



A Correlation of

**Science and Technology for Children[®] and
Science and Technology Concepts for Middle Schools[™]**

to the

**Pennsylvania Academic Standards:
Science and Technology/Environment and Ecology**

Prepared by



V 0208

This document gives a quick visual guide to the alignment of Science and Technology for Children® (STC®) and Science and Technology Concepts for Middle Schools™ (STC/MS™) units with the Pennsylvania Academic Standards for Science and Technology and Environment and Ecology. Although each STC and STC/MS unit was developed for use at a specific grade level, there is some flexibility in grade placement—any unit may be used a grade above or below the one for which it was developed. Because of this flexibility, many curriculum planners prefer to think of each unit as covering a three-level band of grades (as indicated in the chart below). In addition, STC/MS units can be used at grade 9.

In addition, all fourth-grade through sixth-grade STC unit kits include a Discovery Deck, a set of extensions for the unit. When a Discovery Deck meets or helps to meet a standard, the abbreviation “DD” will follow the unit abbreviation.

Recommended Grade Levels and Unit Abbreviations

The National Science Resources Center (NSRC), developer of the STC and STC/MS programs, recommends the units be used within the following grade ranges.

	Grades	Life and Earth Science		Physical Science and Technology	
STC	K–2	<i>Organisms</i> (O)	<i>Weather</i> (W)	<i>Solids and Liquids</i> (SL)	<i>Comparing and Measuring</i> (CM)
	1–3	<i>The Life Cycle of Butterflies</i> (LCB)	<i>Soils</i> (S)	<i>Changes</i> (C)	<i>Balancing and Weighing</i> (BW)
	2–4	<i>Plant Growth and Development</i> (PGD)	<i>Rocks and Minerals</i> (RM)	<i>Chemical Tests</i> (CT)	<i>Sound</i> (So)
	3–5	<i>Animal Studies*</i> (AS)	<i>Land and Water*</i> (LW)	<i>Electric Circuits*</i> (EC)	<i>Motion and Design*</i> (MD)
	4–6	<i>Microworlds*</i> (Mw)	<i>Ecosystems*</i> (E)	<i>Food Chemistry*</i> (FC)	<i>Floating and Sinking*</i> (FS)
	5–7	<i>Experiments with Plants*</i> (EP)	<i>Measuring Time*</i> (MT)	<i>Magnets and Motors*</i> (MM)	<i>The Technology of Paper*</i> (TP)
STC/MS	6–8**	<i>Human Body Systems</i> (HBS)	<i>Catastrophic Events</i> (CE)	<i>Properties of Matter</i> (POM)	<i>Energy, Machines, and Motion</i> (EMM)
		<i>Organisms—From Macro to Micro</i> (OMM)	<i>Earth in Space</i> (ES)	<i>Light</i> (L)	<i>Electrical Energy and Circuit Design</i> (EECD)

*Unit kit includes a Discovery Deck (DD).

**STC/MS units may also be used at grade 9.

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3.1. Unifying Themes	
3.1.4. GRADE 4	STC Unit(s)
A. Know that natural and human-made objects are made up of parts.	
Identify and describe what parts make up a system.	O, LCB, BW, PGD, So, AS, LW, EC, EC DD, MD, MD DD, E, E DD, FS, FS DD
Identify system parts that are natural and human-made (e.g., ball point pen, simple electrical circuits, plant anatomy).	O, LCB, BW, PGD, So, AS, LW, EC, EC DD, MD, MD DD, E, E DD, FS, FS DD
Describe the purpose of analyzing systems.	
Know that technologies include physical technology systems (e.g., construction, manufacturing, transportation, informational systems and biochemical-related systems).	
B. Know models as useful simplifications of objects or processes.	
Identify different types of models.	W, LCB, AS, LW, E, FS
Identify and apply models as tools for prediction and insight.	W, PGD, So, LW, EC, MD, FS
Apply appropriate simple modeling tools and techniques.	W, LCB, PGD, So, LW, EC, MD, Mw, E, FS
Identify theories that serve as models (e.g., molecules).	
C. Illustrate patterns that regularly occur and reoccur in nature.	
Identify observable patterns (e.g., growth patterns in plants, crystal shapes in minerals, climate, structural patterns in bird feathers).	O, W, LCB, PGD, RM, So, AS, LW, EC, MD, Mw, E, E DD
Use knowledge of natural patterns to predict next occurrences (e.g., seasons, leaf patterns, lunar phases).	LCB, PGD, RM, So, AS, LW, EC, MD, Mw, E
D. Know that scale is an important attribute of natural and human-made objects, events and phenomena.	
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.	
E. Recognize change in natural and physical systems.	
Recognize change as fundamental to science and technology concepts.	C (technology not included)
Examine and explain change by using time and measurement.	
Describe relative motion.	
Describe the change to objects caused by heat, cold, light or chemicals.	CT, FC (cold and light not included)
3.1.7. GRADE 7	STC and/or STC/MS Unit(s)
A. Explain the parts of a simple system and their relationship to each other.	

