SRA Life, Earth, and Physical Science Laboratories
correlation to
Pennsylvania Academic Standards for Science and Technology
Grades 6-8

SRA Life, Earth, and Physical Science Laboratories provide core science content in an alternate reading format. Each *SRA Science Lab* contains 180 Science Cards covering key science concepts and vocabulary. Each lab covers 90 different science topics presented at two different reading levels to meet varied student abilities. The *Teacher's Handbook* includes hands-on inquiry activities as well as vocabulary building exercises. The *Classroom Resource CD-ROM* includes Writing Strategies in Science along with tests and vocabulary games.

3.1. Unifying Themes of Science

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

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).**
- **Explain the importance of order in a system.**
- **Distinguish between systems inputs, systems processes and system outputs.**
- **Distinguish between open loop and closed loop systems.**
- **Apply systems analysis to solve problems.**

Life Science Lab, Level A: Cards 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90
Life Science Lab, Level B: Cards 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells*, pages 77-79; Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91; Hands-On Activity 6, *How Much Does Energy Cost?*, pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103

Earth Science Lab, Level A: Cards 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90
Earth Science Lab, Level B: Cards 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90
Earth Science Lab Teacher's Handbook: Hands-On Activity 1, *Identifying Minerals with the Mohs Scale*, pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action*, pages 77-79; Hands-On Activity 4, *Using Sound Waves*, pages 85-87; Hands-On Activity 6, *Modeling a Tornado*, pages 93-95; Hands-On Activity 8, *Temperature, Salinity, and Water Density*, pages 101-103

Physical Science Lab, Level A: Cards 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90
Physical Science Lab, Level B: Cards 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90
Physical Science Lab Teacher's Handbook: Hands-On Activity 1, *Measuring pH of Acids and Bases*, pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83; Hands-On Activity 3, *Energy Conversion*, pages 85-87; Hands-On Activity 4, *Reducing Friction*, pages 89-91; Hands-On Activity 5, *Making a Potato Battery*, pages 93-95; Hands-On Activity 6, *Making Sound*, pages 97-99

3.1. Unifying Themes of Science

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

B. Describe the use of models as an application of scientific or technological concepts.

- **Identify and describe different types of model and their functions.**
- **Apply models to predict scientific 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 functions.**

Life Science Lab Teacher's Handbook: Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91; Hands-On Activity 5, *Making Fossils*, pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?*, pages 97-99

Earth Science Lab Teacher's Handbook: Hands-On Activity 7, *Sizes in the Solar System*, pages 97-99

Physical Science Lab Teacher's Handbook: Hands-On Activity 5, *Making a Potato Battery*, pages 93-95; Hands-On Activity 6, *Making Sound*, pages 97-99

Classroom Resource CD-ROM: Writing Strategy 20

3.1. Unifying Themes of Science

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

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.**
- **Identify repeating structure patterns.**
- **Identify and describe patterns that occur in physical systems (e.g., construction, manufacturing, transportation), informational systems and biochemical-related systems.**

Life Science Lab, Level A: Cards 17, 42, 63, 76, 78, 79
Life Science Lab, Level B: Cards 17, 42, 63, 76, 78, 79

Earth Science Lab, Level A: Cards 9, 47, 55, 62, 64, 65, 66, 68
Earth Science Lab, Level B: Cards 9, 47, 55, 62, 64, 65, 66, 68

Physical Science Lab, Level A: Cards 17, 18, 19, 20, 21, 22, 23, 24, 25, 44, 48, 56
Physical Science Lab, Level B: Cards 17, 18, 19, 20, 21, 22, 23, 24, 25, 44, 48, 56

3.1. Unifying Themes of Science

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

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.**
- **Describe scale as a form of ratio and apply to a life situation.**

Life Science Lab, Level A: Cards 5, 44
Life Science Lab, Level B: Cards 5, 44
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells*, pages 77-79

