Irish Riot of 1844, new waves of immigrants) • Military Conflicts (e.g., Battle of Lake Erie, the Mexican War, the Civil War) 	<p>D. Identify and evaluate conflict and cooperation among social groups and organizations in Pennsylvania history from 1890 to Present.</p> <ul style="list-style-type: none"> • Domestic Instability (e.g., The Great Depression, Three-Mile Island nuclear accident, floods of 1936, 1972 and 1977) • Ethnic and Racial Relations (e.g., segregation, desegregation, racial profiling) • Labor Relations (e.g., strikes, work stoppages, collective bargaining) • Immigration (e.g., increased immigration from Europe, migration of African-Americans from the South, influx of Hispanic and Asian peoples) • Military Conflicts (e.g., World War I, World War II, Persian Gulf War)

8.2. Pennsylvania History			
8.2.3. GRADE 3	8.2.6. GRADE 6	8.2.9. GRADE 9	8.2.12. GRADE 12
<p>Standard Category 8.1. Historical Analysis and Skills Development should be applied to the above standard statements and descriptors. Suggested chronology for grade levels 4-6, 7-9 and 10-12 focus on a particular century; however, instruction is encouraged that draws on prior and later events in history so that students may develop a seamless view of the world.</p>			

8.3. United States History			
8.3.3. GRADE 3	8.3.6. GRADE 6	8.3.9. GRADE 9	8.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i>			
<p>A. Identify contributions of individuals and groups to United States history.</p> <ul style="list-style-type: none"> • George Washington • Thomas Jefferson • Abraham Lincoln • Theodore Roosevelt • Franklin D. Roosevelt • Individuals who are role models (e.g., Abigail Adams, Sacajawea, Frederick Douglass, Clara Barton, Jackie Robinson, Rosa Parks, Archbishop Patrick Flores, Jamie Escalante, Sally Ride, Tiger Woods, Cal Ripken, Jr., Sammy Sosa) 	<p>A. Identify and explain the political and cultural contributions of individuals and groups to United States history from Beginnings to 1824.</p> <ul style="list-style-type: none"> • Native Americans, Africans and Europeans • Political Leaders (e.g., John Adams, Thomas Jefferson, John Marshall) • Military Leaders (e.g. George Washington, Meriwether Lewis, Henry Knox) • Cultural and Commercial Leaders (e.g., Paul Revere, Phyllis Wheatley, John Rolfe) • Innovators and Reformers (e.g., Ann Hutchinson, Roger Williams, Junipero Serra) 	<p>A. Identify and analyze the political and cultural contributions of individuals and groups to United States history from 1787 to 1914.</p> <ul style="list-style-type: none"> • Political Leaders (e.g., Daniel Webster, Abraham Lincoln, Andrew Johnson) • Military Leaders (e.g., Andrew Jackson, Robert E. Lee, Ulysses S. Grant) • Cultural and Commercial Leaders (e.g., Jane Addams, Jacob Riis, Booker T. Washington) • Innovators and Reformers (e.g., Alexander G. Bell, Frances E. Willard, Frederick Douglass) 	<p>A. Identify and evaluate the political and cultural contributions of individuals and groups to United States history from 1890 to Present.</p> <ul style="list-style-type: none"> • Political Leaders (e.g., Theodore Roosevelt, Woodrow Wilson, Franklin D. Roosevelt) • Military Leaders (e.g., John Pershing, Douglas MacArthur, Dwight D. Eisenhower) • Cultural and Commercial Leaders (e.g., Abby Aldrich Rockefeller, Langston Hughes, Alan Greenspan) • Innovators and Reformers (e.g., Wilbur and Orville Wright, John L. Lewis, Reverend Dr. Martin Luther King)

8.3. United States History			
8.3.3. GRADE 3	8.3.6. GRADE 6	8.3.9. GRADE 9	8.3.12. GRADE 12
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i></p>			
<p>B. Identify and describe primary documents, material artifacts and historic sites important in United States history.</p> <ul style="list-style-type: none"> • Documents (e.g., Declaration of Independence, U.S. Constitution, Bill of Rights) • Writings and Communications (e.g., Pledge of Allegiance, famous quotations and sayings) • Historic Places (e.g., The White House, Mount Rushmore, Statue of Liberty) • The Flag of the United States 	<p>B. Identify and explain primary documents, material artifacts and historic sites important in United States history from Beginnings to 1824.</p> <ul style="list-style-type: none"> • Documents (e.g., Mayflower Compact, Northwest Ordinance, Washington's Farewell Address) • 18th Century Writings and Communications (e.g., Paine's <i>Common Sense</i>; Franklin's "Join, or Die," Henry's "Give me liberty or give me death") • Historic Places (e.g., Cahokia Mounds, Spanish Missions, Jamestown) 	<p>B. Identify and analyze primary documents, material artifacts and historic sites important in United States history from 1787 to 1914.</p> <ul style="list-style-type: none"> • Documents (e.g., Fugitive Slave Law, Treaty of Guadalupe Hidalgo, Emancipation Proclamation) • 19th Century Writings and Communications (e.g., Stowe's <i>Uncle Tom's Cabin</i>, Brown's "Washed by Blood," Key's Star Spangled Banner) • Historic Places (e.g., The Alamo, Underground Railroad sites, Erie Canal) 	<p>B. Identify and evaluate primary documents, material artifacts and historic sites important in United States history from 1890 to Present.</p> <ul style="list-style-type: none"> • Documents (e.g., Treaty of Versailles, North Atlantic Treaty, Neutrality Acts) • 20th Century Writings and Communication (e.g., Coolidge's "The Business of America is Business," King's "I Have A Dream," Armstrong's "One Small Step for Man") • Historic Places (e.g., Ellis Island, Pearl Harbor, Los Alamos)

8.3. United States History			
8.3.3. GRADE 3	8.3.6. GRADE 6	8.3.9. GRADE 9	8.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i>			
<p>C. Identify important changes in United States history (e.g., Belief Systems and Religions, Commerce and Industry, Innovations, Politics, Settlement Patterns and Expansion, Social Organization, Transportation, Women's Movement).</p>	<p>C. Explain how continuity and change has influenced United States history from Beginnings to 1824.</p> <ul style="list-style-type: none"> • Belief Systems and Religions (e.g., impact on daily life, colonial government established religions, communal sects) • Commerce and Industry (e.g., fur trade, development of cash crops) • Innovations (e.g., cotton gin, Whitney; wooden clock, Banneker; stove, Franklin) • Politics (e.g., Hamilton's defense of John Peter Zenger, The Great Compromise, <i>Marbury v. Madison</i>) • Settlement Patterns (e.g., frontier settlements, slave plantation society, growth of cities) • Social Organization (e.g., community structure on the frontier, cultural and language barriers) 	<p>C. Analyze how continuity and change has influenced United States history from 1787 to 1914.</p> <ul style="list-style-type: none"> • Belief Systems and Religions (e.g., 19th century trends and movements) • Commerce and Industry (e.g., growth of manufacturing industries, economic nationalism) • Innovations (e.g., Brooklyn Bridge, refrigerated shipping, telephone) • Politics (e.g., election of 1860, impeachment of Andrew Johnson, Jim Crow Laws) • Settlement Patterns and Expansion (e.g., Manifest Destiny, successive waves of immigrants, purchase of Alaska and Hawaii) • Social Organization (e.g., social class differences, women's rights and antislavery movement, education reforms) 	<p>C. Evaluate how continuity and change has influenced United States history from 1890 to Present.</p> <ul style="list-style-type: none"> • Belief Systems and Religions (e.g., 20th century movements, religions of recent immigrants) • (Commerce and Industry (e.g., corporations, conglomerates, multinational corporations) • Innovations (e.g., The Tin Lizzie, radio, World Wide Web) • Politics (e.g., New Deal legislation, <i>Brown v. Topeka</i>, isolationist/non-isolationist debate) • Settlement Patterns (e.g., suburbs, large urban centers, decline of city population) • Social Organization (e.g., compulsory school laws, court decisions expanding individual rights, technological impact)

8.3. United States History			
8.3.3. GRADE 3	8.3.6. GRADE 6	8.3.9. GRADE 9	8.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i>			
	<ul style="list-style-type: none"> • Transportation and Trade (e.g., methods of overland travel, water transportation, National Road) • Women's Movement (e.g., roles and changing status of women, Margaret Brent's vote, soldier Deborah Sampson) 	<ul style="list-style-type: none"> • Transportation and Trade (e.g., Pony Express, telegraph, Transcontinental Railroad) • Women's Movement (e.g., roles in the Civil War, medical college for women, Seneca Falls Conference) 	<ul style="list-style-type: none"> • Transportation and Trade (e.g., expansion and decline of railroads, increased mobility, Internet) • Women's Movement (e.g., right to vote, women in the war effort, Women's Peace Party)

8.3. United States History			
8.3.3. GRADE 3	8.3.6. GRADE 6	8.3.9. GRADE 9	8.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i>			
<p>D. Identify conflict and cooperation among social groups and organizations in United States history.</p> <ul style="list-style-type: none"> • Domestic Instability (e.g., impact on daily activities) • Ethnic and Racial Relations (e.g., treatment of minority groups in history) • Labor Relations (e.g., working conditions over time) • Immigration (e.g., diverse groups inhabiting the state) • Military Conflicts (e.g., struggle for control) 	<p>D. Identify and explain conflict and cooperation among social groups and organizations in United States history from Beginnings to 1824.</p> <ul style="list-style-type: none"> • Domestic Instability (e.g., Salem Witch Trials, Shays Rebellion, religious persecution) • Ethnic and Racial Relations (e.g., cooperation between and among Native Americans and European settlers, slave uprisings, “Colored” troops in the Revolution) • Labor Relations (e.g., early union efforts, 10-hour day, women’s role) • Immigration and Migration (e.g., western settlements, Louisiana Purchase, European immigration) 	<p>D. Identify and analyze conflict and cooperation among social groups and organizations in United States history from 1787 to 1914.</p> <ul style="list-style-type: none"> • Domestic Instability (e.g., wartime confiscation of private property, abolitionist movement, Reconstruction) • Ethnic and Racial Relations (e.g., Cherokee Trail of Tears, slavery and the Underground Railroad, draft riots) • Labor Relations (e.g., female and child labor, trade unionism, strike breakers) • Immigration and Migration (e.g., Manifest Destiny, eastern and southern European immigration, Chinese Exclusion Act) 	<p>D. Identify and evaluate conflict and cooperation among social groups and organizations in United States history from 1890 to the Present.</p> <ul style="list-style-type: none"> • Domestic Instability (e.g., Great Depression, assassination of political and social leaders, terrorist threats) • Ethnic and Racial Relations (e.g., internment camps for Japanese Americans, Montgomery Alabama Bus Boycott, land tensions with Native Americans) • Labor Relations (e.g., rise and decline of industrial unions, free trade agreements, imports impact on domestic employment) • Immigration and Migration (e.g., anti-immigrant attitudes, quota laws, westward and southward migration)

8.3. United States History			
8.3.3. GRADE 3	8.3.6. GRADE 6	8.3.9. GRADE 9	8.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i>			
	<ul style="list-style-type: none"> • Military Conflicts (e.g., French and Indian War, American Revolutionary War, War of 1812) 	<ul style="list-style-type: none"> • Military Conflicts (e.g., Native American opposition to expansion and settlement, Civil War, Spanish-American War) 	<ul style="list-style-type: none"> • Military Conflicts (e.g., World War I, World War II, War on Terrorism)
<p>Standard Category 8.1. Historical Analysis and Skills Development should be applied to the above standard statements and descriptors. Suggested chronology for grade levels 4-6, 7-9 and 10-12 focus on a particular century; however, instruction is encouraged that draws on prior or later events in history so that students may develop a seamless view of the world.</p>			

8.4. World History			
8.4.3. GRADE 3	8.4.6. GRADE 6	8.4.9. GRADE 9	8.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i>			
<p>A. Identify individuals and groups who have made significant political and cultural contributions to world history.</p> <ul style="list-style-type: none"> • Africa (e.g., Nefertiti, Mansa Musa, Nelson Mandela) • Americas (e.g., Montezuma, Simon Bolivar, Fidel Castro) • Asia (e.g., Hammurabi, Mohandas Gandhi, Benazir Bhutto) • Europe (e.g., Julius Ceasar, Joan of Arc, Pope John Paul) 	<p>A. Identify and explain how individuals and groups made significant political and cultural contributions to world history.</p> <ul style="list-style-type: none"> • Africa (e.g., Nelson Mandela, Desmond Tutu, F. W. de Klerk, Pieter Botha, African National Congress) • Americas (e.g., Pizarro, Atahualpa, Aztecs, Incas, Montezuma, Cortez) • Asia (e.g., Tokugawa Ieyasu, Toyotomi clan, shogun Iemitsu, Commodore Perry, daimyo) • Europe (e.g., Pope Leo X, John Calvin, John Wesley, Martin Luther, Ignatius of Loyola) 	<p>A. Analyze the significance of individuals and groups who made major political and cultural contributions to world history before 1500.</p> <ul style="list-style-type: none"> • Political and Military Leaders (e.g., King Ashoka, Montezuma I, Ghenghis Khan, William the Conqueror) • Cultural and Commercial Leaders (e.g., Mansa Musa, Yak Pac, Cheng Ho, Marco Polo) • Innovators and Reformers (e.g., Erastostenes, Tupac Inka Yupenqui, Johannes Gutenberg) 	<p>A. Evaluate the significance of individuals and groups who made major political and cultural contributions to world history since 1450.</p> <ul style="list-style-type: none"> • Political and Military Leaders (e.g., Askia Daud, Simon Bolivar, Napoleon Bonaparte, Mao Zedong) • Cultural and Commercial Leaders (e.g., Chinua Achebe, Gabriel Garcia Marquez, Akira Kurosa, Christopher Columbus) • Innovators and Reformers (e.g., Nelson Mandela, Louis-Joseph Papineau, Mohandas Gandhi, Alexander Fleming)