Describe a system as a group of related parts that work together to achieve a desired result (e.g., digestive system).	EP, all STC/MS units
Explain the importance of order in a system.	All STC/MS units
Distinguish between system inputs, system processes and system outputs.	HBS, POM, EMM, EECD
Distinguish between open loop and closed loop systems.	HBS, EECD
Apply systems analysis to solve problems.	EECD
B. Describe the use of models as an application of scientific or technological concepts.	
Identify and describe different types of models and their functions.	MT, MM, all STC/MS units
Apply models to predict specific results and observations (e.g., population growth, effects of infectious organisms).	MT, MM, all STC/MS units
Explain systems by outlining a system's relevant parts and its purpose and/or designing a model that illustrates its function.	All STC/MS units
C. Identify patterns as repeated processes or recurring elements in science and technology.	
Identify different forms of patterns and use them to group and classify specific objects.	HBS, CE, POM, OMM, ES, L
Identify repeating structure patterns.	HBS, CE, POM, ES
Identify and describe patterns that occur in physical systems (e.g., construction, manufacturing, transportation, informational systems and biochemical-related systems).	HBS, CE, POM, EECD
D. Explain scale as a way of relating concepts and ideas to one another by some measure.	
Apply various applications of size and dimensions of scale to scientific, mathematical, and technological applications.	All STC/MS units
Describe scale as a form of ratio and apply to a life situation.	HBS, ES, L
E. Identify change as a variable in describing natural and physical systems.	
Describe fundamental science and technology concepts that could solve practical problems.	EP, MT, MM, TP, all STC/MS units
Explain how ratio is used to describe change.	EMM, OMM, ES, L, EECD
Describe the effect of making a change in one part of a system on the system as a whole.	EP, all STC/MS units
3.2. Inquiry and Design	
3.2.4. GRADE 4	
STC Unit(s)	
A. Identify and use the nature of scientific and technological knowledge.	
Distinguish between a scientific fact and a belief.	Compatible with all STC units
Provide clear explanations that account for observations and results.	All STC units
Relate how new information can change existing perceptions.	All STC units, EC DD, Mw DD, E DD, FC DD
B. Describe objects in the world using the five senses.	

Recognize observational descriptors from each of the five senses (e.g., see-blue, feel-rough).	O, W (STC units never use the sense of taste.)
Use observations to develop a descriptive vocabulary.	Compatible with all STC units
C. Recognize and use the elements of scientific inquiry to solve problems.	
Generate questions about objects, organisms and/or events that can be answered through scientific investigations.	All STC units
Design an investigation.	So, AS, LW, EC, MD, Mw, FC, FS
Conduct an experiment.	All STC units
State a conclusion that is consistent with the information.	All STC units
D. Recognize and use the technological design process to solve problems.	
Recognize and explain basic problems.	CM, S, C, BW, PGD, So, AS, LW, EC, MD, E
Identify possible solutions and their course of action.	CM, S, C, BW, PGD, So, AS, LW, EC, MD, E
Try a solution.	S, C, BW, PGD, So, LW, EC, MD, E
Describe the solution, identify its impacts and modify if necessary.	S, C, BW, PGD, So, LW, EC, MD, E
Show the steps taken and the results.	S, C, BW, PGD, So, LW, EC, MD, E
3.2.7. GRADE 7	STC and/or STC/MS Unit(s)
A. Explain and apply scientific and technological knowledge.	
Distinguish between a scientific theory and a belief.	Compatible with EP, MT, MM, TP, ES, EECD
Answer “What if” questions based on observation, inference or prior knowledge or experience.	EP, MT, MM, TP, all STC/MS units
Explain how skepticism about an accepted scientific explanation led to a new understanding.	All STC/MS units
Explain how new information may change existing theories and practice.	All STC/MS units
B. Apply process knowledge to make and interpret observations.	
Measure materials using a variety of scales.	All STC/MS units
Describe relationships by making inferences and predictions.	EP, MT, MM, TP, all STC/MS units
Communicate, use space/time relationships, define operationally, raise questions, formulate hypotheses, test and experiment.	EP, MT, MM, TP, all STC/MS units
Design controlled experiments, recognize variables, and manipulate variables.	EP, MT, MM, TP, all STC/MS units
Interpret data, formulate models, design models, and produce solutions.	EP, MT, MM, TP, all STC/MS units
C. Identify and use the elements of scientific inquiry to solve problems.	
Generate questions about objects, organisms and/or events that can be answered through scientific investigations.	EP, MT, MM, TP, all STC/MS units

