



Kutztown Area School District Curriculum (Unit Map)

Grade 6 Science

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Course Description: The science and health curriculum covers a broad spectrum of disciplines. The ideas covered include units on the animal kingdom, electricity and magnetism, forces at work, basic chemistry, the endocrine and reproductive system, and plants. There is also a unit designed to help students set goals, plan, and make use of good time management and study practices. Curriculum includes a trip to Hawk Mountain Sanctuary.

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Unit #/Title	1/Plants	Time Frame	4 Weeks
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Stage 1 - Identify Desired Results

Standards

3.1.7.A, 3.4.7.B, 4.3.7.C, 4.2.7.D, 4.6.7.A

S8.A.3.1 Explain the parts of a simple system, their roles, and their relationships to the system as a whole

3.1.7.B, 3.2.7.B, 4.1.7.B

S8.A.3.2 Apply knowledge of models to make predictions, draw inferences, and explain concepts

4.4.7.B, 4.6.7.A, 4.1.7.C, 4.1.7.D

S8.B.3.1 Explain the relationships between and among organisms in different ecosystems

3.1.7.C, 4.3.7.B, 4.6.7.C, 4.8.7.D, 3.1.7.E, 4.3.7.C

S8.B.3.2 Identify evidence of change to infer and explain the way different variables may affect change in ecosystems

3.5.7.D, 4.3.7.B, 4.1.7.A, 4.1.7.B, 4.1.7.C

S8.D.1.3 Describe characteristics of Earth's water systems or their impact on resources

3.6.7.A, 4.4.7.A, 4.4.7.C, 4.5.7.C, 3.8.7.C

S8.B.3.3 Explain how renewable and nonrenewable resources provide resources for human needs

3.5.7.B, 3.6.7.A, 4.2.7.C

S8.D.1.2 Describe the potential impact of human-made processes on changes to Earth's resources and how they affect everyday life.

Organisms have basic needs for survival.

Adaptations develop over time and are passed from one generation to the next.

Physical components of aquatic systems influence the organisms that live there in terms of size, shape and physical adaptations.

Habitats can be lost or altered through natural processes or human activities.

Natural resources are necessary for agricultural systems.

Pennsylvania soil types impact the types of plants and animals grown, and the profitability of Pennsylvania farms.

Big Ideas

- Living things depend on their habitat to meet their basic needs.
- The survival of living things is dependent upon their adaptations and ability to respond to natural changes in and human influences on the environment.
- Humans depend upon the management and practices of agricultural systems.

Essential Questions

- What factors affect an organism's ability to meet its needs?
- How do adaptations enable an organism to survive?
- How does the growth of food and fiber sustain civilization?

Content	Skills
<ul style="list-style-type: none"> • Organisms have basic needs for survival. • Adaptations develop over time and are passed from one generation to the next. • Physical components of aquatic systems influence the organisms that live there in terms of size, shape and physical adaptations. • Habitats can be lost or altered through natural processes or human activities. • Natural resources are necessary for agricultural systems. • Pennsylvania soil types impact the types of plants and animals grown, and the profitability of Pennsylvania farms. 	<ul style="list-style-type: none"> • Explain or demonstrate the steps of the scientific method. • Discuss how one species may adapt to environmental change while another may not. • Use evidence to explain factors that affect changes in populations. (e.g., deforestation, disease, land use). • Describe the response of an organism to environmental changes and how those changes affect survival (e.g., habitat loss, climate change). • Describe how available natural resources are utilized in agricultural systems throughout the world. • Identify the soils in Pennsylvania and their impact on the growth of plants and animals on Pennsylvania farms. • Manipulate a compound microscope to view microscopic plant life and structures.

Unit #/Title	2/Chemistry	Time Frame	4 Weeks
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Stage 1 - Identify Desired Results

Standards

[S11.A.1.1.2](#), [S11.A.1.1.4](#), [S11.A.1.3.1](#), [S11.A.1.3.2](#), [S11.A.3.3.1](#), [S11.A.3.3.2](#), [S11.C.1.1.2](#), [S11.C.1.1.4](#)

Analyze and explain the accuracy of scientific facts, principles, laws, and theories.