8.4. World History			
8.4.3. GRADE 3	8.4.6. GRADE 6	8.4.9. GRADE 9	8.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i>			
<p>B. Identify historic sites and material artifacts important to world history.</p> <ul style="list-style-type: none"> • Africa (e.g., Pyramids, treasures of Tutankhamen, Nefertiti's sculpture) • Americas (e.g., Olmec ritualistic centers, Mayan pyramids, arrowheads) • Asia (e.g., Code of Hammurabi, Ziggurat at Ur, canals) • Europe (e.g., ancient megaliths, Arc de Triomphe, Acropolis) 	<p>B. Identify and explain important documents, material artifacts and historic sites in world history.</p> <ul style="list-style-type: none"> • Africa (e.g., Prohibition of Marriages Act, prison on Robben Island) • Americas (e.g., Tenochtitlan, Aztec masks) • Asia (e.g., samurai sword, Commodore Perry's Black Ships) • Europe (e.g., Luther's Ninety-Five Theses, Wittenberg Castle Church) 	<p>B. Analyze historical documents, material artifacts and historic sites important to world history before 1500.</p> <ul style="list-style-type: none"> • Documents, Writings and Oral Traditions (e.g., Rosetta Stone, Aztec glyph writing, Dead Sea Scrolls, Magna Carta) • Artifacts, Architecture and Historic Places (e.g., Ethiopian rock churches, Mayan pyramids, Nok terra cotta figures, megaliths at Stonehenge) • Historic districts (e.g., Memphis and its Necropolis, Sanctuary of Machu Picchu, Old City of Jerusalem and its Walls, Centre of Rome and the Holy See) 	<p>B. Evaluate historical documents, material artifacts and historic sites important to world history since 1450.</p> <ul style="list-style-type: none"> • Documents, Writings and Oral Traditions (e.g., Declaration of the International Conference on Sanctions Against South Africa; Monroe Doctrine, Communist Manifesto, Luther's Ninety-five Theses) • Artifacts, Architecture and Historic Places (e.g., Robben Island, New York Trade Center, Hiroshima Ground Zero Memorial, Nazi concentration camps) • Historic districts (e.g., Timbuktu, Centre of Mexico City and Xochimilco, Taj Mahal and Gardens, Kremlin and Red Square)

8.4. World History			
8.4.3. GRADE 3	8.4.6. GRADE 6	8.4.9. GRADE 9	8.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i>			
<p>C. Compare similarities and differences between earliest civilizations and life today. (e.g., Africa, Egypt; Asia, Babylonia; Americas, Olmec; Europe, Neolithic settlements).</p>	<p>C. Identify and explain how continuity and change has affected belief systems, commerce and industry, innovations, settlement patterns, social organizations, transportation and women's roles in world history.</p> <ul style="list-style-type: none"> • Africa (e.g., Apartheid) • Americas (e.g., European conquest) • Asia (e.g., Japanese society prior to the Meiji Restoration) • Europe (e.g., Impact of the Great Schism and Reformation) 	<p>C. Analyze how continuity and change throughout history has impacted belief systems and religions, commerce and industry, innovations, settlement patterns, social organization, transportation and roles of women before 1500.</p> <ul style="list-style-type: none"> • Africa • Americas • Asia • Europe 	<p>C. Evaluate how continuity and change throughout history has impacted belief systems and religions, commerce and industry, innovations, settlement patterns, social organization, transportation and roles of women since 1450.</p> <ul style="list-style-type: none"> • Africa • Americas • Asia • Europe

8.4. World History			
8.4.3. GRADE 3	8.4.6. GRADE 6	8.4.9. GRADE 9	8.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to analyze cultural, economic, geographic, political and social relations to . . .</i>			
<p>D. Identify how conflict and cooperation among social groups and organizations affected world history.</p> <ul style="list-style-type: none"> • Domestic Instability (e.g., political, economic and geographic impact on normal activities) • Labor Relations (e.g., working conditions over time) • Racial and Ethnic Relations (e.g., treatment of various ethnic and racial groups in history) • Immigration and migration (e.g., diverse groups inhabiting a territory) • Military Conflicts (e.g., struggle for control) 	<p>D. Explain how conflict and cooperation among social groups and organizations affected world history</p> <ul style="list-style-type: none"> • Africa (e.g., imperialism) • Americas (e.g., European diseases) • Asia (e.g., trade routes) • Europe (e.g., Counter reformation) 	<p>D. Analyze how conflict and cooperation among social groups and organizations impacted world history through 1500 in Africa, Americas, Asia and Europe</p> <ul style="list-style-type: none"> • Domestic Instability • Ethnic and Racial Relations • Labor Relations • Immigration and Migration • Military Conflicts 	<p>D. Evaluate how conflict and cooperation among social groups and organizations impacted world history from 1450 to Present in Africa, Americas, Asia and Europe.</p> <ul style="list-style-type: none"> • Domestic Instability • Ethnic and Racial Relations • Labor Relations • Immigration and Migration • Military Conflicts
<p>Standard Category 8.1. Historical Analysis and Skills Development should be applied to the above standard statements and descriptors. Suggested chronology in organizing the content for grade levels 7-9 and 10-12 use the 15th century as the dividing point; however, instruction is encouraged that draws on prior and later events in history so that students may develop a seamless view of the world.</p>			

XXIV. GLOSSARY

Artifact:	Any object made by human work or skill.
Beginnings:	A demarcation of time designating studies to commence with the written historical record.
Central issue:	The primary concern from which other problems or matters are derived. For example, today's world migration flows are a central issue from which other concerns such as terrorist threats may arise.
Chronology:	The science of measuring time and of dating events. Examples include BCE (before the common era) and CE (common era). Another reference to chronology is CA, around the time, circa.
Conflict:	The opposition of persons or groups that gives rise to dramatic action. Such actions could include the use of force as in combat.
Culture:	The skills and arts of a given people in a given period of time or a civilization.
Document:	Anything written or printed used to record or prove something.
Historical evidence:	Something that makes something else noticeable, obvious or evident.
Historical passage:	An article or section of a longer work that has importance to the past.
Innovation:	The introduction of something new; an idea, method or devise.
Interpretation:	Explanation or to reply to a situation in order to make sense of it (e.g., a time period, an individual's actions).
Memorial:	An object or ceremony serving as a remembrance for a person, group, day, site or event.
Museum:	A historical display in a building, room, etc. for exhibiting artistic, historical or scientific objects.
Present:	A demarcation of time designating studies to the current year.

- Opinion:** A belief based not on certainty but on what seems to be true or probable.
- Strike:** A work stoppage by employees organized against the management of a business entity.
- Time lines:** A measure of a period during which something exists or happens; usually displayed in chronological order on a graph or linear lines.
- War:** A conflict in which two or more nations or two or more entities inside a nation are at odds.
- Xenophobia:** An intense fear or dislike of groups unknown or not within one’s experience including the group’s customs and culture.

APPENDIX D

Academic Standards for the Arts and Humanities and Health, Safety and Physical Education and Family and Consumer Sciences

Source

The provisions of this Appendix D adopted January 10, 2003, effective January 11, 2003, 33 Pa.B. 255, unless otherwise noted.

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XXVI. INTRODUCTION

The Academic Standards for the Arts and Humanities describe what students should know and be able to do at the end of grades 3, 5, 8 and 12 in the visual and performing arts and the understanding about humanities context within the arts. The arts include dance, music, theatre and visual arts. The arts and the humanities are interconnected through the inclusion of history, criticism and aesthetics. In addition, the humanities include literature and language, philosophy, social studies and world languages. The areas encompassed in the humanities such as jurisprudence, comparative religions and ethics are included among other standards documents. The interconnected arts and humanities areas are divided into these standards categories:

- 9.1. Production, Performance and Exhibition of Dance, Music, Theatre and Visual Arts
- 9.2. Historical and Cultural Contexts
- 9.3. Critical Response
- 9.4. Aesthetic Response

The Academic Standards for the Arts and Humanities define the content for planned instruction that will result in measurable gains for all students in knowledge and skills and provide a basis of learning for continued study in the arts. The

unifying themes of production, history, criticism and aesthetics are common to each area of study within the Academic Standards in the Arts and Humanities.

- Dance Education is a kinesthetic art form that satisfies the human need to respond to life experiences through movement of the physical being.
- Music Education is an aural art form that satisfies the human need to respond to life experiences through singing, listening and/or playing an instrument.
- Theatre Education is an interdisciplinary art form that satisfies the human need to express thoughts and feelings through written text, dramatic interpretation and multimedia production.
- Visual Arts Education is a spatial art form that satisfies the human need to respond to life experiences through images, structures and tactile works.
- Humanities Education is the understanding and integration of human thought and accomplishment.

Knowledge of the Academic Standards for the Arts and Humanities incorporates carefully developed and integrated components:

- Application of problem solving skills
- Extensive practice in the comprehension of basic symbol systems and abstract concepts
- Application of technical skills in practical production and performance
- Comprehension and application of the creative process
- Development and practice of creative thinking skills
- Development of verbal and nonverbal communication skills

These standards provide the targets essential for success in student learning in arts and humanities. They describe the expectations for students' achievement and performance throughout their education in Pennsylvania schools. Utilizing these standards, school entities can develop a local school curriculum that will meet their students' needs.

The arts represent society's capacity to integrate human experience with individual creativity. Comprehensive study of the arts provides an opportunity for all students to observe, reflect and participate both in the arts of their culture and the cultures of others. Sequential study in the arts and humanities provides the knowledge and the analytical skills necessary to evaluate and critique a media-saturated culture. An arts education contributes to the development of productive citizens who have gained creative and technological knowledge necessary for employment in the 21st Century.

A glossary is included to assist the reader in understanding terminology contained in the standards.

9.1. Production, Performance and Exhibition of Dance, Music, Theatre and Visual Arts			
9.1.3. GRADE 3	9.1.5. GRADE 5	9.1.8. GRADE 8	9.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Know and use the elements and principles of each art form to create works in the arts and humanities.</p> <ul style="list-style-type: none"> • Elements <ul style="list-style-type: none"> • Dance: • energy/force • space • time • Music: • duration • intensity • pitch • timbre • Theatre: • scenario • script/text • set design • Visual Arts: • color • form/shape • line • space • texture • value • Principles <ul style="list-style-type: none"> • Dance: • choreography • form • genre • improvisation • style • technique • Music: • composition • form • genre • harmony • rhythm • texture • Theatre: • balance • collaboration • discipline • emphasis • focus • intention • movement • rhythm • style voice • Visual Arts: • balance • contrast • emphasis/focal point • movement/rhythm • proportion/scale • repetition unity/harmony <p>B. Recognize, know, use and demonstrate a variety of appropriate arts elements and principles to produce, review and revise original works in the arts.</p> <ul style="list-style-type: none"> • Dance: • move • perform • read and notate dance • create and choreograph • improvise • Music: • sing • play an instrument • read and notate music • compose and arrange • improvise • Theatre: • stage productions • read and write scripts • improvise • interpret a role • design sets • direct • Visual Arts: • paint • draw • craft • sculpt • print • design for environment, communication, multi-media 			
C. Recognize and use fundamental vocabulary within each of the arts forms.	C. Know and use fundamental vocabulary within each of the arts forms.	C. Identify and use comprehensive vocabulary within each of the arts forms.	C. Integrate and apply advanced vocabulary to the arts forms.

9.1. Production, Performance and Exhibition of Dance, Music, Theatre and Visual Arts			
9.1.3. GRADE 3	9.1.5. GRADE 5	9.1.8. GRADE 8	9.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
D. Use knowledge of varied styles within each art form through a performance or exhibition of unique work.	D. Describe and use knowledge of a specific style within each art form through a performance or exhibition of a unique work.	D. Demonstrate knowledge of at least two styles within each art form through performance or exhibition of unique works.	D. Demonstrate specific styles in combination through the production or performance of a unique work of art (e.g., a dance composition that combines jazz dance and African dance).
E. Demonstrate the ability to define objects, express emotions, illustrate an action or relate an experience through creation of works in the arts.	E. Know and demonstrate how arts can communicate experiences, stories or emotions through the production of works in the arts.	E. Communicate a unifying theme or point of view through the production of works in the arts.	E. Delineate a unifying theme through the production of a work of art that reflects skills in media processes and techniques.
F. Identify works of others through a performance or exhibition (e.g., exhibition of student paintings based on the study of Picasso).	F. Describe works of others through performance or exhibition in two art forms.	F. Explain works of others within each art form through performance or exhibition.	F. Analyze works of arts influenced by experiences or historical and cultural events through production, performance or exhibition.
G. Recognize the function of rehearsals and practice sessions.	G. Identify the function and benefits of rehearsal and practice sessions.	G. Explain the function and benefits of rehearsal and practice sessions.	G. Analyze the effect of rehearsal and practice sessions.