Evaluate the appropriateness of questions.	All STC/MS units
Design an investigation with limited variables to investigate a question.	EP, MT, MM, TP, all STC/MS units
Conduct a two-part experiment.	EP, MT, MM, TP, all STC/MS units
Judge the significance of experimental information in answering the question.	All STC/MS units
Communicate appropriate conclusions from the experiment.	EP, MT, MM, TP, all STC/MS units
D. Know and use the technological design process to solve problems.	
Define different types of problems.	HBS, CE, EMM, ES, L, EECD
Define all aspects of the problem, necessary information and questions that must be answered.	HBS, CE, EMM, ES, L, EECD
Propose the best solution.	HBS, CE, EMM, ES, L, EECD
Design and propose alternative methods to achieve solutions.	HBS, CE, EMM, ES, L, EECD
Apply a solution.	HBS, CE, EMM, ES, L, EECD
Explain the results, present improvements, identify and infer the impacts of the solution.	HBS, CE, EMM, ES, L, EECD
3.3. Biological Sciences	
3.3.4. GRADE 4	
STC Unit(s)	
A. Know the similarities and differences of living things.	
Identify life processes of living things (e.g., growth, digestion, react to environment).	O, LCB, S, PGD, AS, AS DD, Mw, Mw DD, E, E DD
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.	O, LCB, PGD, AS, AS DD, Mw, Mw DD, E, E DD
Describe basic needs of plants and animals.	O, LCB, S, PGD, AS, AS DD, Mw, Mw DD, E, E DD
B. Know that living things are made up of parts that have specific functions.	
Identify examples of unicellular and multicellular organisms.	Mw, Mw DD, E
Determine how different parts of a living thing work together to make the organism function.	O, LCB, S, PGD, AS, AS DD, Mw, E
C. Know that characteristics are inherited and, thus, offspring closely resemble their parents.	
Identify characteristics for animal and plant survival in different climates.	AS, LW
Identify physical characteristics that appear in both parents and offspring and differ between families, strains or species.	LCB, PGD, E (families, strains or species not included)
D. Identify changes in living things over time.	
Compare extinct life forms with living organisms.	
3.3.7. GRADE 7	
STC and/or STC/MS Unit(s)	
A. Describe the similarities and differences that characterize diverse living things.	

Describe how the structures of living things help them function in unique ways.	EP, HBS (human only), OMM, L
Explain how to use a dichotomous key to identify plants and animals.	OMM
Account for adaptations among organisms that live in a particular environment.	OMM, L
B. Describe the cell as the basic structural and functional unit of living things.	
Identify the levels of organization from cell to organism.	HBS (human only), OMM
Compare life processes at the organism level with life processes at the cell level.	OMM
Explain that cells and organisms have particular structures that underlie their functions.	HBS (human only), OMM
Describe and distinguish among cell cycles, reproductive cycles and life cycles.	OMM
Explain disease effects on structures or functions of an organism.	HBS (human only)
C. Know that every organism has a set of genetic instructions that determines its inherited traits.	
Identify and explain inheritable characteristics.	OMM
Identify that the gene is the basic unit of inheritance.	OMM
Identify basic patterns of inheritance (e.g., dominance, recessive, co-dominance).	OMM
Describe how traits are inherited.	OMM
Distinguish how different living things reproduce (e.g., vegetative budding, sexual).	OMM
Recognize that mutations can alter a gene.	OMM
Describe how selective breeding, natural selection and genetic technologies can change genetic makeup of organisms.	OMM
D. Explain basic concepts of natural selection.	
Identify adaptations that allow organisms to survive in their environment.	OMM, ES, L
Describe how an environmental change can affect the survival of organisms and entire species.	OMM, ES
Know that differences in individuals of the same species may give some advantage in surviving and reproducing.	OMM
Recognize that populations of organisms can increase rapidly.	OMM
Describe the role that fossils play in studying the past.	CE, ES
Explain how biologic extinction is a natural process inherited and expressed.	OMM, ES
3.4. Physical Science, Chemistry and Physics	
3.4.4. GRADE 4	
STC Unit(s)	
A. Recognize basic concepts about the structure and properties of matter.	
Describe properties of matter (e.g., hardness, reactions to simple chemical tests).	O, W, SL, CM, LCB, S, C, BW, PGD, RM, CT, AS, LW, E, FC, FS
Know that combining two or more substances can make new materials with different properties.	SL, C, CT
Know different material characteristics (e.g., texture, state of matter, solubility).	SL, S, C, BW, RM, CT