Earth Science Lab, Level A: Cards 1, 18, 19, 20, 32, 74
Earth Science Lab, Level B: Cards 1, 18, 19, 20, 32, 74
Earth Science Lab Teacher's Handbook: Hands-On Activity 3, *Interpreting a Topographic Map*, pages 81-83; Hands-On Activity 7, *Sizes in the Solar System*, pages 97-99

Physical Science Lab, Level A: Cards 3, 4
Physical Science Lab, Level B: Cards 3, 4

3.1. Unifying Themes of Science
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
E. Identify change as a variable in describing natural and physical systems. • **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.**
Life Science Lab, Level A: Cards 8, 9, 10, 13, 24, 34, 42, 43, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 62, 63, 64, 65, 66, 72, 76, 77, 78, 79, 80, 84, 86, 87, 88, 89, 90 **Life Science Lab, Level B:** Cards 8, 9, 10, 13, 24, 34, 42, 43, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 62, 63, 64, 65, 66, 72, 76, 77, 78, 79, 80, 84, 86, 87, 88, 89, 90 **Life Science Lab Teacher's Handbook:** Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab, Level A:** Cards 10, 11, 12, 13, 14, 15, 17, 22, 24, 25, 26, 27, 28, 29, 37, 42, 52, 53, 54, 59, 60, 61, 86 **Earth Science Lab, Level B:** Cards 10, 11, 12, 13, 14, 15, 17, 22, 24, 25, 26, 27, 28, 29, 37, 42, 52, 53, 54, 59, 60, 61, 86 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 5, *What is in the Air?*, pages 89-91; Hands-On Activity 6, *Modeling a Tornado,* pages 93-95 **Physical Science Lab, Level A:** Cards 5, 6, 7, 27, 29, 30, 45, 46, 47, 48, 49, 56, 58, 68, 69, 70, 76, 77, 80, 85, 86, 87 **Physical Science Lab, Level B:** Cards 5, 6, 7, 27, 29, 30, 45, 46, 47, 48, 49, 56, 58, 68, 69, 70, 76, 77, 80, 85, 86, 87 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 5, *Making a Potato Battery*, pages 93-95; Hands-On Activity 6, *Making Sound,* pages 97-99

3.2. Inquiry and Design
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
A. Explain and apply scientific and technological knowledge. • **Distinguish between a scientific theory and a belief.** • **Answer "What if" questions based on observation, inferences 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.**
Life Science Lab, Level A: Cards 5, 64, 69 **Life Science Lab, Level B:** Cards 5, 64, 69 **Earth Science Lab, Level A:** Cards 10, 68, 72, 78 **Earth Science Lab, Level B:** Cards 10, 68, 72, 78 **Physical Science Lab, Level A:** Cards 3, 53, 59 **Physical Science Lab, Level B:** Cards 3, 53, 59

3.2. Inquiry and Design

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

B. Apply process knowledge to make and interpret observations.

- **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.**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

Earth Science Lab Teacher's Handbook: Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action,* pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 4, *Using Sound Waves,* pages 85-87; Hands-On Activity 5, *What is in the Air?,* pages 89-91; Hands-On Activity 6, *Modeling a Tornado,* pages 93-95; Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103

Physical Science Lab Teacher's Handbook: Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 5, *Making a Potato Battery,* pages 93-95; Hands-On Activity 6, *Making Sound,* pages 97-99

Classroom Resource CD-ROM: Writing Strategy 8, 15, 17, 20, 22, 23, 24

3.2. Inquiry and Design

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

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.**
- **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.**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

Earth Science Lab Teacher's Handbook: Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action,* pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 4, *Using Sound Waves,* pages 85-87; Hands-On Activity 5, *What is in the Air?,* pages 89-91; Hands-On Activity 6, *Modeling a Tornado,* pages 93-95; Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103

Physical Science Lab Teacher's Handbook: Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 5, *Making a Potato Battery,* pages 93-95; Hands-On Activity 6, *Making Sound,* pages 97-99

Classroom Resource CD-ROM: Writing Strategy 1, 5, 8, 11, 15, 18, 23

3.2. Inquiry and Design
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
D. Know and use the technological design process to solve problems. • **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.**
This concept is not covered at this level.