Explain how scientific knowledge helps solve practical problems (e.g. momentum, Newton's Laws of Motion).

Use appropriate quantitative data to describe or interpret change in system.

All matter is made of atoms, which consist of protons, neutrons, and electrons that are identifiable by location, mass, and charge.

Predict physical and chemical properties and interactions of matter using the trends of periodic table.

Changes in temperature are accompanied by changes in kinetic energy which can result in changes in the states of matter.

Changes in matter can be chemical, physical, or nuclear.

According to the law of conservation of mass, a chemical change can be represented by a balanced chemical equation.

Big Ideas

- Periodic trends in the properties of atoms allow for the prediction of physical and chemical properties.
- Changes in matter are accompanied by changes in energy.

Essential Questions

- What patterns in the properties of the elements contribute to the layout of the periodic table?
- Why are changes in matter accompanied by changes in energy?

Content

- All matter is made of atoms, which consist of protons, neutrons, and electrons that are identifiable by location, mass, and charge.
- Predict physical and chemical properties and interactions of matter using the trends of periodic table.
- Changes in temperature are accompanied by changes in kinetic energy, which can result in changes in the states of matter.
- Changes in matter can be chemical, physical, or nuclear.
- According to the law of conservation of mass, a chemical change can be represented by a balanced chemical equation.

Skills

- Demonstrate the steps of the scientific method
- Conduct simple and safe, inquiry-based investigations to observe endothermic and exothermic chemical reactions, measure temperature, volume, mass and pH
- Form conclusions based on experimental evidence

Unit #/Title	3/Mountain and Migration	Time Frame	4 Weeks
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Stage 1 - Identify Desired Results

Standards

[S8.B.1.1.1](#), [S8.B.1.1.3](#), [S8.B.1.1.4](#), [S8.A.3.1](#), [S8.A.3.2](#), [S8.B.3.1](#), [S8.B.3.2](#), [S8.D.1.3](#), [S8.A.1.3](#), [S8.B.1.1](#), [S8.B.2.1](#)

4.1.7.A. Describe the relationships between biotic and abiotic components of an ecosystem. Compare and contrast different biomes and their characteristics. Describe symbiotic and predator/ prey relationships.

4.5.6.D. Identify reasons why organisms become threatened, endangered, and extinct.

4.5.7.D. Explain how biological diversity relates to the viability of ecosystems. Compare and contrast monoculture with diverse ecosystems. Explain how biological diversity relates to the ability of an ecosystem to adapt to change. Explain how an adaptation is an inherited, structure, function, or behavior that helps an organism survive and reproduce.

4.1.7.E. Identify factors that contribute to change in natural and human-made systems. Explain the processes of primary and secondary succession in a given ecosystem.

Big Ideas

- Populations of organisms evolve by natural selection.
- Living things depend on their habitat to meet their basic needs.
- The survival of living things is dependent upon their adaptations and ability to respond to natural changes in and human influences on the environment.

Essential Questions

- What allows some populations of organisms to change and survive while others cannot?
- What factors affect an organism's ability to meet its needs?
- How do adaptations enable an organism to survive?

Content

- Individual organisms with certain traits are more likely than others to survive and have offspring.
- Changes in environmental conditions can affect the survival of populations and entire species.
- Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival.
- Organisms have basic needs for survival.
- Predator/prey relationships have a role in an ecosystem.
- Producers, consumers and decomposers have niches in an ecosystem.
- Energy flows through a food web within an ecosystem.
- Plants and animals are uniquely adapted to their environment.
- Adaptations develop over time and are passed from one generation to the next.
- Species can be classified as threatened, endangered, and extinct.