9.1. Production, Performance and Exhibition of Dance, Music, Theatre and Visual Arts			
9.1.3. GRADE 3	9.1.5. GRADE 5	9.1.8. GRADE 8	9.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>H. Handle materials, equipment and tools safely at work and performance spaces.</p> <ul style="list-style-type: none"> • Identify materials used. • Identify issues of cleanliness related to the arts. • Recognize some mechanical/electrical equipment. • Recognize differences in selected physical space/ environments. • Recognize the need to select safe props/stage equipment. • Identify methods for storing materials in the arts. <p>I. Identify arts events that take place in schools and in communities.</p>	<p>H. Use and maintain materials, equipment and tools safely at work and performance spaces.</p> <ul style="list-style-type: none"> • Describe some materials used. • Describe issues of cleanliness related to the arts. • Describe types of mechanical/electrical equipment usage. • Know how to work in selected physical space/environments. • Identify the qualities of safe props/stage equipment. • Describe methods for storing materials in the arts. <p>I. Describe arts events that take place in schools and in communities.</p>	<p>H. Demonstrate and maintain materials, equipment and tools safely at work and performance spaces.</p> <ul style="list-style-type: none"> • Analyze the use of materials. • Explain issues of cleanliness related to the arts. • Explain the use of mechanical/electrical equipment. • Demonstrate how to work in selected physical space/ environment. • Demonstrate the selection of safe props/stage equipment. • Demonstrate methods for storing materials in the arts. <p>I. Know where arts events, performances and exhibitions occur and how to gain admission.</p>	<p>H. Incorporate the effective and safe use of materials, equipment and tools into the production of works in the arts at work and performance spaces.</p> <ul style="list-style-type: none"> • Evaluate the use and applications of materials. • Evaluate issues of cleanliness related to the arts. • Evaluate the use and applications of mechanical/electrical equipment. • Evaluate differences among selected physical space/ environment. • Evaluate the use and applications of safe props/stage equipment. • Evaluate the use and apply safe methods for storing materials in the arts. <p>I. Distinguish among a variety of regional arts events and resources and analyze methods of selection and admission.</p>

9.1. Production, Performance and Exhibition of Dance, Music, Theatre and Visual Arts			
9.1.3. GRADE 3	9.1.5. GRADE 5	9.1.8. GRADE 8	9.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>J. Know and use traditional and contemporary technologies for producing, performing and exhibiting works in the arts or the works of others.</p> <ul style="list-style-type: none"> • Know and use traditional technologies (e.g., charcoal, pigments, clay, needle/thread, quill pens, stencils, tools for wood carving, looms, stage equipment). • Know and use contemporary technologies (e.g., CDs/software, audio/sound equipment, polymers, clays, board-mixers, photographs, recorders). 	<p>J. Apply traditional and contemporary technologies for producing, performing and exhibiting works in the arts or the works of others.</p> <ul style="list-style-type: none"> • Experiment with traditional technologies (e.g., ceramic/ wooden tools, earthen clays, masks, instruments, folk shoes, etching tools, folk looms). • Experiment with contemporary technologies (e.g., color fills on computers, fonts/point systems, animation techniques, video conferencing, multimedia techniques, internet access, library computer card catalogues). 	<p>J. Incorporate specific uses of traditional and contemporary technologies within the design for producing, performing and exhibiting works in the arts or the works of others.</p> <ul style="list-style-type: none"> • Explain and demonstrate traditional technologies (e.g., paint, tools, sponges, weaving designs, instruments, natural pigments/glazes). • Explain and demonstrate contemporary technologies (e.g., MIDI keyboards, internet design, computers, interactive technologies, audio/sound equipment, board-mixer, video equipment, computerized lighting design). 	<p>J. Analyze and evaluate the use of traditional and contemporary technologies for producing, performing and exhibiting works in the arts or the works of others.</p> <ul style="list-style-type: none"> • Analyze traditional technologies (e.g., acid printing, etching methods, musical instruments, costume materials, eight track recording, super 8 movies). • Analyze contemporary technologies (e.g., virtual reality design, instrument enhancements, photographic tools, broadcast equipment, film cameras, preservation tools, web graphics, computer generated marching band designs).
<p>K. Know and use traditional and contemporary technologies for furthering knowledge and understanding in the humanities.</p>	<p>K. Apply traditional and contemporary technology in furthering knowledge and understanding in the humanities.</p>	<p>K. Incorporate specific uses of traditional and contemporary technologies in furthering knowledge and understanding in the humanities.</p>	<p>K. Analyze and evaluate the use of traditional and contemporary technologies in furthering knowledge and understanding in the humanities.</p>

9.2. Historical and Cultural Contexts			
9.2.3. GRADE 3	9.2.5. GRADE 5	9.2.8. GRADE 8	9.2.12. GRADE 12
<p><i>Pennsylvania’s public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to identify, compare, contrast and analyze works in the arts in their historical and cultural context appropriate for each grade level in concert with districts’ social studies, literature and language standards.</i></p>			
<p>A. Explain the historical, cultural and social context of an individual work in the arts.</p> <p>B. Relate works in the arts chronologically to historical events (e.g., 10,000 B.C. to present).</p> <p>C. Relate works in the arts to varying styles and genre and to the periods in which they were created (e.g., Bronze Age, Ming Dynasty, Renaissance, Classical, Modern, Post-Modern, Contemporary, Futuristic, others).</p> <p>D. Analyze a work of art from its historical and cultural perspective.</p> <p>E. Analyze how historical events and culture impact forms, techniques and purposes of works in the arts (e.g., Gilbert and Sullivan operettas).</p> <p>F. Know and apply appropriate vocabulary used between social studies and the arts and humanities.</p> <p>G. Relate works in the arts to geographic regions:</p> <ul style="list-style-type: none"> • Africa • Asia • Australia • Central America • Europe • North America • South America <p>H. Identify, describe and analyze the work of Pennsylvania Artists in dance, music, theatre and visual arts.</p> <p>I. Identify, explain and analyze philosophical beliefs as they relate to works in the arts (e.g., classical architecture, rock music, Native American dance, contemporary American musical theatre).</p>			

9.2. Historical and Cultural Contexts			
9.2.3. GRADE 3	9.2.5. GRADE 5	9.2.8. GRADE 8	9.2.12. GRADE 12
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to identify, compare, contrast and analyze works in the arts in their historical and cultural context appropriate for each grade level in concert with districts' social studies, literature and language standards.</i></p>			
<p>J. Identify, explain and analyze historical and cultural differences as they relate to works in the arts (e.g., plays by Shakespeare, works by Michelangelo, ethnic dance and music).</p>			
<p>K. Identify, explain and analyze traditions as they relate to works in the arts (e.g., story telling—plays, oral histories— poetry, work songs—blue grass).</p>			
<p>L. Identify, explain and analyze common themes, forms and techniques from works in the arts (e.g., Copland and Graham's <i>Appalachian Spring</i> and Millet's <i>The Gleaners</i>).</p>			

9.3. Critical Response			
9.3.3. GRADE 3	9.3.5. GRADE 5	9.3.8. GRADE 8	9.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Recognize critical processes used in the examination of works in the arts and humanities.</p> <ul style="list-style-type: none"> • Compare and contrast • Analyze • Interpret • Form and test hypotheses • Evaluate/form judgments <p>B. Know that works in the arts can be described by using the arts elements, principles and concepts (e.g., use of color, shape and pattern in Mondrian's <i>Broadway Boogie-Woogie</i>; use of dynamics, tempo, texture in Ravel's <i>Bolero</i>).</p> <p>C. Know classification skills with materials and processes used to create works in the arts (e.g., sorting and matching textiles, musical chants, television comedies).</p>	<p>A. Identify critical processes in the examination of works in the arts and humanities.</p> <ul style="list-style-type: none"> • Compare and contrast • Analyze • Interpret • Form and test hypotheses • Evaluate/form judgments <p>B. Describe works in the arts comparing similar and contrasting characteristics (e.g., staccato in Grieg's <i>In the Hall of the Mountain King</i> and in tap dance).</p> <p>C. Classify works in the arts by forms in which they are found (e.g., farce, architecture, graphic design).</p>	<p>A. Know and use the critical process of the examination of works in the arts and humanities.</p> <ul style="list-style-type: none"> • Compare and contrast • Analyze • Interpret • Form and test hypotheses • Evaluate/form judgments <p>B. Analyze and interpret specific characteristics of works in the arts within each art form (e.g., pentatonic scales in Korean and Indonesian music).</p> <p>C. Identify and classify styles, forms, types and genre within art forms (e.g., modern dance and the ethnic dance, a ballad and a patriotic song).</p>	<p>A. Explain and apply the critical examination processes of works in the arts and humanities.</p> <ul style="list-style-type: none"> • Compare and contrast • Analyze • Interpret • Form and test hypotheses • Evaluate/form judgments <p>B. Determine and apply criteria to a person's work and works of others in the arts (e.g., use visual scanning techniques to critique the student's own use of sculptural space in comparison to Julio Gonzales' use of space in <i>Woman Combing Her Hair</i>).</p> <p>C. Apply systems of classification for interpreting works in the arts and forming a critical response.</p>

9.3. Critical Response			
9.3.3. GRADE 3	9.3.5. GRADE 5	9.3.8. GRADE 8	9.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>D. Explain meanings in the arts and humanities through individual works and the works of others using a fundamental vocabulary of critical response.</p> <p>E. Recognize and identify types of critical analysis in the arts and humanities.</p> <ul style="list-style-type: none"> • Contextual criticism • Formal criticism • Intuitive criticism <p>F. Know how to recognize and identify similar and different characteristics among works in the arts (e.g., Amish and Hawaiian quilts, Navaho weavings and Kente cloth from West Africa).</p>	<p>D. Compare similar and contrasting important aspects of works in the arts and humanities based on a set of guidelines using a comprehensive vocabulary of critical response.</p> <p>E. Describe and use types of critical analysis in the arts and humanities.</p> <ul style="list-style-type: none"> • Contextual criticism • Formal criticism • Intuitive criticism <p>F. Know how to recognize the process of criticism in identifying and analyzing characteristics among works in the arts.</p>	<p>D. Evaluate works in the arts and humanities using a complex vocabulary of critical response.</p> <p>E. Interpret and use various types of critical analysis in the arts and humanities.</p> <ul style="list-style-type: none"> • Contextual criticism • Formal criticism • Intuitive criticism <p>F. Apply the process of criticism to identify characteristics among works in the arts.</p>	<p>D. Analyze and interpret works in the arts and humanities from different societies using culturally specific vocabulary of critical response.</p> <p>E. Examine and evaluate various types of critical analysis of works in the arts and humanities.</p> <ul style="list-style-type: none"> • Contextual criticism • Formal criticism • Intuitive criticism <p>F. Analyze the processes of criticism used to compare the meanings of a work in the arts in both its own and present time.</p>

9.3. Critical Response			
9.3.3. GRADE 3	9.3.5. GRADE 5	9.3.8. GRADE 8	9.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
G. Know and demonstrate what a critic's position or opinion is related to works in the arts and humanities (e.g., I like patriotic songs because ...; The movie was enjoyed for its exceptional special effects).	G. Describe a critic's position or opinion about selected works in the arts and humanities (e.g., student's presentation of a critical position on Walt Disney's <i>Evolution of Mickey and Minnie Mouse</i>).	G. Compare and contrast critical positions or opinions about selected works in the arts and humanities (e.g., critic's review and comparison of Alvin Ailey's <i>Revelations to Tchaikovsky's Swan Lake</i>).	G. Analyze works in the arts by referencing the judgments advanced by arts critics as well as one's own analysis and critique.

9.4. Aesthetic Response			
9.4.3. GRADE 3	9.4.5. GRADE 5	9.4.8. GRADE 8	9.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Know how to respond to a philosophical statement about works in the arts and humanities (e.g., “Can artworks that depict or are about ugly or unpleasant things ever be beautiful?”).</p> <p>B. Know how to communicate an informed individual opinion about the meaning of works in the arts (e.g., works of an artist of the month).</p> <p>C. Recognize that the environment of the observer influences individual aesthetic responses to works in the arts (e.g., the effect of live music as opposed to listening to the same piece on a car radio).</p>	<p>A. Identify uses of expressive symbols that show philosophical meanings in works in the arts and humanities (e.g., American TV ads versus Asian TV ads).</p> <p>B. Investigate and communicate multiple philosophical views about works in the arts.</p> <p>C. Identify the attributes of various audiences’ environments as they influence individual aesthetic response (e.g., Beatles’ music played by the Boston Pops versus video taped concerts from the 1970s).</p>	<p>A. Compare and contrast examples of group and individual philosophical meanings of works in the arts and humanities (e.g., group discussions on musical theatre versus the individual’s concept of musical theatre).</p> <p>B. Compare and contrast informed individual opinions about the meaning of works in the arts to others (e.g., debate philosophical opinions within a listserv or at an artist’s website).</p> <p>C. Describe how the attributes of the audience’s environment influence aesthetic responses (e.g., the ambiance of the theatre in a performance of Andrew Lloyd Weber’s <i>Cats</i>).</p>	<p>A. Evaluate an individual’s philosophical statement on a work in the arts and its relationship to one’s own life based on knowledge and experience.</p> <p>B. Describe and analyze the effects that works in the arts have on groups, individuals and the culture (e.g., Orson Welles’ 1938 radio broadcast, <i>War of the Worlds</i>).</p> <p>C. Compare and contrast the attributes of various audiences’ environments as they influence individual aesthetic response (e.g., viewing traditional <i>Irish</i> dance at county fair versus the performance of <i>River Dance</i> in a concert hall).</p>

9.4. Aesthetic Response			
9.4.3. GRADE 3	9.4.5. GRADE 5	9.4.8. GRADE 8	9.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
D. Recognize that choices made by artists regarding subject matter and themes communicate ideas through works in the arts and humanities (e.g., artist's interpretation through the use of classical ballet of the American West in Agnes De Mille's <i>Rodeo</i>).	D. Explain choices made regarding media, technique, form, subject matter and themes that communicate the artist's philosophy within a work in the arts and humanities (e.g., selection of stage lighting in Leonard Bernstein's <i>West Side Story</i> to communicate mood).	D. Describe to what purpose philosophical ideas generated by artists can be conveyed through works in the arts and humanities (e.g., T. Ganson's <i>Destructive Periods in Russia During Stalin's and Deniken's Leadership</i> conveys her memories and emotions of a specific incident).	D. Analyze and interpret a philosophical position identified in works in the arts and humanities.

XXVII. GLOSSARY

Aesthetics:	A branch of philosophy that focuses on the nature of beauty, the nature and value of the arts and the inquiry processes and human responses they produce.
Aesthetic criteria:	Standards on which to make judgments about the artistic merit of a work of art, derived from cultural and emotional values and cognitive meaning.
Aesthetic response:	A philosophical reply to works in the arts.
Artistic choices:	Selections made by artists in order to convey meaning.
Arts resource:	An outside community asset (e.g., performances, exhibitions, performers, artists).
Assess:	To analyze and determine the nature and quality of the process/product through means appropriate to the art form.
Community:	A group of people who share a common social, historical, regional or cultural heritage.
Contemporary technology:	Tools, machines or implements emerging and used today for the practice or production of works in the arts.
Context:	A set of interrelated background conditions (e.g., social, economic, political) that influence and give meaning to the development and reception of thoughts, ideas or concepts and that define specific cultures and eras.
Create:	To produce works in the arts using materials, techniques, processes, elements, principles and analysis.
Critical analysis:	The process of examining and discussing the effective uses of specific aspects of works in the arts.
Contextual criticism:	Discussion and evaluation with consideration of factors surrounding the origin and heritage to works in the arts and humanities.