3.3. Biological Sciences
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
A. Describe the similarities and differences that characterize diverse living things. • **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.**
Life Science Lab, Level A: Cards 2, 3, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43 **Life Science Lab, Level B:** Cards 2, 3, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43 **Life Science Lab Teacher's Handbook:** Hands-On Activity 2, *Culturing Bacteria*, pages 81-83; Hands-On Activity 3, *Investigating Arthropods*, pages 85-87

3.3. Biological Sciences
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
B. Describe the cell as the basic structural and functional unit of living things. • **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.**
Life Science Lab, Level A: Cards 5, 6, 7, 8, 9, 10, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58 **Life Science Lab, Level B:** Cards 5, 6, 7, 8, 9, 10, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58 **Life Science Lab Teacher's Handbook:** Hands-On Activity 1, *Examining Cells*, pages 77-79; Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91

3.3. Biological Sciences
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
C. Know that every organism has a set of genetic instructions that determines its inherited traits. • **Identify and explain inheritable characteristics.** • **Identify that the gene is the basic unit of inheritance.** • **Identify basic patterns of inheritance (e.g., dominance, recessive, co-dominance).** • **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 and genetic technologies can change genetic makeup of organisms.**
Life Science Lab, Level A: Cards 58, 60, 61, 62, 63, 64, 65, 66 **Life Science Lab, Level B:** Cards 58, 60, 61, 62, 63, 64, 65, 66

3.3. Biological Sciences

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

D. Explain basic concepts of natural selection.

- **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.**

Life Science Lab, Level A: Cards 23, 24, 36, 41, 43, 65, 66, 67, 68, 72, 84, 86, 87, 88, 89, 90
Life Science Lab, Level B: Cards 23, 24, 36, 41, 43, 65, 66, 67, 68, 72, 84, 86, 87, 88, 89, 90
Life Science Lab Teacher's Handbook: Hands-On Activity 3, *Investigating Arthropods*, pages 85-87; Hands-On Activity 5, *Making Fossils*, pages 93-95

3.4. Physical Science, Chemistry, and Physics

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

A. Describe concepts about the structure and properties of matter.

- **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.**

Physical Science Lab, Level A: Cards 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 27, 28, 29, 30
Physical Science Lab, Level B: Cards 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 27, 28, 29, 30
Physical Science Lab Teacher's Handbook: Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83

3.4. Physical Science, Chemistry, and Physics

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

B. Relate energy sources and transfers to beat 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.**
- **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.**

Physical Science Lab, Level A: Cards 34, 36, 37, 38, 39, 40, 41, 42, 45, 46, 47, 48, 49, 66, 67, 68, 69, 79, 80, 81, 82, 83, 85
Physical Science Lab, Level B: Cards 34, 36, 37, 38, 39, 40, 41, 42, 45, 46, 47, 48, 49, 66, 67, 68, 69, 79, 80, 81, 82, 83, 85
Physical Science Lab Teacher's Handbook: Hands-On Activity 3, *Energy Conversion*, pages 85-87; Hands-On Activity 5, *Making a Potato Battery*, pages 93-95; Hands-On Activity 6, *Making Sound*, pages 97-99

3.4. Physical Science, Chemistry, and Physics

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

C. Identify and explain the principles of force and motion.

- **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.**

Physical Science Lab, Level A: Cards 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 81, 85, 86, 87, 89
Physical Science Lab, Level B: Cards 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 81, 85, 86, 87, 89
Physical Science Lab Teacher's Handbook: Hands-On Activity 4, *Reducing Friction*, pages 89-91

3.4. Physical Science, Chemistry, and Physics

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

D. Describe essential ideas about the composition and structure of the universe and the earth's place in it.

- **Compare various planets' composition.**
- **Describe basic 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.**
- **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.**