Skills

- Identify examples of the relationship(s) between structure and function in the living world.
- Describe the response of organism to environmental changes and how those changes affect survival (e.g., habitat loss, climate change).
- Describe the life cycle of organisms that depend on water for all or part of its life cycle and describe the limited factors which affect its cycle.
- Explain predator/prey relationships and the unique roles of producers/consumers and decomposers.
- Describe the flow of energy within an ecosystem.
- Discuss how one species may adapt to environmental change while another may not.
- Compare and contrast organisms with very specific needs with those organisms that have more general requirements.
- Identify PA plants and animals that are threatened and endangered, and describe ways to protect them.

Unit #/Title	4/Leave No Trace	Time Frame	2 Weeks
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Stage 1 - Identify Desired Results	
Standards	
<p>S8.A.1.1, S8.A.1.3, S8.A.3.3, S8.A.1.2, S8.B.3.2</p> <p>S8.A.1.1 Explain, interpret, and apply scientific, environmental, or technological knowledge presented in a variety of formats</p> <p>S8.A.1.3 Identify and analyze evidence that certain variables may have caused measurable changes in natural or human-made systems</p> <p>S8.A.3.3 Describe repeated processes or recurring elements in natural, scientific, or technological patterns</p> <p>S8.A.1.2 Identify and explain the impacts of applying scientific, environmental or technological knowledge to address solutions to practical problems</p> <p>S8.B.3.2 Identify evidence of change to infer and explain the ways different variables may affect change in natural or human-made systems</p>	
Big Ideas	Essential Questions
<p><i>Students will understand that...</i></p> <ul style="list-style-type: none"> Sustainable use of natural resources is essential to provide for the needs and wants of all living things now and in the future. People acting individually and/or as groups influence the environment. 	<ul style="list-style-type: none"> Why is the sustainable use of natural resources necessary? How do the actions of humans affect the environment?
Content	Skills
<ul style="list-style-type: none"> Seven principles guide our use and behavior in the outdoors. Sustainable use of natural resources is essential for the survival of humans and other organisms. The environment is impacted by the consumption of resources and generation of waste. Human actions can result in the loss of habitat and species. 	<ul style="list-style-type: none"> Explain how a dynamically changing environment provides for the sustainability of living systems. Explain how the wise use and misuse of resources affects the environment. Identify human impacts that cause habitat loss.

Unit #/Title	5/Forces at Work	Time Frame	4 Weeks
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Stage 1 - Identify Desired Results

Standards

3.2.7 A 3,4. Explain and apply scientific and technological knowledge.

- Explain how skepticism about an accepted scientific explanation led to a new understanding.
- Explain how new information may change existing theories and practice.

3.2.7 B 1,2,3,4,5. 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.

3.2.7 D 4. Know and use the technological design process to solve problems.

- Design and propose alternative methods to achieve solutions.

3.4.7 C 1,3. Identify and explain the principles of force and motion.

- Describe the motion of an object based on its position, direction and speed.
- Explain various motions using models.

Big Ideas

- Newtonian Laws of Force and Motion: An object's motion is the result of all the forces acting on it.
- Forces change the motion of objects in predictable ways.
- Newton's Laws apply to all forces.
- Energy is transferred when a force moves an object.
- The motion of an object can be described and predicted.

Essential Questions

- What causes objects to move?
- What are forces?
- How do Newton's Laws apply to real life?

Content

- Design and conduct a scientific investigation (scientific method); Use appropriate tools and techniques to gather and interpret data; Use evidence to describe, predict, explain, and model; Use critical thinking to find relationships between results and interpretations; Communicate procedures, results, and conclusions; Use mathematics in scientific investigations; Identify a problem to be solved; Design a solution or product; evaluate the solution or design.
- Concepts of acceleration and velocity; calculate speed, distance, time given two of three; Differentiate b/w balanced and unbalanced forces; Explain differences b/w potential and kinetic energy; Action and reaction forces
- Vocabulary: motion, speed, velocity, acceleration, air resistance, friction, gravity, inertia, potential energy,