Formal Criticism:	Discussion and evaluation of the elements and principles essential to works in the arts and humanities.
Intuitive Criticism:	Discussion and evaluation of one's subjective insight to works in the arts and humanities.
Critical process:	The use of sequential examination through comparison, analysis, interpretation, formation and testing of hypothesis and evaluation to form judgments.
Critical response:	The act or process of describing and evaluating the media, processes and meanings of works in the arts and making comparative judgments.
Culture:	The way of life of a group of people, including customs, beliefs, arts, institutions and worldview. Culture is acquired through many means and is always changing.
Elements:	Core components that support the principles of the arts.
Genre:	A type or category (e.g., music—opera, oratorio; theater—tragedy, comedy; dance—modern, ballet; visual arts—pastoral, scenes of everyday life).
Humanities:	The branch of learning that connects the fine arts, literature, languages, philosophy and cultural science. The humanities are concerned with the understanding and integration of human thought and accomplishment.
Improvisation:	Spontaneous creation requiring focus and concentration.
MIDI keyboard:	(Musical Instrument Digital Interface) A piece of equipment that interacts with a computer that uses a MIDI language set-up to notate and play music.
Multimedia:	The combined use of media, such as movies, CD-ROMs, television, radio, print and the Internet for entertainment and publicity.
Original works in the arts:	Dance, music, theatre and visual arts pieces created by performing or visual artists.

Principles:	Essential assumptions, basic or essential qualities determining intrinsic characteristics.
Style:	A distinctive or characteristic manner of expression.
Technique:	Specific skills and details employed by an artist, craftsperson or performer in the production of works in the arts.
Timbre:	A unique quality of sound.
Traditions:	Knowledge, opinions and customs a group feels is so important that members continue to practice it and pass it on to other generations.
Traditional technology:	Tools, machines or implements used for the historical practice or production of works in the arts.
Vocabulary:	Age and content appropriate terms used in the instruction of the arts and humanities that demonstrate levels of proficiency as defined in local curriculum (i.e., fundamental—grade 3, comprehensive—grade 5, discriminating—grade 8 and advanced—grade 12).

Academic Standards for Health, Safety and Physical Education

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XXIX. INTRODUCTION

This document includes Academic Standards for Health, Safety and Physical Education in these categories:

- 10.1 Concepts of Health
- 10.2 Healthful Living
- 10.3 Safety and Injury Prevention
- 10.4 Physical Activity
- 10.5 Concepts, Principles and Strategies of Movement

The Academic Standards for Health, Safety and Physical Education describe what students should know and be able to do by the end of third, sixth, ninth and twelfth grade. The standards are sequential across the grade levels and reflect the increasing complexity and rigor that students are expected to achieve. The Standards define the content for planned instruction that will result in measurable gains for all students in knowledge and skill. School entities will use these standards to develop local school curriculum and assessments that will meet the needs of the students.

The Academic Standards for Health, Safety and Physical Education provide students with the knowledge and skills that will enable them to achieve and maintain a physically active and healthful life. The attainment of these standards will favorably impact their lives and the lives of those around them. By becoming and remaining physically, mentally, socially and emotionally healthy, students will increase their chances of achieving to their highest academic potential.

The Academic Standards for Health, Safety and Physical Education provide parents with specific information about the knowledge and skills students should be developing as they progress through their educational programs. With the standards serving as clearly defined targets, parents, students, teachers and community members will be able to become partners in helping children achieve educational success.

A glossary is included to assist the reader in understanding terminology contained in the standards.

10.1. Concepts of Health			
10.1.3. GRADE 3	10.1.6. GRADE 6	10.1.9. GRADE 9	10.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Identify and describe the stages of growth and development.</p> <ul style="list-style-type: none"> • infancy • childhood • adolescence • adulthood • late adulthood <p>B. Identify and know the location and function of the major body organs and systems.</p> <ul style="list-style-type: none"> • circulatory • respiratory • muscular • skeletal • digestive 	<p>A. Describe growth and development changes that occur between childhood and adolescence and identify factors that can influence these changes.</p> <ul style="list-style-type: none"> • education • socioeconomic <p>B. Identify and describe the structure and function of the major body systems.</p> <ul style="list-style-type: none"> • nervous • muscular • integumentary • urinary • endocrine • reproductive • immune 	<p>A. Analyze factors that impact growth and development between adolescence and adulthood.</p> <ul style="list-style-type: none"> • relationships (e.g., dating, friendships, peer pressure) • interpersonal communication • risk factors (e.g., physical inactivity, substance abuse, intentional/unintentional injuries, dietary patterns) • abstinence • STD and HIV prevention • community <p>B. Analyze the interdependence existing among the body systems.</p>	<p>A. Evaluate factors that impact growth and development during adulthood and late adulthood.</p> <ul style="list-style-type: none"> • acute and chronic illness • communicable and non-communicable disease • health status • relationships (e.g., marriage, divorce, loss) • career choice • aging process • retirement <p>B. Evaluate factors that impact the body systems and apply protective/preventive strategies.</p> <ul style="list-style-type: none"> • fitness level • environment (e.g., pollutants, available health care) • health status (e.g., physical, mental, social) • nutrition

10.1. Concepts of Health			
10.1.3. GRADE 3	10.1.6. GRADE 6	10.1.9. GRADE 9	10.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Explain the role of the food guide pyramid in helping people eat a healthy diet.</p> <ul style="list-style-type: none"> • food groups • number of servings • variety of food • nutrients <p>D. Know age appropriate drug information.</p> <ul style="list-style-type: none"> • definition of drugs • effects of drugs • proper use of medicine • healthy/unhealthy risk-taking (e.g. inhalant use, smoking) • skills to avoid drugs 	<p>C. Analyze nutritional concepts that impact health.</p> <ul style="list-style-type: none"> • caloric content of foods • relationship of food intake and physical activity (energy output) • nutrient requirements • label reading • healthful food selection <p>D. Explain factors that influence childhood and adolescent drug use.</p> <ul style="list-style-type: none"> • peer influence • body image (e.g., steroids, enhancers) • social acceptance • stress • media influence • decision-making/refusal skills • rules, regulations and laws • consequences 	<p>C. Analyze factors that impact nutritional choices of adolescents.</p> <ul style="list-style-type: none"> • body image • advertising • dietary guidelines • eating disorders • peer influence • athletic goals <p>D. Analyze prevention and intervention strategies in relation to adolescent and adult drug use.</p> <ul style="list-style-type: none"> • decision-making/refusal skills • situation avoidance • goal setting • professional assistance (e.g., medical, counseling, support groups) • parent involvement 	<p>C. Analyze factors that impact nutritional choices of adults.</p> <ul style="list-style-type: none"> • cost • food preparation (e.g., time, skills) • consumer skills (e.g., understanding food labels, evaluating fads) • nutritional knowledge • changes in nutritional requirements (e.g., age, physical activity level) <p>D. Evaluate issues relating to the use/non-use of drugs.</p> <ul style="list-style-type: none"> • psychology of addiction • social impact (e.g., cost, relationships) • chemical use and fetal development • laws relating to alcohol, tobacco and chemical substances • impact on the individual • impact on the community

10.1. Concepts of Health			
10.1.3. GRADE 3	10.1.6. GRADE 6	10.1.9. GRADE 9	10.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
E. Identify types and causes of common health problems of children. <ul style="list-style-type: none"> • infectious diseases (e.g., colds, flu, chickenpox) • noninfectious diseases (e.g., asthma, hay fever, allergies, lyme disease) • germs • pathogens • heredity 	E. Identify health problems that can occur throughout life and describe ways to prevent them. <ul style="list-style-type: none"> • Diseases (e.g., cancer diabetes, STD/HIV/AIDS, cardiovascular disease) • Preventions (i.e. do not smoke, maintain proper weight, eat a balanced diet, practice sexual abstinence, be physically active) 	E. Analyze how personal choice, disease and genetics can impact health maintenance and disease prevention.	E. Identify and analyze factors that influence the prevention and control of health problems. <ul style="list-style-type: none"> • research • medical advances • technology • government policies/regulations

10.2. Healthful Living			
10.2.3. GRADE 3	10.2.6. GRADE 6	10.2.9. GRADE 9	10.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Identify personal hygiene practices and community helpers that promote health and prevent the spread of disease.</p> <p>B. Identify health-related information.</p> <ul style="list-style-type: none"> • signs and symbols • terminology • products and services <p>C. Identify media sources that influence health and safety.</p>	<p>A. Explain the relationship between personal health practices and individual well-being.</p> <ul style="list-style-type: none"> • immunizations • health examinations <p>B. Explain the relationship between health-related information and consumer choices.</p> <ul style="list-style-type: none"> • dietary guidelines/food selection • sun exposure guidelines/sunscreen selection <p>C. Explain the media's effect on health and safety issues.</p>	<p>A. Identify and describe health care products and services that impact adolescent health practices.</p> <p>B. Analyze the relationship between health-related information and adolescent consumer choices.</p> <ul style="list-style-type: none"> • tobacco products • weight control products <p>C. Analyze media health and safety messages and describe their impact on personal health and safety.</p>	<p>A. Evaluate health care products and services that impact adult health practices.</p> <p>B. Assess factors that impact adult health consumer choices.</p> <ul style="list-style-type: none"> • access to health information • access to health care • cost • safety <p>C. Compare and contrast the positive and negative effects of the media on adult personal health and safety.</p>

10.2. Healthful Living			
10.2.3. GRADE 3	10.2.6. GRADE 6	10.2.9. GRADE 9	10.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>D. Identify the steps in a decision making process.</p> <p>E. Identify environmental factors that affect health.</p> <ul style="list-style-type: none"> • pollution (e.g., air, water, noise, soil) • waste disposal • temperature extremes • insects/animals 	<p>D. Describe and apply the steps of a decision making process to health and safety issues.</p> <p>E. Analyze environmental factors that impact health.</p> <ul style="list-style-type: none"> • indoor air quality (e.g., second-hand smoke, allergens) • chemicals, metals, gases (e.g., lead, radon, carbon monoxide) • radiation • natural disasters 	<p>D. Analyze and apply a decision making process to adolescent health and safety issues.</p> <p>E. Explain the interrelationship between the environment and personal health.</p> <ul style="list-style-type: none"> • ozone layer/skin cancer • availability of health care/individual health • air pollution/respiratory disease • breeding environments/lyme disease/West Nile virus 	<p>D. Examine and apply a decision making process to the development of short and long-term health goals.</p> <p>E. Analyze the interrelationship between environmental factors and community health.</p> <ul style="list-style-type: none"> • public health policies and laws/health promotion and disease prevention • individual choices/maintenance of environment • recreational opportunities/health status

10.3. Safety and Injury Prevention			
10.3.3. GRADE 3	10.3.6 GRADE 6	10.3.9. GRADE 9	10.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Recognize safe/unsafe practices in the home, school and community.</p> <ul style="list-style-type: none"> • general (e.g., fire, electrical, animals) • modes of transportation (e.g., pedestrian, bicycle, vehicular) • outdoor (e.g., play, weather, water) • safe around people (e.g., safe/unsafe touch, abuse, stranger, bully) <p>B. Recognize emergency situations and explain appropriate responses.</p> <ul style="list-style-type: none"> • importance of remaining calm • how to call for help • simple assistance procedures • how to protect self 	<p>A. Explain and apply safe practices in the home, school and community.</p> <ul style="list-style-type: none"> • emergencies (e.g., fire, natural disasters) • personal safety (e.g., home alone, latch key, harassment) • communication (e.g., telephone, Internet) • violence prevention (e.g., gangs, weapons) <p>B. Know and apply appropriate emergency responses.</p> <ul style="list-style-type: none"> • basic first aid • Heimlich maneuver • universal precautions 	<p>A. Analyze the role of individual responsibility for safe practices and injury prevention in the home, school and community.</p> <ul style="list-style-type: none"> • modes of transportation (e.g., pedestrian, bicycle, vehicular, passenger, farm vehicle, all-terrain vehicle) • violence prevention in school • self-protection in the home • self-protection in public places <p>B. Describe and apply strategies for emergency and long-term management of injuries.</p> <ul style="list-style-type: none"> • rescue breathing • water rescue • self-care • sport injuries 	<p>A. Assess the personal and legal consequences of unsafe practices in the home, school or community.</p> <ul style="list-style-type: none"> • loss of personal freedom • personal injury • loss of income • impact on others • loss of motor vehicle operator's license <p>B. Analyze and apply strategies for the management of injuries.</p> <ul style="list-style-type: none"> • CPR • advanced first aid

10.3. Safety and Injury Prevention			
10.3.3. GRADE 3	10.3.6 GRADE 6	10.3.9. GRADE 9	10.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Recognize conflict situations and identify strategies to avoid or resolve.</p> <ul style="list-style-type: none"> • walk away • I-statements • refusal skills • adult intervention <p>D. Identify and use safe practices in physical activity settings (e.g., proper equipment, knowledge of rules, sun safety, guidelines of safe play, warm-up, cool-down).</p>	<p>C. Describe strategies to avoid or manage conflict and violence.</p> <ul style="list-style-type: none"> • anger management • peer mediation • reflective listening • negotiation <p>D. Analyze the role of individual responsibility for safety during physical activity.</p>	<p>C. Analyze and apply strategies to avoid or manage conflict and violence during adolescence.</p> <ul style="list-style-type: none"> • effective negotiation • assertive behavior <p>D. Analyze the role of individual responsibility for safety during organized group activities.</p>	<p>C. Analyze the impact of violence on the victim and surrounding community.</p> <p>D. Evaluate the benefits, risks and safety factors associated with self-selected life-long physical activities.</p>

10.4. Physical Activity			
10.4.3. GRADE 3	10.4.6. GRADE 6	10.4.9. GRADE 9	10.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Identify and engage in physical activities that promote physical fitness and health.</p> <p>B. Know the positive and negative effects of regular participation in moderate to vigorous physical activities.</p>	<p>A. Identify and engage in moderate to vigorous physical activities that contribute to physical fitness and health.</p> <p>B. Explain the effects of regular participation in moderate to vigorous physical activities on the body systems.</p>	<p>A. Analyze and engage in physical activities that are developmentally/individually appropriate and support achievement of personal fitness and activity goals.</p> <p>B. Analyze the effects of regular participation in moderate to vigorous physical activities in relation to adolescent health improvement.</p> <ul style="list-style-type: none"> • stress management • disease prevention • weight management 	<p>A. Evaluate and engage in an individualized physical activity plan that supports achievement of personal fitness and activity goals and promotes life-long participation.</p> <p>B. Analyze the effects of regular participation in a self-selected program of moderate to vigorous physical activities.</p> <ul style="list-style-type: none"> • social • physiological • psychological