B. Know basic energy types, sources and conversions.	
Identify energy forms and examples (e.g., sunlight, heat, stored, motion).	W, C, CT, LW, EC, MD
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.	EC DD (attraction and repulsion not included)
Apply knowledge of the basic electrical circuits to design and construct simple direct current circuits.	EC
Classify materials as conductors and nonconductors.	EC
Know and demonstrate the basic properties of heat by producing it in a variety of ways.	
Know the characteristics of light (e.g., reflection, refraction, absorption) and use them to produce heat, color or a virtual image.	Mw
C. Observe and describe different types of force and motion.	
Identify characteristics of sound (pitch, loudness and echoes).	So
Recognize forces that attract or repel other objects and demonstrate them.	SL, RM
Describe various types of motions.	SL, BW, So, MD, MD DD, FS, FS DD
Compare the relative movement of objects and describe types of motion that are evident.	SL, BW, So, MD, MD DD, FS, FS DD
Describe the position of an object by locating it relative to another object or the background (e.g., geographic direction, left, up).	BW
D. Describe the composition and structure of the universe and the earth's place in it.	
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).	
3.4.7. GRADE 7	STC and/or STC/MS Unit(s)
A. Describe concepts about the structure and properties of matter.	
Identify elements as basic building blocks of matter that cannot be broken down chemically.	POM
Distinguish compounds from mixtures.	
Describe and conduct experiments that identify chemical and physical properties.	MM, TP, POM
Describe reactants and products of simple chemical reactions.	POM
B. Relate energy sources and transfers to heat and temperature.	
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.	CE, ES, L
Explain the conversion of one form of energy to another by applying knowledge of each form of energy.	MM, MM DD, all STC/MS units
Explain the parts and functions in an electrical circuit.	MM, EMM, EECD
C. Identify and explain the principles of force and motion.	
Describe the motion of an object based on its position, direction and speed.	MT, MM, EMM
Classify fluid power systems according to fluid used or mode of power transmission (e.g., air, oil).	
Explain various motions using models.	MT, HBS, CE, EMM, ES, L, EECD
Explain how convex and concave mirrors and lens change light images.	L
Explain how sound and light travel in waves of differing speeds, sizes and frequencies.	L (light only)
D. Describe essential ideas about the composition and structure of the universe and the earth's place in it.	
Compare various planets' characteristics.	ES
Describe basic star types and identify the sun as a star type.	ES (sun as a star type only)
Describe and differentiate comets, asteroids and meteors.	ES
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.	EMM (sun and earth only), ES
Illustrate how the positions of stars and constellations change in relation to the Earth during an evening and from month to month.	ES
Identify equipment and instruments that explore the universe.	EMM, ES, L, EECD
Identify the accomplishments and contributions provided by selected past and present scientists in the field of astronomy.	ES, L
Identify and articulate space program efforts to investigate possibilities of living in space and on other planets.	ES
3.5. Earth Sciences	
3.5.4. GRADE 4	
STC Unit(s)	
A. Know basic landforms and earth history.	
Describe earth processes (e.g., rusting, weathering, erosion) that have affected selected physical features in students' neighborhoods.	RM, LW, LW DD
Identify various earth structures (e.g., mountains, faults, drainage basins) through the use of models.	LW
Identify the composition of soil as weathered rock and decomposed organic remains.	S, LW, E
Describe fossils and the type of environment they lived in (e.g., tropical, aquatic, desert).	
B. Know types and uses of earth materials.	
Identify uses of various earth materials (e.g., buildings, highways, fuels, growing plants).	S, PGD, RM, LW

