

Oxford Area School District Science Scope and Sequence – Quarter 1:

Grade 6

*Origin of the
Universe*

3.3.5-6.B1

- Provide evidence that the earth revolves around (orbits) the sun in a year's time and that the earth rotates on its axis once approximately every 24 hours.
- Compare and contrast the size, composition, and surface features of the planets that comprise the solar system as well as the objects orbiting them.
- Recognize the role of gravity as a force that pulls all things on or near the earth toward the center of the earth and in the formation of the solar system and the motions of objects in the solar system.
- Explain why the planets orbit the sun in nearly circular paths.
- Describe how the planets change their position relative to the background of the stars
- Explain how the tilt of the earth and its revolution around the sun cause an uneven heating of the earth which in turn causes the seasons and weather patterns.

*Unifying
Themes*

3.3.6-7.B2

- Use models to demonstrate that earth has different seasons and weather patterns.
- Use models to demonstrate that the phases of the moon are a result of its orbit around Earth.
- Identify a variety of instruments used to gather evidence about the universe.
- Describe repeating patterns in the Sun Earth-Moon system and the positions of stars.
- Relate planetary size and distance in our solar system using an appropriate scale model.

*Earth's
Features and
Processes*

3.3.6-8.A1

- Recognize and interpret various mapping representations of Earth's common features.
- Define basic features of the rock cycle.
- Describe the layers of the earth.
- Differentiate among the mechanisms by which heat is transferred through the Earth's system.
- Distinguish between physical and chemical weathering.
- Describe renewable and nonrenewable energy resources.

Oxford Area School Science Scope and Sequence – Quarter 2:

Grade 6

*Earth's
History*
3.3.5-8.A3

- Describe the scales involved in characterizing Earth and its atmosphere.
- Create models of Earth's common physical features.
- Locate significant geologic structures using various mapping representations.
- Describe changes in atmospheric conditions associated with various weather patterns.
- Describe geologic time as it relates to earth processes.
- Explain changes in earth systems in terms of energy transformation and transport.
- Explain how satellite images, models, and maps are used to identify Earth's resources.

*The
Environment*
4.1.5.A

- Describe the roles of producers, consumers, and decomposers within a local ecosystem.

*Materials
Cycles*
4.1.7-8.B

- 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.

Energy Flow
4.1.5.C

- Describe different food webs including a food web containing humans.

Oxford Area School District Science Scope and Sequence – Quarter 3:

Grade 6

*Properties of
Matter*
3.2.6.A1

- Distinguish the differences in properties of solids, liquids, and gases.
- Differentiate between volume and mass. Investigate that equal volumes of different substances usually have different masses.

*Unifying
Themes*
3.2.5-8.A5

- Identify characteristic properties of matter that can be used to separate one substance from the other.

*Heat/Heat
Transfer*
3.2.5-7.B3

- Demonstrate how heat energy is usually a byproduct of an energy transformation.
- Give examples of how heat moves in predictable ways, normally flowing from warmer objects to cooler ones until they reach the same temperature.
- Explain the effect of heat on particle motion by describing what happens to particles during a phase change.
- Differentiate among convection, conduction, and radiation.
- Explain why heat energy consists of the random motion and vibrations of the particles of matter.
- Explain how changes in temperature are accompanied by changes in kinetic energy.

*Nature of
Waves*
3.2.5-8.B5

- Compare the characteristics of sound as it is transmitted through different materials.
- Relate the rate of vibration to the pitch of the sound.
- Demonstrate that visible light is a mixture of many different colors.
- Explain the construct of the electromagnetic spectrum.
- Describe how sound and light energy are transmitted by waves.

Oxford Area School District Science Scope and Sequence – Quarter 4:

Grade 6

*Unifying
Themes*
3.2.5-7.B5

- Demonstrate that heat moves in predictable ways from warmer objects to cooler ones.
- Investigate that materials may be composed of parts too small to be seen without magnification.
- Demonstrate that heat is often produced as energy is transformed through a system.
- Demonstrate how the transfer of heat energy causes temperature changes.
- Explain how physics principles underlie everyday phenomena and important technologies.

Energy Flow
3.1.5-8.A2

- Compare and contrast the similarities and differences in life cycles of different organisms.

*Food and
Fiber System*
4.4.6.A

- Explain how different plants and animals in the United States have specific growing requirements related to climate and soil conditions.

*Importance
of Agriculture*
4.4.6-7.B

- Analyze how soil types and geographic regions have impacted agriculture in Pennsylvania.
- Describe the economic importance of agriculture to society.