10.4. Physical Activity			
10.4.3. GRADE 3	10.4.6. GRADE 6	10.4.9. GRADE 9	10.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Know and recognize changes in body responses during moderate to vigorous physical activity.</p> <ul style="list-style-type: none"> • heart rate • breathing rate 	<p>C. Identify and apply ways to monitor and assess the body's response to moderate to vigorous physical activity.</p> <ul style="list-style-type: none"> • heart rate monitoring • checking blood pressure • fitness assessment 	<p>C. Analyze factors that affect the responses of body systems during moderate to vigorous physical activities.</p> <ul style="list-style-type: none"> • exercise (e.g., climate, altitude, location, temperature) • healthy fitness zone • individual fitness status (e.g., cardiorespiratory fitness, muscular endurance, muscular strength, flexibility) • drug/substance use/abuse 	<p>C. Evaluate how changes in adult health status may affect the responses of the body systems during moderate to vigorous physical activity.</p> <ul style="list-style-type: none"> • aging • injury • disease
<p>D. Identify likes and dislikes related to participation in physical activities.</p>	<p>D. Describe factors that affect childhood physical activity preferences.</p> <ul style="list-style-type: none"> • enjoyment • personal interest • social experience • opportunities to learn new activities • parental preference • environment 	<p>D. Analyze factors that affect physical activity preferences of adolescents.</p> <ul style="list-style-type: none"> • skill competence • social benefits • previous experience • activity confidence 	<p>D. Evaluate factors that affect physical activity and exercise preferences of adults.</p> <ul style="list-style-type: none"> • personal challenge • physical benefits • finances • motivation • access to activity • self-improvement

10.4. Physical Activity			
10.4.3. GRADE 3	10.4.6. GRADE 6	10.4.9. GRADE 9	10.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>E. Identify reasons why regular participation in physical activities improves motor skills.</p> <p>F. Recognize positive and negative interactions of small group activities.</p> <ul style="list-style-type: none"> • roles (e.g., leader, follower) • cooperation/sharing • on task participation 	<p>E. Identify factors that have an impact on the relationship between regular participation in physical activity and the degree of motor skill improvement.</p> <ul style="list-style-type: none"> • success-oriented activities • school-community resources • variety of activities • time on task <p>F. Identify and describe positive and negative interactions of group members in physical activities.</p> <ul style="list-style-type: none"> • leading • following • teamwork • etiquette • adherence to rules 	<p>E. Analyze factors that impact on the relationship between regular participation in physical activity and motor skill improvement.</p> <ul style="list-style-type: none"> • personal choice • developmental differences • amount of physical activity • authentic practice <p>F. Analyze the effects of positive and negative interactions of adolescent group members in physical activities.</p> <ul style="list-style-type: none"> • group dynamics • social pressure 	<p>E. Analyze the interrelationships among regular participation in physical activity, motor skill improvement and the selection and engagement in lifetime physical activities.</p> <p>F. Assess and use strategies for enhancing adult group interaction in physical activities.</p> <ul style="list-style-type: none"> • shared responsibility • open communication • goal setting

10.5. Concepts, Principles and Strategies of Movement			
10.5.3. GRADE 3	10.5.6. GRADE 6	10.5.9. GRADE 9	10.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Recognize and use basic movement skills and concepts.</p> <ul style="list-style-type: none"> • locomotor movements (e.g., run, leap, hop) • non-locomotor movements (e.g., bend, stretch, twist) • manipulative movements (e.g., throw, catch, kick) • relationships (e.g., over, under, beside) • combination movements (e.g., locomotor, non-locomotor, manipulative) • space awareness (e.g., self-space, levels, pathways, directions) • effort (e.g., speed, force) 	<p>A. Explain and apply the basic movement skills and concepts to create and perform movement sequences and advanced skills.</p>	<p>A. Describe and apply the components of skill-related fitness to movement performance.</p> <ul style="list-style-type: none"> • agility • balance • coordination • power • reaction time • speed 	<p>A. Apply knowledge of movement skills, skill-related fitness and movement concepts to identify and evaluate physical activities that promote personal lifelong participation.</p>

10.5. Concepts, Principles and Strategies of Movement			
10.5.3. GRADE 3	10.5.6. GRADE 6	10.5.9. GRADE 9	10.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>B. Recognize and describe the concepts of motor skill development using appropriate vocabulary.</p> <ul style="list-style-type: none"> • form • developmental differences • critical elements • feedback <p>C. Know the function of practice.</p> <p>D. Identify and use principles of exercise to improve movement and fitness activities.</p> <ul style="list-style-type: none"> • frequency/how often to exercise • intensity/how hard to exercise • time/how long to exercise • type/what kind of exercise 	<p>B. Identify and apply the concepts of motor skill development to a variety of basic skills.</p> <ul style="list-style-type: none"> • transfer between skills • selecting relevant cues • types of feedback • movement efficiency • product (outcome/result) <p>C. Describe the relationship between practice and skill development.</p> <p>D. Describe and apply the principles of exercise to the components of health-related and skill-related fitness.</p> <ul style="list-style-type: none"> • cardiorespiratory endurance • muscular strength • muscular endurance • flexibility • body composition 	<p>B. Describe and apply concepts of motor skill development that impact the quality of increasingly complex movement.</p> <ul style="list-style-type: none"> • response selection • stages of learning a motor skill i.e. verbal cognitive, motor, automatic • types of skill i.e. discrete, serial, continuous <p>C. Identify and apply practice strategies for skill improvement.</p> <p>D. Identify and describe the principles of training using appropriate vocabulary.</p> <ul style="list-style-type: none"> • specificity • overload • progression • aerobic/anaerobic • circuit/interval • repetition/set 	<p>B. Incorporate and synthesize knowledge of motor skill development concepts to improve the quality of motor skills.</p> <ul style="list-style-type: none"> • open and closed skills • short-term and long-term memory • aspects of good performance <p>C. Evaluate the impact of practice strategies on skill development and improvement.</p> <p>D. Incorporate and synthesize knowledge of exercise principles, training principles and health and skill-related fitness components to create a fitness program for personal use.</p>

10.5. Concepts, Principles and Strategies of Movement			
10.5.3. GRADE 3	10.5.6. GRADE 6	10.5.9. GRADE 9	10.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>E. Know and describe scientific principles that affect movement and skills using appropriate vocabulary.</p> <ul style="list-style-type: none"> • gravity • force production/absorption • balance • rotation <p>F. Recognize and describe game strategies using appropriate vocabulary.</p> <ul style="list-style-type: none"> • faking/dodging • passing/receiving • moving to be open • defending space • following rules of play 	<p>E. Identify and use scientific principles that affect basic movement and skills using appropriate vocabulary.</p> <ul style="list-style-type: none"> • Newton's Laws of Motion • application of force • static/dynamic balance • levers • flight <p>F. Identify and apply game strategies to basic games and physical activities.</p> <ul style="list-style-type: none"> • give and go • one on one • peer communication 	<p>E. Analyze and apply scientific and biomechanical principles to complex movements.</p> <ul style="list-style-type: none"> • centripetal/centrifugal force • linear motion • rotary motion • friction/resistance • equilibrium • number of moving segments <p>F. Describe and apply game strategies to complex games and physical activities.</p> <ul style="list-style-type: none"> • offensive strategies • defensive strategies • time management 	<p>E. Evaluate movement forms for appropriate application of scientific and biomechanical principles.</p> <ul style="list-style-type: none"> • efficiency of movement • mechanical advantage • kinetic energy • potential energy • inertia • safety <p>F. Analyze the application of game strategies for different categories of physical activities.</p> <ul style="list-style-type: none"> • individual • team • lifetime • outdoor

XXX. GLOSSARY

Abstinence:	Choosing not to do something or completely giving something up in order to gain something.
Acute illness:	A health condition of sudden onset, sharp rises and short course.
Adolescence:	The period of life beginning with puberty and ending with completed growth.
Aerobic:	Physical activity or exercise done at a steady pace for an extended period of time so that the heart can supply as much oxygen as the body needs (e.g., walking, running, swimming, cycling).
Agility:	A component of physical fitness that relates to the ability to rapidly change the position of the entire body in space with speed and accuracy.
AIDS	Acquired Immune Deficiency Syndrome: a condition that results when infection with HIV causes a breakdown of the body's ability to fight other infections.
Allergen:	A substance that stimulates the production of antibodies and subsequently results in allergic reactions (e.g., mold spores, cat/dog dander, dust).
Anaerobic:	Physical activity or exercise done in short, fast bursts so that the heart cannot supply oxygen as fast as the body needs (e.g., sprinting, weightlifting, football).
Assertive:	The expression of thoughts and feelings without experiencing anxiety or threatening others.
Automatic Stage of Learning:	Movement responses flow and the individual can focus on what to do without thinking about it.
Balance:	A skill-related component of physical fitness that relates to the maintenance of equilibrium while stationary or moving.
Biomechanical principles:	The science concerned with the action of forces, internal or external, on the living body.

Body composition:	A health-related component of physical fitness that relates to the percentage of fat tissue and lean tissue in the body.
Body systems:	Anatomically or functionally related parts of the body (e.g., skeletal, nervous, immune, circulatory systems).
Caloric content:	The amount of energy supplied by food. The more calories in the food, the more fattening.
Cardiorespiratory fitness:	A health related component of physical fitness relating to the ability of the circulatory and respiratory systems to supply oxygen during sustained physical activity.
Centrifugal:	The force that seems to pull an object away from the center as it moves in a circle.
Centripetal:	The force that is required to keep an object moving around a circular path.
Chronic illness:	A health condition of long duration or frequent recurrence.
Circuit training:	Exercise program, similar to an obstacle course, in which the person goes from one place to another doing a different exercise at each place.
Closed:	Skills that are performed in an environment that does not change or that changes very little, such as archery or the foul shot in basketball.
Communicable:	Illness caused by pathogens that enter the body through direct or indirect contact and can be transmitted from one host to another.
Community helpers:	Any group or individual who plays a role in health promotion or disease prevention such as doctors, nurses, dentists, teachers, parents, firemen, policemen, trash collectors, animal control officers.
Continuous:	Two or more repetitions of the same skill such as dribbling in basketball or soccer.
Cool-down:	Brief, mild exercise done after vigorous exercise to help the body safely return to a resting state.

Coordination:	A skill-related component of physical fitness that relates to the ability to use the senses together with body parts in performing motor tasks smoothly and accurately.
CPR:	A first aid technique, which involves rescue breathing and chest (heart) compressions, that is used to revive a person whose heart has stopped beating.
Critical elements:	The important parts of a skill.
Decision-making process:	An organized approach to making choices.
Developmental differences:	Learners are at different levels in their motor, cognitive, emotional, social and physical development. The learners' developmental status will affect their ability to learn or improve.
Developmentally appropriate:	Motor skill development and change that occur in an orderly, sequential fashion and are age and experience related.
Directions:	Forward, backward, left, right, up, down.
Discrete:	Single skill performed in isolation from other motor skills such as the soccer penalty kick and golf stroke.
Dynamic balance:	Equilibrium used when in motion, starting and stopping.
Eating disorders:	Food-related dysfunction in which a person changes eating habits in a way that is harmful to the mind or body (e.g., bulimia, anorexia nervosa).
Efficiency of movement:	The state or quality of competence in performance with minimum expenditure of time and effort.
Equilibrium:	State in which there is no change in the motion of a body.
Feedback:	Information given to the learner about how to improve or correct a movement.
Flexibility:	A health-related component of physical fitness that relates to the range of motion available at a joint.

Food guide pyramid:	A visual tool used to help people plan healthy diets according to the Dietary Guidelines for America.
Force:	Any external agent that causes a change in the motion of a body.
Form:	Manner or style of performing a movement according to recognized standards of technique.
Good performance:	The ability to correctly select what to do and the ability to execute the selection appropriately.
Health:	A state of complete physical, mental and social well-being; not merely the absence of disease and infirmity.
Health education:	Planned, sequential K—12 program of curricula and instruction that helps students develop knowledge, attitudes and skills related to the physical, mental, emotional and social dimensions of health.
Health-related fitness:	Components of physical fitness that have a relationship with good health. Components are cardiorespiratory endurance, muscular strength and endurance, flexibility and body composition.
Heimlich maneuver:	A first aid technique that is used to relieve complete airway obstruction.
HIV:	Human immunodeficiency virus that infects cells of the immune system and other tissues and causes acquired immunodeficiency syndrome (AIDS).
I-statement:	A statement describing a specific behavior or event and the effect that behavior or event has on a person and the feelings that result.
Inertia:	A body at rest will remain at rest and a body in motion will remain in motion unless acted upon by a force.
Inhalant:	Chemicals that produce vapors that act on the central nervous system and alter a user's moods, perceptions, feelings, personality and behavior such as airplane glue and aerosols.

Integumentary system:	Body system composed of the skin, hair, nails and glands.
Intensity:	How hard a person should exercise to improve fitness.
Interval training:	An anaerobic exercise program that consists of runs of short distance followed by rest.
Kinetic:	Energy that an object possesses because it is moving, such as a pitched baseball or a person running.
Levels:	Positions of the body (e.g., high, medium, low).
Linear motion:	Movement which occurs in a straight path.
Locomotor movement:	Movements producing physical displacement of the body, usually identified by weight transference via the feet. Basic locomotor steps are the walk, run, hop and jump as well as the irregular rhythmic combinations of the skip, slide and gallop.
Long-term memory:	Ability to recall information that was learned days or even years ago.
Manipulative movements:	Control of objects with body parts and implements. Action causes an object to move from one place to another.
Mechanical advantage:	The ratio between the force put into a machine and the force that comes out of the same machine.
Media sources:	Various forms of mass communication such as television, radio, magazines, newspapers and Internet.
Moderate physical activity:	Sustained, repetitive, large muscle movements (e.g., walking, running, cycling) done at less than 60% of maximum heart rate for age. Maximum heart rate is 220 beats per minute minus participant's age.
Motor skills:	Non-fitness abilities that improve with practice and relate to one's ability to perform specific sports and other motor tasks (e.g., tennis serve, shooting a basketball).