Earth Science Lab, Level A: Cards 67, 68, 69, 70, 71, 72, 73, 75, 76, 79, 80, 81
Earth Science Lab, Level B: Cards 67, 68, 69, 70, 71, 72, 73, 75, 76, 79, 80, 81
Earth Science Lab Teacher's Handbook: Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99

Physical Science Lab, Level A: Cards 57, 59
Physical Science Lab, Level B: Cards 57, 59

3.5. Earth Sciences

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

A. Describe earth features and processes.

- **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 (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.**
- **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.**

Life Science Lab, Level A: Card 67
Life Science Lab, Level B: Card 67
Life Science Lab Teacher's Handbook: Hands-On Activity 5, *Making Fossils,* pages 93-95

Earth Science Lab, Level A: Cards 1, 2, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 21, 22, 24, 25, 26, 27, 28, 33, 34
Earth Science Lab, Level B: Cards 1, 2, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 21, 22, 24, 25, 26, 27, 28, 33, 34
Earth Science Lab Teacher's Handbook: Hands-On Activity 2, *Plate Boundaries in Action,* pages 77-79

3.5. Earth Sciences
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
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.** • **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.**
Earth Science Lab, Level A: Cards 3, 5, 35, 82, 90 **Earth Science Lab, Level B:** Cards 3, 5, 35, 82, 90 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale*, pages 73-75 **Physical Science Lab, Level A:** Card 38 **Physical Science Lab, Level B:** Card 38

3.5. Earth Sciences
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
C. Describe basic elements of meteorology. • **Explain weather forecasts by interpreting weather data and symbols.** • **Explain the oceans' impact on local weather and 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.**
Earth Science Lab, Level A: Cards 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61 **Earth Science Lab, Level B:** Cards 36, 37, 38,3 9, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 5, *What is in the Air?*, pages 89-91; Hands-On Activity 6, *Modeling a Tornado*, pages 93-95

3.5. Earth Sciences
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
D. Explain the behavior and impact of the earth's water system. • **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).**
Earth Science Lab, Level A: Cards 47, 82, 83, 84, 85, 86, 87 **Earth Science Lab, Level B:** Cards 47, 82, 83, 84, 85, 86, 87 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 8, *Temperature, Salinity, and Water Density*, pages 101-103

3.6. Technology Education
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
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.** • **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.** • **Explain the impact that agricultural science has had on biotechnology.**
Life Science Lab, Level A: Cards 45, 46, 47, 49, 57, 64, 69, 84, 86, 87, 88, 89, 90 **Life Science Lab, Level B:** Cards 45, 46, 47, 49, 57, 64, 69, 84, 86, 87, 88, 89, 90 **Life Science Lab Teacher's Handbook:** Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103 **Earth Science Lab, Level A:** Cards 35, 37, 42, 59, 60, 61, 86, 90 **Earth Science Lab, Level B:** Cards 35, 37, 42, 59, 60, 61, 86, 90 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 5, *What is in the Air?*, pages 89-91 **Physical Science Lab, Level A:** Cards 35, 49 **Physical Science Lab, Level B:** Cards 35, 49

3.6. Technology Education
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
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).** • **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.**
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells*, pages 77-79; Hands-On Activity 3, *Investigating Arthropods*, pages 85-87; Hands-On Activity 5, *Making Fossils*, pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?*, pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 2, *Plate Boundaries in Action*, pages 77-79; Hands-On Activity 4, *Using Sound Waves*, pages 85-87; Hands-On Activity 6, *Modeling a Tornado*, pages 93-95 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 5, *Making a Potato Battery*, pages 93-95 **Classroom Resource CD-ROM:** Writing Strategy 27

3.6. Technology Education
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
C. Explain physical technologies of structural design, analysis and engineering, personal 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).** • **Differentiate among the different types of construction applications (e.g., microwave tower, power plants, aircrafts).** • **Explain how 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.** • **Explain the relationships among the basic resources needed in the production process for a specific manufactured process.** • **Explain the differences between design engineering and production engineering processes.** • **Analyze manufacturing steps that affect water 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.**
This concept is not covered at this level.