Skills

- Demonstrate the steps of the scientific method.
- Explain forces
- Differentiate between speed and velocity
- Make calculations using formulas for speed, distance, and time
- Experience real world examples friction, gravity, and air resistance, and how these forces affect the movement of objects
- Define Newton's Laws of Motion, and provide real-world examples of each
- Differentiate between potential and kinetic energy and identify real-world situations of each
- Identify momentum as "bashing power" and demonstrate the relationship between mass and momentum

kinetic energy, physicist, force, momentum, weight, mass, newton, matter	
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Unit #/Title	6/Energy	Time Frame	4 Weeks
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Stage 1 - Identify Desired Results

Standards

[S11.A.1.3.2](#), [S11.C.2.1.1](#), [S11.C.2.1.3](#), [S11.C.2.1.4](#), [S11.C.3.1.4](#), [S8.B.3.2](#), [S8.B.3.3](#), [S8.C.2.1](#), [S8.C.2.2](#), [S8.D.1.2](#)

S8.B.3.2 Identify evidence of change to infer and explain the ways different variables may affect change in natural or human-made systems

S8.B.3.3 Explain how renewable and nonrenewable resources provide for human needs or how these needs affect the environment

S8.C.2.1 Describe energy sources, transfer of energy or conversion of energy

S8.C.2.2 Compare the environmental impact of different energy sources chosen to support human endeavors

S8.D.1.2 Describe the potential impact of human made processes on changes to Earth's resources and how they affect everyday life

Big Ideas

- Energy can be transferred between objects and/or can be converted into different forms.
- Sustainable use of natural resources is essential to provide for the needs and wants of all living things now and in the future.

Essential Questions

- How is energy transferred between objects and converted into different forms?
- Why is the sustainable use of natural resources necessary?

Content

- Energy can be transferred thermally, mechanically, electrically or chemically in a system.
- Electricity is the result of converting one form of energy into another and the flow of electrons via a conductor.
- Resources are either renewable or nonrenewable.
- Sustainable use of natural resources is essential for the survival of humans and other organisms.

Skills

- Identify renewable and nonrenewable resources and describe their uses in providing humans with energy, food, housing and water and the waste derived from them.
- Describe sources and forms of energy and explain their transformations.
- Explain society's standard of living in terms of technological advancements and how these advancements impact our use of resources (e.g., agriculture, transportation, energy, production).
- Students will investigate the construction, function and feasibility of wind turbines, then determine the best location for a wind farm locally.

Unit #/Title	7/Endocrine and Reproductive Systems	Time Frame	4 Weeks
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Stage 1 - Identify Desired Results	
Standards	
<p>S8.B.1.1.1, S8.B.1.1.3, S8.B.1.1.4</p> <p>3.3.7 B 4,5 Describe the cell as the basic structural and functional unit of living things.</p> <ul style="list-style-type: none"> Describe and distinguish among cell cycles, reproductive cycles and life cycles. Explain disease effects on structures or functions of an organism. <p>3.3.7 C 1,2,3,4,5 C. Know that every organism has a set of genetic instructions that determines its inherited traits.</p> <ul style="list-style-type: none"> Identify and explain inheritable characteristics. Identify that the gene is the basic unit of inheritance. Identify basic patterns of inheritance (e.g., dominance, recessive, codominance). Describe how traits are inherited. Distinguish how different living things reproduce (e.g., vegetative budding, sexual). <p>10.1.6 A Describe growth and development changes that occur between childhood and adolescence and identify factors that can influence these changes.</p> <p>10.1.6 E Identify and describe health problems that can occur throughout life</p>	
Big Ideas	Essential Questions
<ul style="list-style-type: none"> Populations of organisms evolve by natural selection. The cell is the basic unit of structure and function for all living things. 	<ul style="list-style-type: none"> What allows some populations of organisms to change and survive while others cannot? How can one cell function as an organism?
Content	Skills
<ul style="list-style-type: none"> Every organism has a set of instructions for specifying its traits. Hereditary information (set of instructions) is contained in genes, located on chromosomes in cells. Organisms reproduce and pass their genes to the next generation (their offspring). Genes can randomly change or mutate, causing changes in certain traits of the offspring. Cells grow and divide thereby producing more cells. The gene is the basic unit of inheritance. All multicellular organisms have systems that interact with one another to perform specific functions and enable the organism to function as a whole. 	<ul style="list-style-type: none"> determine how cell division makes the body grow draw and label each stage of cell division define growth spurt and recognize pubescent differences in boys/girls identify the component parts of the endocrine system and their functions specify the endocrine glands responsible for regulation of growth describe the physical and emotional characteristics of puberty for boys and girls define heredity and explore how traits are inherited understand the relationship between DNA, genes, and chromosomes, and how these factors determine inherited traits model how X and Y chromosomes determine a person's sex define dominant and recessive genes and the characteristics/ examples of each understand how sex-linked traits differ from other traits and provide examples label the organs of the male/female reproductive systems