Identify and sort earth materials according to a classification key (e.g., soil/ rock type).	S, RM
C. Know basic weather elements.	
Identify cloud types.	W
Identify weather patterns from data charts (including temperature, wind direction and speed, precipitation) and graphs of the data.	W
Explain how the different seasons effect plants, animals, food availability and daily human life.	
D. Recognize the earth's different water resources.	
Know that approximately three-fourths of the earth is covered by water.	LW
Identify and describe types of fresh and salt-water bodies.	LW
Identify examples of water in the form of solid, liquid and gas on or near the surface of the earth.	LW
Explain and illustrate evaporation and condensation.	C, LW
Recognize other resources available from water (e.g., energy, transportation, minerals, food).	W, LW
3.5.7. GRADE 7	STC and/or STC/MS Unit(s)
A. Describe earth features and processes.	
Describe major layers of the earth.	CE
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.	CE, ES
Describe the processes that formed Pennsylvania geologic structures and resources including mountains, glacial formations, water gaps and ridges.	CE (extension only)
Explain how the rock cycle affected rock formations in the state of Pennsylvania.	CE (extension only)
Distinguish between examples of rapid surface changes (e.g., landslides, earthquakes) and slow surface changes (e.g., weathering).	CE
Identify living plants and animals that are similar to fossil forms.	ES
B. Recognize earth resources and how they affect everyday life.	
Identify and locate significant earth resources (e.g., rock types, oil, gas, coal deposits) in Pennsylvania.	TP (Pennsylvania not included)
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).	CE, POM, EMM
Compare the locations of human settlements as related to available resources.	
C. Describe basic elements of meteorology.	
Explain weather forecasts by interpreting weather data and symbols.	CE
Explain the oceans' impact on local weather and the climate of a region.	CE

Identify how cloud types, wind directions and barometric pressure changes are associated with weather patterns in different regions of the country.	CE
Explain and illustrate the processes of cloud formation and precipitation.	CE
Describe and illustrate the major layers of the earth's atmosphere.	CE, ES (describe only)
Identify different air masses and global wind patterns and how they relate to the weather patterns in different regions of the U. S.	CE
D. Explain the behavior and impact of the earth's water systems.	
Explain the water cycle using the processes of evaporation and condensation.	CE
Describe factors that affect evaporation and condensation.	CE
Distinguish salt from fresh water (e.g., density, electrical conduction).	OMM (polluted only)
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).	
3.6. Technology Education	
3.6.4. GRADE 4	STC Unit(s)
A. Know that biotechnologies relate to propagating, growing, maintaining, adapting, treating and converting.	
Identify agricultural and industrial production processes that involve plants and animals.	E, E DD
Identify waste management treatment processes.	E DD
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).	Mw DD
B. Know that information technologies involve encoding, transmitting, receiving, storing, retrieving and decoding.	
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.	O, W, SL, CM, LCB, S, C, BW, PGD, RM, CT (extensions only), So, AS, LW, EC, MD, Mw, E, FC (extensions only)
C. Know physical technologies of structural design, analysis and engineering, finance, production, marketing, research and design.	
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.	MD
Identify examples of manufactured goods present in the home and school.	MD, MD DD, FC, FC DD, FS DD
Identify basic resources needed to produce a manufactured item.	MD
Identify basic component operations in a specific manufacturing enterprise (e.g., cutting, shaping, attaching).	MD
Identify waste and pollution resulting from a manufacturing enterprise.	E
Explain and demonstrate the concept of manufacturing (e.g., assemble a set of papers or ball point pens sequentially, mass produce an object).	MD
Identify transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting.	MD
Identify and experiment with simple machines used in transportation systems.	MD
Explain how improved transportation systems have changed society.	
3.6.7. GRADE 7	STC and/or STC/MS Unit(s)
A. Explain biotechnologies that relate to related technologies of propagating, growing, maintaining, adapting, treating and converting.	
Identify the environmental, societal and economic impacts that waste has in the environment.	POM, EMM, OMM, L, EECD
Identify and explain the impact that a specific medical advancement has had on society.	MM DD, HBS, OMM
Explain the factors that were taken into consideration when a specific object was designed.	TP, CE, POM, EMM, ES, L, EECD
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.	EP, OMM (plant only)
Explain the impact that agricultural science has had on biotechnology.	
B. Explain information technologies of encoding, transmitting, receiving, storing, retrieving and decoding.	
Demonstrate the effectiveness of image generating technique to communicate a story (e.g., photography, video).	L
Analyze and evaluate the effectiveness of a graphic object designed and produced to communicate a thought or concept.	Compatible with HBS, POM, OMM, ES, L
Apply basic technical drawing techniques to communicate an idea or solution to a problem.	TP, OMM, EECD
Apply the appropriate method of communications technology to communicate a thought.	EP, MT, MM, TP, all STC/MS units
C. Explain physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design.	
Use knowledge of material effectiveness to solve specific construction problems (e.g., steel vs. wood bridges).	CE, POM, EECD
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).	POM
Evaluate a construction activity by specifying task analyses and necessary resources.	
Explain the relationships among the basic resources needed in the production process for a specific manufactured object.	POM, L
Explain the difference between design engineering and production engineering processes.	
Analyze manufacturing steps that affect waste and pollutants.	POM
Explain transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting.	EMM (propelling only)
Identify and explain the workings of several mechanical power systems.	EMM
Model and explain examples of vehicular propulsion, control, guidance, structure and suspension systems.	EMM (propulsion only)
Explain the limitations of land, marine, air and space transportation systems.	
3.7. Technological Devices	
Computer literacy, including the use of hardware and software in standard statements C, D, and E, should be integrated across all content areas.	
3.7.4. GRADE 4	STC Unit(s)
A. Explore the use of basic tools, simple materials and techniques to safely solve problems.	
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.	All STC units
B. Select appropriate instruments to study materials.	
Develop simple skills to measure, record, cut and fasten.	All STC units
Explain appropriate instrument selection for specific tasks.	All STC units
C. Identify basic computer operations and concepts.	
Identify the major parts necessary for a computer to input and output data.	All STC units are compatible with this standard; however, STC does not require the use of computers.
Explain and demonstrate the basic use of input and output devices (e.g., keyboard, monitor, printer mouse).	All STC units are compatible with this standard; however, STC does not require the use of computers.
Explain and demonstrate the use of external and internal storage devices (e.g., disk drive, CD drive).	All STC units are compatible with this standard; however, STC does not require the use of computers.