3.7. Technological Devices
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
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.** • **Describe safe procedures for using tools and materials.** • **Assess materials for appropriateness of use.**
Physical Science Lab, Level A: Cards 63, 64 **Physical Science Lab, Level B:** Cards 63, 64

3.7. Technological Devices
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
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.** • **Apply knowledge of different measurement systems to measure and record objects' properties.**
Life Science Lab Teacher's Handbook: Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 6, *Making Sound,* pages 97-99

3.7. Technological Devices
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
C. Explain and demonstrate basic computer operations and concepts. • **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.**
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 communication 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.**
This concept is not covered at this level.

3.8. Science, Technology, and Human Endeavors
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
A. Explain how sciences and technologies are limited in their effects and influences on society. • **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 affect our lives.**
Life Science Lab, Level A: Cards 5, 59, 83, 88 **Life Science Lab, Level B:** Cards 5, 59, 83, 88 **Earth Science Lab, Level A:** Cards 16, 20, 31, 51, 54, 70, 79, 80, 81, 88 **Earth Science Lab, Level B:** Cards 16, 20, 31, 51, 54, 70, 79, 80, 81, 88 **Physical Science Lab, Level A:** Cards 33, 35, 76, 81, 84, 90 **Physical Science Lab, Level B:** Cards 33, 35, 76, 81, 84, 90

3.8. Science, Technology, and Human Endeavors
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
B. Explain how human ingenuity and technological resources satisfy specific human needs and improve the quality of life. • **Identify interrelationships between systems and resources.** • **Identify and describe the resources necessary to solve a selected problem in the 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.**
Life Science Lab, Level A: Cards 84, 85, 87, 88, 89, 90 **Life Science Lab, Level B:** Cards 84, 85, 87, 88, 89, 90 **Life Science Lab Teacher's Handbook:** Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103 **Earth Science Lab, Level A:** Cards 37, 42, 59, 60, 61, 86, 90 **Earth Science Lab, Level B:** Cards 37, 42, 59, 60, 61, 86, 90 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 5, *What is in the Air?*, pages 89-91 **Physical Science Lab, Level A:** Cards 34, 38, 46, 47, 48, 49 **Physical Science Lab, Level B:** Cards 34, 38, 46, 47, 48, 49

3.8. Science, Technology, and Human Endeavors
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
C. Identify the pros ad 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.** • **Describe ways technology extends and enhances human abilities.**
Life Science Lab, Level A: Cards 5, 49, 59, 64, 69, 83, 84, 87, 88, 89, 90 **Life Science Lab, Level B:** Cards 5, 49, 59, 64, 69, 83, 84, 87, 88, 89, 90 **Life Science Lab Teacher's Handbook:** Hands-On Activity 1, *Examining Cells*, pages 77-79; Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103 **Earth Science Lab, Level A:** Cards 16, 20, 31, 37, 42, 51, 54, 59, 60, 61, 70, 79, 80, 81, 86, 90 **Earth Science Lab, Level B:** Cards 16, 20, 31, 37, 42, 51, 54, 59, 60, 61, 70, 79, 80, 81, 86, 90 **Physical Science Lab, Level A:** Cards 33, 34, 35, 76, 81, 84, 90 **Physical Science Lab, Level B:** Cards 33, 34, 35, 76, 81, 84, 90

4.1. Watersheds and Wetlands
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
A. Explain the role of the water cycle within a watershed. • **Explain the water cycle.** • **Explain the water cycle as it relates to a watershed.**
Earth Science Lab, Level A: Cards 47, 48, 49, 82, 83, 84 **Earth Science Lab, Level B:** Cards 47, 48, 49, 82, 83, 84

4.1. Watersheds and Wetlands
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
B. Understand the role of the water shed. • **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.**
Earth Science Lab, Level A: Cards 82, 83, 84 **Earth Science Lab, Level B:** Cards 82, 83, 84