	<ul style="list-style-type: none">• describe the functions of the male and female reproductive organs• explain the process of fertilization• recognize various stages of pregnancy and note the development of the child at each stage• identify A.I.D.S. and STDs as communicable diseases and understand the ways that the HIV virus and other STDs can and cannot be transmitted
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Unit #/Title	8/Biological Monitoring – GLOBE program	Time Frame	4 Weeks
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Stage 1 - Identify Desired Results

Standards

Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.

Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.

Describe relationships using inference and prediction.

Use appropriate tools and techniques to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.

Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.

Analyze alternative explanations and understanding that science advances through legitimate skepticism.

Use mathematics in all aspects of scientific inquiry.

Understand that scientific investigations may result in new ideas for areas of study, new methods, or procedures for an investigation or new technologies to improve data collection.

3.1.7 D. 1-2 Explain scale as a way of relating concepts and ideas to one another by some measure.

3.2.7 A. 3-4 Explain and apply scientific and technological knowledge.

3.2.7 B. 1-5 Apply process knowledge to make and interpret observations.

3.2.7 D.4 Know and use the technological design process to solve problems.

CC.3.6.6-8.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

CC.3.6-8.J.I. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

CC.3.5.6-8.A. Cite specific textual evidence to support analysis of science and technical texts.

CC.3.5.6-8.B. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

CC.6-8.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

CC.6-8.7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

Big Ideas

- Living things depend on their habitat to meet their basic needs.
- The survival of living things is dependent upon their adaptations and ability to respond to natural changes in and human influences on the environment.
- Humans depend upon the management and practices of agricultural systems.

Essential Questions

- What factors affect an organism's ability to meet its needs?
- How do adaptations enable an organism to survive?
- How does the growth of food and fiber sustain civilization?

Content	Skills
<ul style="list-style-type: none"> • Organisms have basic needs for survival. • Adaptations develop over time and are passed from one generation to the next. • Physical components of aquatic systems influence the organisms that live there in terms of size, shape and physical adaptations. • Habitats can be lost or altered through natural processes or human activities. • Natural resources are necessary for agricultural systems. • Pennsylvania soil types impact the types of plants and animals grown, and the profitability of Pennsylvania farms. 	<ul style="list-style-type: none"> • Review the steps of the scientific method. "Review" seems like what the teacher will do with the students. What is the desired outcome for students? List? Demonstrate? • Discuss how one species may adapt to environmental change while another may not. • Use evidence to explain factors that affect changes in populations. (e.g., deforestation, disease, land use). • Describe the response of an organism to environmental changes and how those changes affect survival (e.g., habitat loss, climate change). • Describe how available natural resources are utilized in agricultural systems throughout the world. • Identify the soils in Pennsylvania and their impact on the growth of plants and animals on Pennsylvania farms. • Manipulate a compound microscope to view microscopic plant life and structures.