Motor stage of learning:	Individual working to perfect the motor skill and makes conscious adjustments to the environment.
Movement skills:	Proficiency in performing nonlocomotor, locomotor and manipulative movements that are the foundation for participation in physical activities.
Muscular endurance:	A health-related component of physical fitness that relates to the ability of a muscle to continue to perform without fatigue.
Muscular strength:	A health-related component of physical fitness that relates to the ability of the muscle to exert force.
Newton's Laws of Motion:	Three laws by Sir Isaac Newton that explain the relations between force and the motions produced by them: The Law of Inertia, Force and Acceleration, Reacting Forces.
Noncommunicable:	Illness that is not caused by a pathogen that is not transmitted from one host to another.
Nonlocomotor movement:	Movements that do not produce physical displacement of the body.
Nutrient:	A basic component of food that nourishes the body.
Open:	Skill performed in an environment that varies or is unpredictable such as the tennis forehand or the soccer pass.
Overload:	A principle of exercise that states that the only way to improve fitness is to exercise more than the normal.
Pathways:	Patterns of travel while performing locomotor movements (e.g., straight, curved, zigzag).
Physical activity:	Bodily movement that is produced by the contraction of skeletal muscle and which substantially increases energy expenditure.

Physical education:	Planned, sequential, movement-based program of curricula and instruction that helps students develop knowledge, attitudes, motor skills, self-management skills and confidence needed to adapt and maintain a physically active life.
Physical fitness:	A set of attributes that people have or achieve and that relate to their ability to perform physical activity. Generally accepted to consist of health-related fitness and skill-related fitness.
Potential:	Energy stored in a body because of its position such as the crouch position prior to a jump.
Power:	A skill-related component of physical fitness that relates to the rate at which one can perform work.
Principles of exercise:	Guidelines to follow to obtain the maximum benefits from physical activity and exercise.
Principles of training:	Guidelines to follow to obtain the maximum benefits from an exercise plan.
Progression:	A principle of exercise that states that a person should start slowly and increase exercise gradually.
Reaction time:	A skill-related component of physical fitness that relates to the time elapsed between stimulation and the beginning of the response to it.
Reflective listening:	An active listening skill in which the individual lets others know he/she has heard and understands what has been said.
Refusal skills:	Systematic ways to handle situations in which a person wants to say no to an action and/or leave an environment that threatens health or safety, breaks laws, results in lack of respect for self and others or disobeys guidelines set by responsible adults.
Repetitions:	Number of times an exercise is repeated.
Rescue breathing:	Technique used to supply air to an individual who is not breathing.

Rotary motion:	Force that produces movement that occurs around an axis or center point such as a somersault.
Safety education:	Planned, sequential program of curricula and instruction that helps students develop the knowledge, attitudes and confidence needed to protect them from injury.
Self-space:	All the space that the body or its parts can reach without traveling from a starting location.
Serial:	Two or more different skills performed with each other such as fielding a ball and throwing it or dribbling a basketball and shooting it.
Set:	A group of several repetitions.
Short-term memory:	Ability to recall recently learned information, such as within the past few seconds or minutes.
Skill-related fitness:	Consists of components of physical fitness that have a relationship with enhanced performance in sports and motor skills. The components are agility, balance, coordination, power, reaction time and speed.
Specificity:	A principle of exercise that states that specific kinds of exercises must be done to develop specific aspects of the body and specific aspects of fitness.
Speed:	A skill-related component of physical fitness that relates to the ability to perform a movement or cover a distance in a short period of time.
Static balance:	Maintaining equilibrium while holding a pose or remaining motionless.
STD:	Sexually transmitted disease.
Universal precautions:	An approach to infection control. All human blood and body fluids are treated as if known to be infectious.
Warm-up:	Brief, mild exercise that is done to get ready for more vigorous exercise.

Verbal cognitive stage of learning: The individual is attempting to move from verbal instruction to trying to figure out how to actually do the skill. The first attempts at the skill are generally mechanical and success is inconsistent. The individual thinks through each step of the movement.

Vigorous physical activity: Sustained, repetitive, large muscle movements (e.g., running, swimming, soccer) done at 60% or more of maximum heart rate for age. Maximum heart rate is 220 beats per minute minus the participant’s age. Activity makes person sweat and breathe hard.

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XXXII. INTRODUCTION

This document includes Academic Standards for Family and Consumer Sciences at four grade levels (third, sixth, ninth and twelfth) with the emphasis on what students will know and be able to do in the following areas:

- 11.1. Financial and Resource Management
- 11.2. Balancing Family, Work, and Community Responsibility
- 11.3. Food Science and Nutrition
- 11.4. Child Development.

The focus of the Academic Standards for Family and Consumer Sciences education is the individual, the family and the community. The economic, social and political well-being of our state depends on the well-being of Pennsylvania’s families. The family is responsible for nurturing its members. Family experiences, to a great extent, determine who a person is and what a person becomes. Family and Consumer Sciences, working with Pennsylvania’s families, supports the development of the knowledge and skills that students need as family members both now and in the future. The 21st Century requires students to develop the ability to transform information into knowledge by using standards to certify that this information is meaningful, categorizing it to a purpose and then transforming their knowledge into wisdom by applying it to real life.

Family and Consumer Sciences is a discipline composed of strong subject matter concentrations with a commitment to integration. Concepts form a framework for learning based on these tenets:

- Families are the fundamental unit of society.
- A life-span approach to individual and family development contributes to creating lifelong learners.
- Meeting individual and family needs inside and outside the home are shared responsibilities.
- Individual, family and community well-being is strengthened through an awareness of diversity.
- The use of diverse modes of inquiry strengthens intellectual development.
- The content learning in Family and Consumer Sciences classes’ enhances the mastery of academic standards.
- Standards-based learning within Family and Consumer Sciences’ classrooms can best be demonstrated through performance based assessment.

Learners in Family and Consumer Sciences nurture themselves and others, taking increased responsibility for improving their quality of living.

The Academic Standards for Family and Consumer Sciences are written to empower individuals and families to manage the challenges of living and working in a diverse, global society. These Academic Standards address the functioning of families and their interrelationships with work, community and society. The focus is on the recurring, practical problems of individuals and families. An integrative approach is used to help individuals and families identify, create and evaluate goals and alternative solutions to significant problems of everyday life. Students are taught to take responsibility for the consequences of their actions. Comprehensive classroom experiences allow students to develop the knowledge and skills needed in making choices to meet their personal, family and work responsibilities.

A glossary is included to assist the reader in understanding terminology contained in the standards.

11.1. Financial and Resource Management			
11.1.3. GRADE 3	11.1.6. GRADE 6	11.1.9. GRADE 9	11.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
A. Identify money denominations, services and material resources available as trade-offs within the home, school and community.	A. Justify the decision to use or not use resources based on scarcity.	A. Analyze current conservation practices and their effect on future renewable and non-renewable resources. <ul style="list-style-type: none"> • Refuse • Reduce • Reuse • Recycle 	A. Evaluate the impact of family resource management on the global community.
B. Define the components of a spending plan (e.g., income, expenses, savings).	B. Know the relationship of the components of a simple spending plan and how that relationship allows for managing income, expenses and savings.	B. Explain the responsibilities associated with managing personal finances (e.g., savings, checking, credit, noncash systems, investments, insurance).	B. Analyze the management of financial resources across the lifespan.
C. Explain the need for shelter for the purpose of safety, warmth and comfort.	C. Describe the adaptability to meet basic human needs of the different types of housing available (e.g., single home, apartment, mobile home, shelter, recreational vehicle, public housing).	C. Delineate and assess the factors affecting the availability of housing (e.g., supply and demand, market factors, geographical location, community regulations).	C. Analyze the relationship among factors affecting consumer housing decisions (e.g., human needs, financial resources, location, legal agreements, maintenance responsibilities).

11.1. Financial and Resource Management			
11.1.3. GRADE 3	11.1.6. GRADE 6	11.1.9. GRADE 9	11.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>D. Explain consumer rights and responsibilities.</p> <ul style="list-style-type: none"> • To be safe • To be informed • To be heard • To choose • To redress <p>E. Explain the relationship between work and income.</p> <p>F. Describe criteria needed to identify quality in consumer goods and services (e.g., food, clothing, furniture, home technology, health care, transportation, services).</p> <p>G. Identify the services that communities provide for individuals and families.</p>	<p>D. Analyze information in care instructions, safety precautions and the use of consumable goods as a demonstration of understanding of consumer rights and responsibilities.</p> <p>E. Explain the principles of child labor laws and the opportunity cost of working by evaluating the advantages and disadvantages of holding a job while a teenager.</p> <p>F. Explain practices to maintain and/or repair consumer goods and services.</p> <p>G. Identify the public and nonpublic services that are available to serve families within the community.</p>	<p>D. Explain how consumer rights and responsibilities are protected (e.g., government agencies, consumer protection agencies, consumer action groups).</p> <p>E. Compare the influences of income and fringe benefits to make decisions about work.</p> <p>F. Evaluate different strategies to obtain consumer goods and services.</p> <p>G. Analyze how public, nonpublic and for-profit service providers serve the family.</p>	<p>D. Evaluate the role of consumer rights and responsibilities in the resolution of a consumer problem through the practical reasoning process.</p> <p>E. Compare and contrast factors affecting annual gross and taxable income and reporting requirements (e.g., W-2 form, Income tax form).</p> <p>F. Compare and contrast the selection of goods and services by applying effective consumer strategies.</p> <p>G. Compare the availability, costs and benefits of accessing public, nonpublic and for-profit services to assist the family.</p>

11.2. Balancing Family, Work and Community Responsibility			
11.2.3. GRADE 3	11.2.6. GRADE 6	11.2.9. GRADE 9	11.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
A. Examine consequences of family, work or career decisions.	A. Contrast the solutions reached through the use of a simple decision making process that includes analyzing consequences of alternative solutions against snap decision making methods.	A. Solve dilemmas using a practical reasoning approach <ul style="list-style-type: none"> • Identify situation • Identify reliable information • List choices and examine the consequences of each • Develop a plan of action • Draw conclusions • Reflect on decisions 	A. Justify solutions developed by using practical reasoning skills.
B. Identify the importance of routines and schedules while differentiating between short and long term goals.	B. Deduce the importance of time management skills (e.g. home, school, recreational activities).	B. Know FCCLA action planning procedure and how to apply it to family, work and community decisions.	B. Evaluate the effectiveness of action plans that integrate personal, work, family and community responsibilities.
C. Indicate the benefits and costs of working as an individual or as a team member and of being a leader or follower.	C. Classify the components of effective teamwork and leadership.	C. Assess the effectiveness of the use of teamwork and leadership skills in accomplishing the work of the family.	C. Analyze teamwork and leadership skills and their application in various family and work situations.
D. Explain the importance of organizing space for efficiency and a sense of comfort (e.g., desk space, classroom space).	D. Identify the concepts and principles used in planning space for activities.	D. Analyze the space requirements for a specified activity to meet a given need (e.g., family room, home office, kitchen).	D. Based on efficiency, aesthetics and psychology, evaluate space plans (e.g., home, office, work areas) for their ability to meet a variety of needs including those of individuals with special needs.

11.2. Balancing Family, Work and Community Responsibility			
11.2.3. GRADE 3	11.2.6. GRADE 6	11.2.9. GRADE 9	11.2.12. GRADE 12
<i>Pennsylvania’s public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>E. Analyze the effectiveness of technology used for school and home in accomplishing the work of the family (e.g., security, entertainment, communication, education).</p> <p>F. Explain daily activities that fulfill family functions in meeting responsibilities (e.g., economic, emotional support, childcare and guidance, housekeeping, maintaining kinship, providing recreation).</p> <p>G. Identify the life stages by identifying their developmental task (e.g., infant, pre-schooler, school age, teen-age, adult, senior citizen).</p>	<p>E. Describe the role of technology within a community in maintaining a safe and healthy living environment (e.g., safety, hospitals, waste treatment, water quality, schools).</p> <p>F. Compare and contrast how different cultures meet family responsibilities within differing configurations (e.g., new parent, just married, single adult living alone, “empty nest,” retired, senior citizen).</p> <p>G. Identify the characteristics of the stages of the family life cycle (e.g., beginning, expanding, developing, launching, middle years, retirement, variations).</p>	<p>E. Evaluate the impact of technology and justify the use or nonuse of it (e.g., safety, cost/budget, appearance, efficiency).</p> <p>F. Contrast past and present family functions and predict their probable impact on the future of the family.</p> <p>G. Explain the influences of family life cycle stages on the needs of families and communities (e.g., a large number of young families needing day care, fixed income senior citizens, school age children).</p>	<p>E. Assess the availability of emerging technology that is designed to do the work of the family and evaluate the impact of its use on individuals, families and communities.</p> <p>F. Assess the relationship of family functions to human developmental stages.</p> <p>G. Hypothesize the impact of present family life-cycle trends on the global community (e.g., over population, increase in an aging population, economic base).</p>

11.2. Balancing Family, Work and Community Responsibility			
11.2.3. GRADE 3	11.2.6. GRADE 6	11.2.9. GRADE 9	11.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
H. Identify how to resolve conflict using interpersonal communications skills. <ul style="list-style-type: none"> • Speaking and listening • I messages • Active listening • Checking for understanding • Following directions • Empathy • Feedback 	H. Describe positive and negative interactions within patterns of interpersonal communications. <ul style="list-style-type: none"> • Placating • Blaming • Distracting • Intellectualizing • Asserting 	H. Justify the significance of interpersonal communication skills in the practical reasoning method of decision making.	H. Evaluate the effectiveness of using interpersonal communication skills to resolve conflict.