4.1. Watersheds and Wetlands
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
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.** • **Describe the life cycle of organisms that depend on water.** • **Identify organisms that have aquatic stages of life and describe those stages.**
Life Science Lab, Level A: Cards 1, 16, 17, 71, 82 **Life Science Lab, Level B:** Cards 1, 16, 17, 71, 82 **Earth Science Lab, Level A:** Cards 82, 83, 87, 89, 90 **Earth Science Lab, Level B:** Cards 82, 83, 87, 89, 90

4.1. Watersheds and Wetlands
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
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.**
Life Science Lab, Level A: Card 82 **Life Science Lab, Level B:** Card 82 **Earth Science Lab, Level A:** Card 83 **Earth Science Lab, Level B:** Card 83

4.1. Watersheds and Wetlands
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
E. Describe the impact of watersheds and wetlands on people. • **Explain the impact of watersheds and wetlands in flood control, wildlife habitat and pollution abatement.** • **Explain the influence of flooding on wetlands.**
Life Science Lab, Level A: Card 82 **Life Science Lab, Level B:** Card 82 **Earth Science Lab, Level A:** Cards 83, 85 **Earth Science Lab, Level B:** Cards 83, 85

4.2. Renewable and Nonrenewable Resources

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

A. Know that raw materials come from natural resources.

- **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.**

Life Science Lab, Level A: Cards 22, 84, 85, 86, 87, 88, 89, 90
Life Science Lab, Level B: Cards 22, 84, 85, 86, 87, 88, 89, 90

Earth Science Lab, Level A: Cards 3, 5, 23, 29, 35, 82, 84, 90
Earth Science Lab, Level B: Cards 3, 5, 23, 29, 35, 82, 84, 90

Physical Science Lab, Level A: Card 38
Physical Science Lab, Level B: Card 38

4.2. Renewable and Nonrenewable Resources

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

B. Examine the renewability of resources.

- **Identify renewable resources and describe their uses.**
- **Identify nonrenewable resources and describe their uses.**
- **Compare finished products to their original 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.**

Life Science Lab, Level A: Cards 84, 87, 88, 89, 90
Life Science Lab, Level B: Cards 84, 87, 88, 89, 90
Life Science Lab Teacher's Handbook: Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103

Earth Science Lab, Level A: Cards 29, 35, 37, 42, 59, 60, 61
Earth Science Lab, Level B: Cards 29, 35, 37, 42, 59, 60, 61
Earth Science Lab Teacher's Handbook: Hands-On Activity 5, *What is in the Air?*, pages 89-91

Physical Science Lab, Level A: Cards 38, 46, 47, 48, 49, 86, 90
Physical Science Lab, Level B: Cards 38, 46, 47, 48, 49, 86, 90

4.2. Renewable and Nonrenewable Resources

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

C. Explain natural resource distribution.

- **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.**

Life Science Lab, Level A: Cards 85, 88
Life Science Lab, Level B: Cards 85, 88

Earth Science Lab, Level A: Cards 29, 85, 90
Earth Science Lab, Level B: Cards 29, 85, 90

Physical Science Lab, Level A: Cards 46, 47, 48, 49
Physical Science Lab, Level B: Cards 46, 47, 48, 49

4.2. Renewable and Nonrenewable Resources
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
D. Describe the role of recycling and waste management. • **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.**
Life Science Lab, Level A: Card 88 **Life Science Lab, Level B:** Card 88

4.3. Environmental Health
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
A. Identify environmental health issues. • **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.**
Life Science Lab, Level A: Cards 84, 86, 87, 88, 89, 90 **Life Science Lab, Level B:** Cards 84, 86, 87, 88, 89, 90 **Life Science Lab Teacher's Handbook:** Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab, Level A:** Cards 37, 42, 59, 60, 61, 86 **Earth Science Lab, Level B:** Cards 37, 42, 59, 60, 61, 86 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 5, *What is in the Air?,* pages 89-91