D. Use basic computer software.	
Apply operating system skills to perform basic computer tasks.	
Apply basic word processing skills.	All STC units are compatible with this standard; however, STC does not require the use of computers.
Identify and use simple graphic and presentation graphic materials generated by the computer.	All STC units are compatible with this standard; however, STC does not require the use of computers.
Apply specific instructional software.	All STC units are compatible with this standard; however, STC does not require the use of computers.
E. Identify basic computer communications systems.	
Apply a web browser.	All STC units are compatible with this standard; however, STC does not require the use of computers.
Apply basic electronic mail functions.	All STC units are compatible with this standard; however, STC does not require the use of computers.
Use on-line searches to answer age appropriate questions.	All STC units are compatible with this standard; however, STC does not require the use of computers.
3.7.7. GRADE 7	STC and/or STC/MS Unit(s)
A. Describe the safe and appropriate use of tools, materials and techniques to answer questions and solve problems.	
Identify uses of tools, machines, materials, information, people, money, energy and time that meet specific design criteria.	EP, MT, MM, TP, all STC/MS units
Describe safe procedures for using tools and materials.	All STC and STC/MS units
Assess materials for appropriateness of use.	All STC and STC/MS units
B. Use appropriate instruments and apparatus to study materials.	
Select appropriate instruments to measure the size, weight, shape and temperature of living and non-living objects.	All STC and STC/MS units
Apply knowledge of different measurement systems to measure and record objects' properties.	EP, MT, MM, TP, all STC/MS units
C. Explain and demonstrate basic computer operations and concepts.	
Know specialized computer applications used in the community.	CE, POM, ES, L, EECD
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.	All STC and STC/MS units are compatible with this standard; however, STC and STC/MS do not require the use of computers.
D. Apply computer software to solve specific problems.	
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.	
E. Explain basic computer communications systems.	
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.	All STC and STC/MS units are compatible with this standard; however, STC and STC/MS do not require the use of computers.
3.8. Science, Technology and Human Endeavors	
3.8.4. GRADE 4	STC Unit(s)
A. Know that people select, create and use science and technology and is limited by social and physical restraints.	
Identify and describe positive and negative impacts that influence or result from new tools and techniques.	So, LW, EC DD, Mw, E, E DD
Identify how physical technology (e.g., construction, manufacturing, transportation, informational technology and biotechnology) are used to meet human needs.	MD
Describe how scientific discoveries and technological advancements are related.	EC DD, MD DD, Mw DD
Identify interrelationships among technology, people and their world.	So, EC DD, MD DD, Mw DD, E, E DD, FS DD
Apply the technological design process to solve a simple problem.	CM, C, BW, So, EC, MD, FS
B. Know how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.	
Identify and distinguish between human needs and improving the quality of life.	So, EC, MD, E, FC