11.3. Food Science and Nutrition			
11.3.3. GRADE 3	11.3.6. GRADE 6	11.3.9. GRADE 9	11.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Know the production steps that a food travels from the farm to the consumer.</p> <p>B. Describe personal hygiene techniques in food handling (e.g., handwashing, sneeze control, signs of food spoilage).</p> <p>C. Explain the importance of eating a varied diet in maintaining health.</p> <p>D. Classify foods by food group within the food guide pyramid including the serving size and nutrient function within the body.</p>	<p>A. Demonstrate knowledge of techniques used to evaluate food in various forms (e.g., canned, frozen, dried, irradiated).</p> <p>B. Describe safe food handling techniques (e.g., storage, temperature control, food preparation, conditions that create a safe working environment for food production).</p> <p>C. Analyze factors that effect food choices.</p> <p>D. Describe a well-balanced daily menu using the dietary guidelines and the food guide pyramid.</p>	<p>A. Explain how scientific and technological developments enhance our food supply (e.g., food preservation techniques, packaging, nutrient fortification).</p> <p>B. Identify the cause, effect and prevention of microbial contamination, parasites and toxic chemicals in food.</p> <p>C. Analyze the impact of food addictions and eating disorders on health.</p> <p>D. Analyze relationship between diet and disease and risk factors (e.g., calcium and osteoporosis; fat, cholesterol and heart disease; folate and birth defects; sodium and hypertension).</p>	<p>A. Analyze how food engineering and technology trends will influence the food supply.</p> <p>B. Evaluate the role of Government agencies in safeguarding our food supply (e.g., USDA, FDA, EPA and CDC).</p> <p>C. Evaluate sources of food and nutrition information.</p> <p>D. Critique diet modifications for their ability to improve nutritionally-related health conditions (e.g., diabetes, lactose-intolerance, iron deficiency).</p>

11.3. Food Science and Nutrition			
11.3.3. GRADE 3	11.3.6. GRADE 6	11.3.9. GRADE 9	11.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
E. Define energy-yielding nutrients and calories.	E. Explain the relationship between calories, nutrient and food input versus energy output; describe digestion.	E. Analyze the energy requirements, nutrient requirements and body composition for individuals at various stages of the life cycle.	E. Analyze the breakdown of foods, absorption of nutrients and their conversion to energy by the body.
F. Identify components of a basic recipe (e.g., volume, weight, fractions, recipe ingredients, recipe directions, safety techniques).	F. Analyze basic food preparation techniques and food-handling procedures.	F. Hypothesize the effectiveness of the use of meal management principles (e.g., time management, budgetary considerations, sensory appeal, balanced nutrition, safety, sanitation).	F. Evaluate the application of nutrition and meal planning principles in the selection, planning, preparation and serving of meals that meet the specific nutritional needs of individuals across their lifespan.
G. Classify foods according to senses (e.g., taste, touch, smell, mouth feel, sight, sound).	G. Describe the physical, biological, and chemical changes that take place in food preparation.	G. Analyze the application of physical and chemical changes that occur in food during preparation and preservation.	G. Analyze the relevance of scientific principles to food processing, preparation and packaging.

11.4. Child Development			
11.4.3. GRADE 3	11.4.6. GRADE 6	11.4.9. GRADE 9	11.4.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Identify characteristics in each stage of child development.</p> <ul style="list-style-type: none"> • Infancy/birth to 1 year • Early childhood/1 to 6 years • Middle childhood/6 to 9 years • Late childhood/9—13 years • Adolescence/13—18 years <p>B. Identify health and safety needs for children at each stage of child development.</p> <p>C. Identify the characteristics of a learning environment.</p> <p>D. Identify community resources provided for children.</p> <p>E. Explain how the home and community help a person learn to read, write and compute.</p>	<p>A. Compare and contrast child development guided practices according to the stage of child development.</p> <p>B. Identify ways to keep children healthy and safe at each stage of child development.</p> <p>C. Identify the role of the caregiver in providing a learning environment (e.g., babysitting, daycare, preschool).</p> <p>D. Identify child-care provider considerations.</p> <p>E. Identify characteristics of quality literature for children and other literacy enhancing activities.</p>	<p>A. Analyze physical, intellectual and social/emotional development in relation to theories of child development.</p> <p>B. Evaluate health and safety hazards relating to children at each stage of child development.</p> <p>C. Evaluate various environments to determine if they provide the characteristics of a proper learning environment.</p> <p>D. Analyze the roles, responsibilities and opportunity for family involvement in schools.</p> <p>E. Explain how storytelling, story reading and writing enhance literacy development in children.</p>	<p>A. Analyze current research on existing theories in child development and its impact on parenting (e.g., Piaget, Erikson and prior findings versus new brain development research).</p> <p>B. Analyze current issues in health and safety affecting children at each stage of child development.</p> <p>C. Analyze practices that optimize child development (e.g., stimulation, safe environment, nurturing caregivers, reading to children).</p> <p>D. Analyze plans and methods to blend work and family responsibilities to meet the needs of children.</p> <p>E. Identify practices that develop the child's imagination, creativity and reading and writing skills through literature.</p>

XXXIII. GLOSSARY

Aesthetics:	Appreciation of and responsive to beauty.
CDC:	Center for Disease Control
Child-care provider considerations:	Criteria to use in evaluating child care facilities. These include well-trained and highly motivated staff, pleasant sanitary surroundings, variety in toys and supplies, ratio of staff to children.
Child development stage:	An age range with similar growth characteristics: infancy, early childhood, middle childhood, late childhood, adolescence.
Consumer responsibilities:	The need to interpret information in care instructions, safety precautions and proper use of consumable goods as a user of goods and services.
Consumer rights:	The guarantee to be safe, the right to be informed, to be heard, to choose consumer education and to redress as a user of goods and services.
Dietary guidelines:	A set of seven recommendations developed by the United States Department of Agriculture and Health and Human Services to help healthy people over age 2 know what to eat to stay healthy.
Developmental tasks:	Changes in the thinking and behavior of individuals over time.
Empathy:	The action of understanding another's thoughts, feelings and behaviors.
EPA:	Environmental Protection Agency
FCCLA Action planning procedure:	The decision making process endorsed by the Family, Career and Community Leaders of America, involving five steps: <ol style="list-style-type: none">1. Identify concerns—brainstorm and evaluate, narrow choices to workable ideas.2. Set your goals—write what you want to accomplish as an achievable objective.3. Form a plan—who, what, when, where and how.4. Act—carry out the plan.5. Follow up—determine if your goal was met and create an improvement plan.

FDA:	Food and Drug Administration
Family, Career and Community Leaders Of America:	Vocational student organization sponsored by Family and Consumer Sciences' classrooms.
Food guide pyramid:	A visual tool used to help people plan healthy diets according to the Dietary Guidelines for America.
Guided practices:	Interaction with a child based on age appropriate developmental principles.
I message:	A statement containing three parts: <ol style="list-style-type: none">1. The situation2. How it makes the speaker feel3. What will happen if it continues.
Kinship:	Relationships or relatives.
Leadership skills:	The ability to: <ul style="list-style-type: none">• Use resources• Delegate authority• Communicate effectively• Assess composition of group• Determine and rank goals• Evaluate consequences.
Microbial contamination:	Most common food contaminants causing foodborne illnesses.
Nutrient:	A basic component of food that nourishes the body.
Opportunity cost:	The tangible and nontangible trade-off necessary to procure a good or service or to take an action.
Practical reasoning:	A decision making process unique because of its emphasis on relationships and involving six steps: <ol style="list-style-type: none">1. Identify situation to be solved2. Identify reliable information3. List choices and examine consequences4. Develop plan of action5. Draw conclusions6. Reflect on decisions.
Redress:	To set right or remedy.

Toxic chemical:	Contaminants found in natural, environmental and pesticide residue forms that are poisonous to the body.
Scarcity:	The lack of provisions for the support of life.
Team work skills:	The ability to: <ul style="list-style-type: none"> • Collaborate • Cooperate • Set community goals • Reach consensus.
Trade-off:	Exchange of goods, services or monies.
USDA:	United States Department of Agriculture

APPENDIX E

Academic Standards for Career Education and Work

Source

The provisions of this Appendix E adopted July 7, 2006, effective July 8, 2006, 36 Pa.B. 3528, unless otherwise noted.

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XXXVII. INTRODUCTION

The Academic Standards for Career Education and Work reflect the increasing complexity and sophistication that students experience as they progress through school. Career Education and Work Standards describe what students should know and be able to do at four grade levels (3, 5, 8 and 11) in four areas:

- 13.1 Career Awareness and Preparation
- 13.2 Career Acquisition (Getting a Job)
- 13.3 Career Retention and Advancement
- 13.4 Entrepreneurship

Pennsylvania’s economic future depends on having a well-educated and skilled workforce. No student should leave secondary education without a solid foundation in Career Education and Work. It is the rapidly changing workplace and the demand for continuous learning and innovation on the part of the workers that drive the need to establish academic standards in Career Education and Work.

Through a comprehensive approach, Career Education and Work Standards complement all disciplines and other academic standards. If Pennsylvania’s students are to succeed in the workplace, there are certain skills that they need to obtain prior to graduation from high school. These skills have been identified in the Career Education and Work Standards, but it is up to individual school districts to decide how they are to be taught. Districts can implement integration strategies within existing disciplines or can implement stand-alone courses to specifically address these standards.

A glossary is included to assist the reader in understanding terminology contained in the standards.

13.1. Career Awareness and Preparation			
13.1.3. GRADE 3	13.1.5. GRADE 5	13.1.8. GRADE 8	13.1.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his maximum potential and to acquire the knowledge and skills needed to:</i>			
A. Recognize that individuals have unique interests.	A. Describe the impact of individual interests and abilities on career choices.	A. Relate careers to individual interests, abilities and aptitudes.	A. Relate careers to individual interests, abilities and aptitudes.
B. Identify current personal interests.	B. Describe the impact of personal interest and abilities on career choices.	B. Relate careers to personal interests, abilities and aptitudes.	B. Analyze career options based on personal interests, abilities, aptitudes, achievements and goals.
C. Recognize that the roles of individuals at home, in the workplace and in the community are constantly changing.	C. Relate the impact of change to both traditional and nontraditional careers.	C. Explain how both traditional and nontraditional careers offer or hinder career opportunities.	C. Analyze how the changing roles of individuals in the workplace relate to new opportunities within career choices.

13.1. Career Awareness and Preparation			
13.1.3. GRADE 3	13.1.5. GRADE 5	13.1.8. GRADE 8	13.1.11. GRADE 11
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his maximum potential and to acquire the knowledge and skills needed to:</i></p>			
<p>D. Identify the range of jobs available in the community.</p>	<p>D. Describe the range of career training programs in the community such as, but not limited to:</p> <ul style="list-style-type: none"> • Two-and-four year colleges • Career and technical education programs at centers (formerly AVTS) and high schools • CareerLinks • Community/recreation centers • Faith-based organizations • Local industry training centers • Military • Registered apprenticeship • Vocational rehabilitation centers • Web-based training 	<p>D. Explain the relationship of career training programs to employment opportunities.</p>	<p>D. Evaluate school-based opportunities for career awareness/preparation, such as, but not limited to:</p> <ul style="list-style-type: none"> • Career days • Career portfolio • Community service • Cooperative education • Graduation/senior project • Internship • Job shadowing • Part-time employment • Registered apprenticeship • School-based enterprise

13.1. Career Awareness and Preparation			
13.1.3. GRADE 3	13.1.5. GRADE 5	13.1.8. GRADE 8	13.1.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his maximum potential and to acquire the knowledge and skills needed to:</i>			
E. Describe the work done by school personnel and other individuals in the community.	E. Describe the factors that influence career choices, such as, but not limited to: <ul style="list-style-type: none"> • Geographic location • Job description • Salaries/benefits • Work schedule • Working conditions 	E. Analyze the economic factors that impact employment opportunities, such as, but not limited to: <ul style="list-style-type: none"> • Competition • Geographic location • Global influences • Job growth • Job openings • Labor supply • Potential advancement • Potential earnings • Salaries/benefits • Unemployment 	E. Justify the selection of a career.

13.1. Career Awareness and Preparation			
13.1.3. GRADE 3	13.1.5. GRADE 5	13.1.8. GRADE 8	13.1.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his maximum potential and to acquire the knowledge and skills needed to:</i>			
F. Explore how people prepare for careers.	F. Investigate people's rationale for making career choices.	F. Analyze the relationship of school subjects, extracurricular activities and community experiences to career preparation.	F. Analyze the relationship between career choices and career preparation opportunities, such as, but not limited to: <ul style="list-style-type: none"> • Associate degree • Baccalaureate degree • Certificate/licensure • Entrepreneurship • Immediate part/full time employment • Industry training • Military training • Professional degree • Registered apprenticeship • Tech Prep • Vocational rehabilitation centers

13.1. Career Awareness and Preparation			
13.1.3. GRADE 3	13.1.5. GRADE 5	13.1.8. GRADE 8	13.1.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his maximum potential and to acquire the knowledge and skills needed to:</i>			
G. Explain why education and training plans are important to careers.	G. Identify the components of a career plan, such as, but not limited to: <ul style="list-style-type: none"> • Beginnings of career portfolio • Career goals • Individual interests and abilities • Training/education requirements and costs 	G. Create an individualized career plan including, such as, but not limited to: <ul style="list-style-type: none"> • Assessment and continued development of career portfolio • Career goals • Cluster/pathway opportunities • Individual interests and abilities • Training/education requirements and financing 	G. Assess the implementation of the individualized career plan through the ongoing development of the career portfolio.
H. Explain how workers in their careers use what is learned in the classroom.	H. Connect personal interests and abilities and academic strengths to personal career options.	H. Choose personal electives and extra curricular activities based upon personal career interests, abilities and academic strengths.	H. Review personal high school plan against current personal career goals and select postsecondary opportunities based upon personal career interests.