4.3. Environmental Health
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
B. Describe how humans affect the health of the environment. • **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 water supply and air quality.** • **Explain how aid deposition can affect water, soil and air quality.** • **Explain the relationship between resource use, reuse, recycling and environmental health.**
Life Science Lab, Level A: Cards 84, 87, 89, 90 **Life Science Lab, Level B:** Cards 84, 87, 89, 90 **Life Science Lab Teacher's Handbook:** Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab, Level A:** Cards 29, 35, 37, 42, 59, 60, 61, 86 **Earth Science Lab, Level B:** Cards 29, 35, 37, 42, 59, 60, 61, 86 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 5, *What is in the Air?,* pages 89-91

4.3. Environmental Health
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
C. Explain biological diversity. • **Explain the complex, interactive relationships among members of an ecosystem.** • **Explain how diversity affects ecological integrity of the natural resources.**
Life Science Lab, Level A: Cards 65, 66, 71, 73, 74, 75, 76, 77 **Life Science Lab, Level B:** Cards 65, 66, 71, 73, 74, 75, 76, 77 **Life Science Lab Teacher's Handbook:** Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99

4.4. Agriculture and Society
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
A. Explain society's standard of living in relation to agriculture. • **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.**
Life Science Lab, Level A: Card 85 **Life Science Lab, Level B:** Card 85 **Earth Science Lab, Level A:** Card 90 **Earth Science Lab, Level B:** Card 90

4.4. Agriculture and Society
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
B. Investigate how agricultural science has recognized the various soil types found in Pennsylvania. • **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.**
Earth Science Lab, Level A: Cards 23, 29 **Earth Science Lab, Level B:** Cards 23, 29

4.4. Agriculture and Society
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
C. Explain agricultural systems' use of natural and human resources. • **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 be the need for animal production.** • **Define issues associated with food and fiber production.**
Life Science Lab, Level A: Cards 1, 16, 17, 34, 85 **Life Science Lab, Level B:** Cards 1, 16, 17, 34, 85

4.4. Agriculture and Society
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
D. Explain the improvement of agricultural production through technology. • **Compare the technologies that have advanced agricultural production.** • **Explain how energy sources have changed to meet agricultural technology.**
This concept is not covered at this level.

4.5. Integrated Pest Management
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
A. Explain benefit and harmful effects of pests. • **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.**
B. Explain how pest management affects the environment. • **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.**
C. Explain various integrated pest management practices used in society. • **Compare and contrast integrated pest management 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.**
This concept is not covered at this level.

4.6. Ecosystems and their Interactions
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
A. Explain the flows of energy and matter from organism to organism within an ecosystem. • **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.** • **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.**
Life Science Lab, Level A: Cards 70, 71, 72, 73, 74, 75, 76, 77, 81, 82 **Life Science Lab, Level B:** Cards 70, 71, 72, 73, 74, 75, 76, 77, 81, 82

4.6. Ecosystems and their Interactions
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
B. Explain the concepts of cycles. • **Identify and explain cycles within an ecosystem.** • **Analyze the role of different cycles within an ecosystem.**
Life Science Lab, Level A: Cards 76, 78, 79, 80 **Life Science Lab, Level B:** Cards 76, 78, 79, 80 **Earth Science Lab, Level A:** Card 47 **Earth Science Lab, Level B:** Card 47

4.6. Ecosystems and their Interactions
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
C. Explain how ecosystems change over time. • **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.**
Life Science Lab, Level A: Cards 80, 84, 86, 87, 88, 89, 90 **Life Science Lab, Level B:** Cards 80, 84, 86, 87, 88, 89, 90 **Earth Science Lab, Level A:** Cards 59, 60, 61, 86 **Earth Science Lab, Level B:** Cards 59, 60, 61, 86