Identify and distinguish between natural and human-made resources.	O, W, PGD, RM, CT, AS, LW, EC DD, Mw, Mw DD, E, E DD, FC, FC DD, FS DD
Describe a technological invention and the resources that were used to develop it.	MD, FS DD
C. Know the pros and cons of possible solutions to scientific and technological problems in society.	
Compare the positive and negative expected and unexpected impacts of technological change.	So, LW, EC DD, E, E DD
Identify and discuss examples of technological change in the community that have both positive and negative impacts.	So, LW, EC DD, E, E DD
3.8.7. GRADE 7	STC and/or STC/MS Unit(s)
A. Explain how sciences and technologies are limited in their effects and influences on society.	
Identify and describe the unavoidable constraints of technological design.	TP, all STC/MS units
Identify changes in society as a result of a technological development.	EP, MT, MM, TP, all STC/MS units
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.	All STC/MS units
B. Explain how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.	
Identify interrelationships between systems and resources.	EP, all STC/MS units
Identify and describe the resources necessary to solve a selected problem in a community and improve the quality of life.	CE
Identify and explain specific examples of how agricultural science has met human needs and has improved the quality of life.	OMM
C. Identify the pros and cons of applying technological and scientific solutions to address problems and the effect upon society.	
Describe the positive and negative expected and unexpected effects of specific technological developments.	All STC/MS units
Describe ways technology extends and enhances human abilities.	All STC/MS units
4.1. Watersheds and Wetlands	
4.1.4. GRADE 4	STC Unit(s)
A. Identify various types of water environments.	
Identify the lotic system (e.g., creeks, rivers, streams).	
Identify the lentic system (e.g., ponds, lakes, swamps).	
B. Explain the difference between moving and still water.	
Explain why water moves or does not move.	LW (why water moves only)
Identify types of precipitation.	W, LW
C. Identify living things found in water environments.	
Identify fish, insects and amphibians that are found in fresh water.	O, AS, AS DD, E

Identify plants found in fresh water.	O, AS, E
D. Identify a wetland and the plants and animals found there.	
Identify different kinds of wetlands.	
Identify plants and animals found in wetlands.	
Explain wetlands as habitats for plants and animals.	
E. Recognize the impact of watersheds and wetlands on animals and plants.	
Explain the role of watersheds in everyday life.	LW, E
Identify the role of watersheds and wetlands for plants and animals.	
4.1.7. GRADE 7	STC and/or STC/MS Unit(s)
A. Explain the role of the water cycle within a watershed.	
Explain the water cycle.	CE
Explain the water cycle as it relates to a watershed.	
B. Understand the role of the watershed.	
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.	
C. Explain the effects of water on the life of organisms in a watershed.	
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.	OMM (extension only)
Describe the life cycle of organisms that depend on water.	OMM
Identify organisms that have aquatic stages of life and describe those stages.	OMM
D. Explain and describe characteristics of a wetland.	
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.	
E. Describe the impact of watersheds and wetlands on people.	
Explain the impact of watersheds and wetlands in flood control, wildlife habitats and pollution abatement.	
Explain the influence of flooding on wetlands.	
4.3. Environmental Health	
4.3.4. GRADE 4	STC Unit(s)

A. Know that plants, animals and humans are dependent on air and water.	
Know that all living things need air and water to survive.	O, LCB, S, PGD, AS, LW, E
Describe potentially dangerous pest controls used in the home.	
Identify things that cause sickness when put into the air, water or soil.	E, E DD
Identify different areas where health can be affected by air, water or land pollution.	E, E DD
Identify actions that can prevent or reduce waste pollution.	E, E DD
B. Identify how human actions affect environmental health.	
Identify pollutants.	LW, E
Identify sources of pollution.	E, E DD
Identify litter and its effect on the environment.	LW (effect on the environment not included)
Describe how people can reduce pollution.	E, E DD
C. Understand that the elements of natural systems are interdependent.	
Identify some of the organisms that live together in an ecosystem.	E
Understand that the component of a system all play a part in a healthy natural system.	LW, E
Identify the effects of a healthy environment on the ecosystem.	E
4.3.7. GRADE 7	STC and/or STC/MS Unit(s)
A. Identify environmental health issues.	
Identify various examples of long-term pollution and explain their effects on environmental health.	POM, ES
Identify diseases that have been associated with poor environmental quality.	HBS, POM
Describe different types of pest controls and their effects on the environment.	OMM
Identify alternative products that can be used in life to reduce pollution.	POM, EMM, EECD
B. Describe how human actions affect the health of the environment.	
Identify land use practices and their relation to environmental health.	
Explain how natural disasters affect environmental health.	CE, ES
Identify residential and industrial sources of pollution and their effects on environmental health.	POM, ES
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.	TP
C. Explain biological diversity.	
Explain the complex, interactive relationships among members of an ecosystem.	OMM
Explain how diversity affects ecological integrity of the natural resources.	