13.2. Career Acquisition (Getting a Job)			
13.2.3. GRADE 3	13.2.5. GRADE 5	13.2.8. GRADE 8	13.2.11. GRADE 11
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his maximum potential and to acquire the knowledge and skills needed to:</i></p>			
<p>A. Identify appropriate speaking and listening techniques used in conversation.</p> <p>B. Discuss resources available in researching job opportunities, such as, but not limited to:</p> <ul style="list-style-type: none"> • Internet • Magazines • Newspapers 	<p>A. Apply appropriate speaking and listening techniques used in conversation.</p> <p>B. Identify and review resources available in researching job opportunities, such as, but not limited to:</p> <ul style="list-style-type: none"> • Internet • Magazines • Newspapers 	<p>A. Identify effective speaking and listening skills used in a job interview.</p> <p>B. Evaluate resources available in researching job opportunities, such as, but not limited to:</p> <ul style="list-style-type: none"> • CareerLinks • Internet (i.e. O*NET) • Networking • Newspapers • Professional associations • Resource books (that is <i>Occupational Outlook Handbook, PA Career Guide</i>) 	<p>A. Apply effective speaking and listening skills used in a job interview.</p> <p>B. Apply research skills in searching for a job.</p> <ul style="list-style-type: none"> • CareerLinks • Internet (i.e. O*NET) • Networking • Newspapers • Professional associations • Resource books (that is <i>Occupational Outlook Handbook, PA Career Guide</i>)

13.2. Career Acquisition (Getting a Job)			
13.2.3. GRADE 3	13.2.5. GRADE 5	13.2.8. GRADE 8	13.2.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his maximum potential and to acquire the knowledge and skills needed to:</i>			
C. Compose a personal letter.	C. Compose and compare a business and a personal letter.	C. Prepare a draft of career acquisition documents, such as, but not limited to: <ul style="list-style-type: none"> • Job application • Letter of appreciation following an interview • Letter of introduction • Request for letter of recommendation • Resume 	C. Develop and assemble, for career portfolio placement, career acquisition documents, such as, but not limited to: <ul style="list-style-type: none"> • Job application • Letter of appreciation following an interview • Letter of introduction • Postsecondary education/training applications • Request for letter of recommendation • Resume

13.2. Career Acquisition (Getting a Job)			
13.2.3. GRADE 3	13.2.5. GRADE 5	13.2.8. GRADE 8	13.2.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his maximum potential and to acquire the knowledge and skills needed to:</i>			
D. Identify the importance of developing a plan for the future.	D. Identify individualized career portfolio components, such as, but not limited to: <ul style="list-style-type: none"> • Achievements • Awards/recognitions • Career exploration results • Career plans • Community service involvement/projects • Interests/hobbies • Personal career goals • Selected school work • Self inventories 	D. Develop an individualized career portfolio including components, such as, but not limited to: <ul style="list-style-type: none"> • Achievements • Awards/recognitions • Career exploration results • Career plans • Community service involvement/projects • Interests/hobbies • Personal career goals • Selected school work • Self inventories 	D. Analyze, revise and apply an individualized career portfolio to chosen career path.

13.2. Career Acquisition (Getting a Job)			
13.2.3. GRADE 3	13.2.5. GRADE 5	13.2.8. GRADE 8	13.2.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>E. Discuss the importance of the essential workplace skills, such as, but not limited to:</p> <ul style="list-style-type: none"> • Dependability • Health/safety • Team building • Technology 	<p>E. Apply to daily activities, the essential workplace skills, such as, but not limited to:</p> <ul style="list-style-type: none"> • Commitment • Communication • Dependability • Health/safety • Personal initiative • Scheduling/time management • Team building • Technical literacy • Technology 	<p>E. Explain, in the career acquisition process, the importance of the essential workplace skills/ knowledge, such as, but not limited to:</p> <ul style="list-style-type: none"> • Commitment • Communication • Dependability • Health/safety • Laws and regulations (that is Americans With Disabilities Act, child labor laws, Fair Labor Standards Act, OSHA, Material Safety Data Sheets) • Personal initiative • Self-advocacy • Scheduling/time management • Team building • Technical literacy • Technology 	<p>E. Demonstrate, in the career acquisition process, the application of essential workplace skills/knowledge, such as, but not limited to:</p> <ul style="list-style-type: none"> • Commitment • Communication • Dependability • Health/safety • Laws and regulations (that is Americans With Disabilities Act, child labor laws, Fair Labor Standards Act, OSHA, Material Safety Data Sheets) • Personal initiative • Self-advocacy • Scheduling/time management • Team building • Technical literacy • Technology

13.3. Career Retention and Advancement			
13.3.3. GRADE 3	13.3.5. GRADE 5	13.3.8. GRADE 8	13.3.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Identify attitudes and work habits that contribute to success at home and school.</p> <p>B. Identify how to cooperate at both home and school.</p> <p>C. Explain effective group interaction terms, such as, but not limited to:</p> <ul style="list-style-type: none"> • Compliment • Cooperate • Encourage • Participate 	<p>A. Explain how student attitudes and work habits transfer from the home and school to the workplace.</p> <p>B. Explain the importance of working cooperatively with others at both home and school to complete a task.</p> <p>C. Identify effective group interaction strategies, such as, but not limited to:</p> <ul style="list-style-type: none"> • Building consensus • Communicating effectively • Establishing ground rules • Listening to others 	<p>A. Determine attitudes and work habits that support career retention and advancement.</p> <p>B. Analyze the role of each participant's contribution in a team setting.</p> <p>C. Explain and demonstrate conflict resolution skills:</p> <ul style="list-style-type: none"> • Constructive criticism • Group dynamics • Managing/leadership • Mediation • Negotiation • Problem solving 	<p>A. Evaluate personal attitudes and work habits that support career retention and advancement.</p> <p>B. Evaluate team member roles to describe and illustrate active listening techniques:</p> <ul style="list-style-type: none"> • Clarifying • Encouraging • Reflecting • Restating • Summarizing <p>C. Evaluate conflict resolution skills as they relate to the workplace:</p> <ul style="list-style-type: none"> • Constructive criticism • Group dynamics • Managing/leadership • Mediation • Negotiation • Problem solving

13.3. Career Retention and Advancement			
13.3.3. GRADE 3	13.3.5. GRADE 5	13.3.8. GRADE 8	13.3.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his maximum potential and to acquire the knowledge and skills needed to:</i>			
D. Explain how money is used.	D. Explain budgeting.	D. Analyze budgets and pay statements, such as, but not limited to: <ul style="list-style-type: none"> • Charitable contributions • Expenses • Gross pay • Net pay • Other income • Savings • Taxes 	D. Develop a personal budget based on career choice, such as, but not limited to: <ul style="list-style-type: none"> • Charitable contributions • Fixed/variable expenses • Gross pay • Net pay • Other income • Savings • Taxes
E. Discuss how time is used at both home and school.	E. Develop a personal schedule based on activities and responsibilities at both home and school.	E. Identify and apply time management strategies as they relate to both personal and work situations.	E. Evaluate time management strategies and their application to both personal and work situations.
F. Identify the changes in family and friend's roles at home, at school and in the community.	F. Describe the impact of role changes at home, school, and at work, and how the role changes impact career advancement and retention.	F. Identify characteristics of the changing workplace including Americans With Disabilities Act accommodations, and explain their impact on jobs and employment.	F. Evaluate strategies for career retention and advancement in response to the changing global workplace.
G. Define and describe the importance of lifelong learning.	G. Describe how personal interests and abilities impact lifelong learning.	G. Identify formal and informal lifelong learning opportunities that support career retention and advancement.	G. Evaluate the impact of lifelong learning on career retention and advancement.

13.4. Entrepreneurship			
13.4.3. GRADE 3	13.4.5. GRADE 5	13.4.8. GRADE 8	13.4.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>C. Describe age-appropriate entrepreneurial opportunities, such as, but not limited to:</p> <ul style="list-style-type: none"> • Bake sale • Crafts • Lemonade stand • Pet care 	<p>C. Discuss the steps entrepreneurs take to bring their goods or services to market, such as, but not limited to:</p> <ul style="list-style-type: none"> • Marketing • Production • Research and development • Selection of goods and services 	<p>C. Identify and describe the basic components of a business plan, such as, but not limited to:</p> <ul style="list-style-type: none"> • Business idea • Competitive analysis • Daily operations • Finances/budget • Marketing • Productive resources (human, capital, natural) • Sales forecasting 	<p>C. Develop a business plan for an entrepreneurial concept of personal interest and identify available resources, such as, but not limited to:</p> <ul style="list-style-type: none"> • Community based organizations (that is chambers of commerce, trade/technical associations, Industrial Resource Centers) • Financial institutions • School-based career centers • Small Business Administration services (that is SCORE, Small Business Development Centers, Entrepreneurial Development Centers) • Venture capital

Academic Standards for Career Education and Work

XXXIX. GLOSSARY

Americans With Disabilities Act (Pub. L. No. 101-336):	The Americans With Disabilities Act is a Federal civil rights law that prohibits discrimination and for ensuring equal opportunity for persons with disabilities in employment, state and local government services, public accommodations, commercial facilities, transportation and requiring the establishment of TDD/telephone relay services.
Aptitudes:	Capacity to learn and understand.
Associate degree:	A postsecondary degree typically earned within a 2-year time frame.
Baccalaureate degree:	A postsecondary degree, also known as a bachelor's degree, typically earned within a 4-year time frame from a college or university.
Benefits:	Something of value that an employee receives in addition to a wage or salary. Examples include health and life insurance, vacation leave, retirement plans, and the like.
Budget:	A financial plan that summarizes anticipated income and expenditures over a period of time.
Business plan:	A prepared document detailing the past, present and future of an organization.
Career and technical centers:	Schools that educate secondary students and adults through academic instruction, job preparation and acquisition of occupational skills leading to credentials or employment, or both, in specific industries. The centers also provide opportunities for transition to postsecondary education and continuing education.
Career cluster:	A grouping of related occupations, which share similar skill sets.

Career days:	Special events that allow students to meet with employers, career development specialists, community-based organization representatives and postsecondary educators. Events are designed to encourage students to gain information about careers and job opportunities.
Career plan:	A document developed by the student that identifies a series of educational studies and experiences to prepare them for postsecondary education or work, or both, in a selected career cluster or area.
Career portfolio:	An ongoing, individualized collection of materials (electronic or hard copy) that documents a student's educational performance, career exploration and employment experiences over time. While there is no standard format that a career portfolio must take, it typically includes a range of work, containing assignments by the teacher/counselor and selections by the student. It serves as a guide for the student to transition to postsecondary education or the workplace, or both.
Career retention and advancement:	Career retention is the process of keeping a job. Career advancement is the process of performing the necessary requirements to progress in a career.
CareerLinks:	A cooperative system that provides one-stop delivery of career services to job seekers, employers and other interested individuals.
Certificate/licensure:	A document, issued by associations, employers, educational institutions, government, and the like, confirming that one has fulfilled the requirements and is able to perform to a specified level of proficiency within a career field.
Child labor laws:	Legislation governing the employment of children under the age of 18.
Competitive analysis:	A tool that allows a business to identify its competitors and evaluate their respective strengths and weaknesses.

- Cooperative education:** A structured method of instruction whereby students alternate or coordinate their high school studies with a job in a field related to their academic or career objectives.
- Entrepreneurs:** Individuals who engage in the process of organizing, managing and assuming the risk of a business or enterprise.
- Entrepreneurship:** The process of organizing, managing and assuming the risks of a business or enterprise.
- Fair Labor Standards Act:** A Federal law that defines overtime and wage requirements (26 U.S.C.A. §§ 201—219).
- Fixed/variable expenses:** Fixed expenses are regular in their timing and amount, and include things such as rent, mortgage, car payment and insurance. Variable expenses are irregular in their timing and amount, and include such things as food, clothing, home and car maintenance, entertainment and gifts.
- Global influences:** Political and cultural changes, which impact the world and its economy.
- Gross pay:** The amount earned before deductions, such as taxes, insurance and retirement/pension plan.
- Industrial resource centers:** Nonprofit corporations, which provide assistance to improve the competitive position of small-to-medium sized manufacturers.
- Internship:** A work experience with an employer for a specified period of time to learn about a particular industry or occupation, which may or may not include financial compensation. The workplace activities may include special projects, a sample of tasks from different jobs or tasks from a single occupation.

Job shadowing:	Typically as part of career exploration activities in late middle and early high school, a student follows an employee for 1 or more days to learn about a particular occupation or industry. Job shadowing is intended to help students explore a range of career objectives and to possibly select a career pathway.
Labor supply:	The number of persons either working or unemployed and actively seeking work.
Marketing:	The process or technique of promoting, selling and distributing a product or service.
Material Safety Data Sheets:	Federally-mandated listings of all hazardous materials that will impact the health and safety of the workers and that are required to be posted in the workplace.
Mediation:	Third-party intervention between conflicting parties to promote reconciliation, settlement or compromise.
Net pay:	The amount remaining after deductions, such as taxes, insurance and retirement/pension plan.
Networking:	The act of exchanging information, contacts and services.
Nontraditional careers:	Fields of work for which individuals from one gender comprise less than 25% of the individuals employed in each occupation or field of work.
O*NET:	Occupational Information Network—is a free public access online web-based system provided by the United States Department of Labor, which includes comprehensive up-to-date occupational information including skills, knowledge, abilities and tasks for more than 950 occupations.
Operating costs:	The funds necessary to operate a business, not including the cost of goods sold. This is also referred to as overhead.

OSHA:	The Occupational Safety and Health Administration—A National agency with representatives in each state who monitor health and safety issues in the workplace.
Professional associations:	Organizations of people having common interests.
Professional degree:	A title conferred on students by a college, university or professional school upon completion of a program of study.
Registered apprenticeship:	A formal program registered with the United States Department of Labor’s Bureau of Apprenticeship and Training and with the Pennsylvania Apprenticeship Council. This program must follow strict guidelines as to the types of training and amount of training time an apprentice receives and leads directly into occupations requiring the training for entry.
Resume:	A summary of one’s personal qualifications, education/training and employment experience.
Salaries/benefits:	Financial compensation paid regularly for services (See “benefits” for definition).
Sales forecasting:	Predicting the number of services or units likely to be sold over a specified period of time.
School-based career centers:	Specialized areas in schools equipped with resources and materials used to research postsecondary and occupational opportunities.
School-based enterprise:	The production of goods or services as part of a school program.
SCORE:	Service Corps of Retired Executives—A Small Business Administration Federally-sponsored program to assist small-to-medium sized companies.
Self inventories:	Evaluation of an individual’s strengths, weaknesses and interests, as it relates to career planning.

Tech Prep:	The name given to programs that offer at least 4 years of sequential course work at the secondary and postsecondary levels to prepare students for technical careers. The curricula are designed to build student competency in academic subjects, as well as to provide broad technical preparation in a career area.
Technical literacy:	The ability of individuals to use existing and emerging technologies, equipment, language, materials and manuals to participate intelligently in performing tasks related to everyday life, school or job.
Time management strategies:	Scheduling techniques used to effectively and efficiently direct or control activities.
Traditional careers:	Fields of work for which individuals from one gender comprise more than 25% of the individuals employed in each occupation or field of work.
Unemployment:	Measurement of the number of people who are not working and who are actively seeking work.
Venture capital:	Public or private funds invested in a potentially profitable business enterprise despite risk of loss.
Vocational rehabilitation centers:	Educational facilities that provide life skills and occupational training services for individuals with special needs.
Wages:	Payments of money for labor or services according to contract and on an hourly, daily or piecework basis.
Web-based training:	Instruction that is available online.
Work habits:	Acquired behaviors that individuals regularly perform in completing tasks related to chores, school or job.
Working conditions:	The environment in which an individual is employed.

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