4.7. Threatened, Endangered and Extinct Species
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
A. Describe diversity of plants and animals in ecosystems. • **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).**
Life Science Lab, Level A: Cards 23, 24, 41, 43, 65, 66, 67, 71, 81, 82 **Life Science Lab, Level B:** Cards 23, 24, 41, 43, 65, 66, 67, 71, 81, 82 **Earth Science Lab, Level A:** Card 89 **Earth Science Lab, Level B:** Card 89

4.7. Threatened, Endangered and Extinct Species
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
B. Explain how species of living organisms adapt to their environment. • **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.**
Life Science Lab, Level A: Cards 65, 66, 86 **Life Science Lab, Level B:** Cards 65, 66, 86

4.7. Threatened, Endangered and Extinct Species

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

C. Explain natural of human actions in relation to the loss of species.

- **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.**
- **Describe state laws passed regarding endangered species in Pennsylvania.**
- **Explain why one species may be more susceptible to becoming endangered than another species.**

Life Science Lab, Level A: Cards 67, 72, 80, 84, 85, 86, 87, 88, 89, 90
Life Science Lab, Level B: Cards 67, 72, 80, 84, 85, 86, 87, 88, 89, 90

Earth Science Lab, Level A: Card 60
Earth Science Lab, Level B: Card 60

4.8. Humans and the Environment

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

A. Describe how the development of civilization relates to the environment.

- **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.**

Earth Science Lab, Level A: Cards 3, 5, 35, 87, 90
Earth Science Lab, Level B: Cards 3, 5, 35, 87, 90
Earth Science Lab Teacher's Handbook: Hands-On Activity 1, *Identifying Minerals with the Mohs Scale*, pages 73-75

Physical Science Lab, Level A: Card 38
Physical Science Lab, Level B: Card 38

4.8. Humans and the Environment

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

B. Explain how people use natural resources.

- **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.**

Earth Science Lab, Level A: Cards 52, 53, 54, 55, 58
Earth Science Lab, Level B: Cards 52, 53, 54, 55, 58

4.8. Humans and the Environment

Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…

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.**
- **Explain how a particular human activity has changed the local area over the years.**

Life Science Lab, Level A: Cards 84, 86, 87, 88, 89, 90
Life Science Lab, Level B: Cards 84, 86, 87, 88, 89, 90
Life Science Lab Teacher's Handbook: Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103

Earth Science Lab, Level A: Cards 37, 42, 59, 60, 61, 86
Earth Science Lab, Level B: Cards 37, 42, 59, 60, 61, 86
Earth Science Lab Teacher's Handbook: Hands-On Activity 5, *What is in the Air?*, pages 89-91

4.8. Humans and the Environment
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
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.** • **Explain how conservation practices have influenced ecosystems.** • **Define the roles of Pennsylvania agencies that deal with natural resources.**
Life Science Lab, Level A: Cards 84, 85, 86, 87, 88, 89, 90 **Life Science Lab, Level B:** Cards 84, 85, 86, 87, 88, 89, 90 **Life Science Lab Teacher's Handbook:** Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab, Level A:** Cards 15, 17, 29, 37, 42, 52, 53, 54, 59, 60, 61, 85, 86 **Earth Science Lab, Level B:** Cards 15, 17, 29, 37, 42, 52, 53, 54, 59, 60, 61, 85, 86 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 5, *What is in the Air?,* pages 89-91

4.9. Environmental Laws and Regulations
Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential to acquire the knowledge and skills needed to…
A. Explain the role of environmental laws and regulations. • **Identify and explain environmental laws and regulations (e.g., Clean Air Act, Clear Water Act, Recycling and Waste Reduction Act, Act 26 on Agricultural Education).** • **Explain he role of local and state agencies in enforcing environmental laws and regulations (e.g., Department of Environmental Protection, Department of Agriculture, Game Commission).**
Life Science Lab, Level A: Cards 85, 87, 89 **Life Science Lab, Level B:** Cards 85, 87, 89 **Earth Science Lab, Level A:** Cards 37, 42, 86 **Earth Science Lab, Level B:** Cards 37, 42, 86