4.6. Ecosystems and their Interactions	
4.6.4. GRADE 4	STC Unit(s)
A. Understand that living things are dependent on nonliving things in the environment for survival.	
Identify and categorize living and nonliving things.	O, LCB, S, PGD, AS, Mw, E
Describe the basic needs of an organism.	O, LCB, S, PGD, AS, E
Identify basic needs of a plant and an animal and explain how their needs are met.	O, LCB, S, PGD, AS, E
Identify plants and animals with their habitat and food sources.	O, LCB, S, AS, LW, E
Identify environmental variables that affect plant growth.	PGD
Describe how animals interact with plants to meet their needs for shelter.	O, AS, E
Describe how certain insects interact with soil for their needs.	O, S
Understand the components of a food chain.	E
Identify a local ecosystem and its living and nonliving components.	E, E DD
Identify a simple ecosystem and its living and nonliving components.	E
Identify common soil textures.	S
Identify animals that live underground.	S
B. Understand the concept of cycles.	
Explain the water cycle.	LW, E DD
Explain the carbon dioxide/oxygen cycle (photosynthesis).	E
C. Identify how ecosystems change over time.	
4.6.7. GRADE 7	STC and/or STC/MS Unit(s)
A. Explain the flows of energy and matter from organism to organism within an ecosystem.	
Identify and explain the characteristics of biotic and abiotic.	OMM
Describe and explain the adaptations of plants and animals to their environment.	HBS (humans only), OMM, L (eyes only)
Demonstrate the dependency of living components in the ecosystem on the nonliving components.	OMM
Explain energy flow through a food web.	OMM
Explain the importance of the predator/prey relationship and how it maintains the balances within ecosystems.	OMM
Understand limiting factors and predict their effects on an organism.	OMM (plant only)
Identify niches for producers, consumers and decomposers within an ecosystem.	OMM
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.	OMM
Explain how different soil types determine the characteristics of ecosystems.	
B. Explain the concepts of cycles.	
Identify and explain cycles within an ecosystem.	
Analyze the role of different cycles within an ecosystem.	
C. Explain how ecosystems change over time.	
Explain how ecosystems change.	OMM
Identify the succession stages of a given ecosystem.	OMM
Explain how specific organisms may change an ecosystem.	OMM
Explain a change in an ecosystem that relates to humans.	OMM
4.8. Humans and the Environment	
4.8.4. GRADE 4	
STC Unit(s)	
A. Identify the biological requirements of humans.	
Explain how a dynamically changing environment provides for sustainability of living systems.	AS, LW, E
Identify several ways that people use natural resources.	S, PGD, RM, LW, EC, MD, E, FS
B. Know that environmental conditions influence where and how people live.	
Identify how regional natural resources influence what people use.	
Explain the influence of climate on how and where people live.	
C. Explain how human activities may change the environment.	
Identify everyday human activities and how they affect the environment.	LW, E, E DD
Identify examples of how human activities within a community affect the natural environment.	LW, E, E DD
D. Know the importance of natural resources in daily life.	
Identify items used in daily life that come from natural resources.	S
Identify ways to conserve our natural resources.	S
Identify major land uses in the community.	LW, E
4.8.7. GRADE 7	
STC and/or STC/MS Unit(s)	
A. Describe how the development of civilization relates to the environment.	
Explain how people use natural resources in their environment.	TP, POM, EMM, EECD
Locate and identify natural resources in different parts of the world.	TP
Compare and contrast how people use natural resources throughout the world.	TP, EECD
B. Explain how people use natural resources.	
Describe how natural resources are used for survival.	POM, EMM, EECD
Explain how natural resources and technological changes have affected the development of civilizations.	CE, POM, EMM, ES, L, EECD

Explain how climate and extreme weather events (e.g., drought, flood) influence people's lives.	CE
C. Explain how human activities may affect local, regional and national environments.	
Describe what effect consumption and related generation of wastes have on the environment.	POM, ES
Explain how a particular human activity has changed the local area over the years.	
D. Explain the importance of maintaining the natural resources at the local, state and national levels.	
Explain how human activities and natural events have affected ecosystems.	POM, OMM, ES
Explain how conservation practices have influenced ecosystems.	
Define the roles of Pennsylvania agencies that deal with natural resources.	