3.2.A Chemistry			
<u>Big Idea</u> How do scientists identify and sort materials?			
<u>Standards</u> 3.2.6.A1		<u>Essential Questions</u> How do scientists identify and sort materials?	
<ul style="list-style-type: none"> Distinguish the differences in properties of solids, liquids, and gases. Differentiate between volume and mass. Investigate that equal volumes of different substances usually have different masses. 			
Concepts	Competencies	Resources	Assessments
<p>S6.C.1.1.1 Describe how characteristic physical properties of matter can be used to distinguish one substance from another.</p> <p>S6.C.1.1.2 Explain that materials are characterized by having specific amount of mass in each unit of volume (density).</p> <p>S6.C.1.2.1 Describe how water changes from one state to another.</p> <p>S6.C.1.2.2 Identify differences between chemical and physical changes of matter.</p> <ul style="list-style-type: none"> All matter is made up of particles, which are far too small to see directly through a microscope. Particles are always in motion 	<ul style="list-style-type: none"> Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. Use models and patterns to make predictions, draw inferences, or explain scientific and technological concepts. Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship. 	<p><i>Science Fusion 2017</i> <i>Module F</i></p>	

<p>with the smallest motion in solids progressing to the largest motion in gases.</p> <ul style="list-style-type: none"> • Materials are characterized by having a specific amount of mass in each unit of volume (density). • A substance has characteristic properties such as density, boiling point, freezing point, solubility, all of which are independent of the mass or volume of the sample. • Changing a substance’s state of matter may change its density but not its composition. 			
<p><u>Vocabulary</u> density, gas, liquid, mass, solid, volume</p>			
<p>3.3.A: Earth Structure, Processes and Cycles</p>			
<p><u>Big Idea</u> Solid, liquid and gaseous earth materials all circulate in large scale systems at a variety of time scales, giving rise to landscapes, the rock cycle, ocean currents, weather, and climate.</p>			
<p><u>Standards</u> 3.3.6.A1 Recognize and interpret various mapping representations of Earth’s common features.</p> <p>3.3.7.A1 Define basic features of the rock cycle. Describe the layers of the earth. Differentiate among the mechanisms by which heat is transferred through the Earth’s system.</p>	<p><u>Essential Questions</u> What causes the great variation at Earth’s surface?</p>		
<p>Concepts</p>	<p>Competencies</p>	<p>Resources</p>	<p>Assessments</p>

<p>S6.C.1.2.1 Describe how water changes from one state to another.</p> <p>S6.C.1.2.2 Identify difference between chemical and physical changes of matter.</p> <p>S6.D.1.1.2 Identify the three basic rock types and describe their formation (i.e., igneous [granite, basalt, obsidian, and pumice]; sedimentary [limestone, sandstone, shale and coal]; and metamorphic [slate, quartzite, marble, and gneiss]).</p> <p>S7.D.1.1.1 Identify and describe soil characteristics (i.e. particle size, porosity, and permeability) of different biomes.</p> <p>S7.D.1.1.2 Explain how fossils are formed and how they can provide evidence about plants and animals that once lived on Earth.</p> <ul style="list-style-type: none"> The Earth is mostly rock, with a metallic core, a thin layer of water covering about $\frac{3}{4}$ of the surface and surrounded by a thin blanket of air. 	<ul style="list-style-type: none"> Describe the flow of energy from the sun, throughout the earth system, living and non-living, from the cellular scale to the global scale, and describe the transformations of that energy as it moves through the system. 	<p>Science Fusion 2017 Module G</p>	
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<ul style="list-style-type: none">• Heat flow from the earth and motion within the earth lead the outer shell of the earth to move around in large rigid pieces (plates) and lead to the creation and destruction of ocean basins, motion of continents relative to one another, earthquakes, volcanic eruptions, and development of mountain belts.• Thousands of layers of sedimentary rock confirm the long history of the changing surface of the earth and the changing life forms whose remains are found in successive layers.• Earth materials (rocks and soils) can be classified by their composition and texture and those features can be interpreted to infer the history of the material.			
Vocabulary			

3.2.B: Physics
Big Idea How do energy transformations explain that energy is neither created nor destroyed?

<p>Standards</p> <p>3.2.5.B3 Demonstrate how heat energy is usually a byproduct of an energy transformation.</p> <p>3.2.6.B2 Describe energy as a property of objects associated with heat, light, electricity, magnetism, mechanical motion, and sound.</p> <p>Differentiate between potential and kinetic energy.</p> <p>3.2.7.B2 Describe how energy can be changed from one form to another (transformed) as it moves through a system or transferred from one system to another system.</p> <p>3.2.5.B5 Compare the characteristics of sound as it is transmitted through different materials.</p> <p>Relate the rate of vibration to the pitch of the sound.</p> <p>3.2.7.B5 Demonstrate that visible light is a mixture of many different colors.</p> <p>Explain the construct of the electromagnetic spectrum.</p> <p>Describe how sound and light energy are transmitted by waves.</p>			
Concepts	Competencies	Resources	Assessments
S5.C.2.1.1 Describe how energy exists in many forms (e.g., electrical, mechanical, chemical, heat, light, sound) and can be transformed within	<ul style="list-style-type: none"> Describe the flow of energy from the sun, throughout the earth system, living and non-living, from the cellular scale to the global scale, 	<i>Science Fusion 2017 Module F</i>	

<p>a system.</p> <p>S5.C.2.1.2 Describe how heat energy is usually a byproduct of an energy transformation.</p> <p>S6.C.2.1.1 Describe how heat moves in predictable ways from warmer objects to cooler ones until they reach the same temperature.</p> <p>S6.C.2.1.2 Describe the effect of heat on particle motion during phase changes.</p> <p>S6.C.2.1.3 Compare various energy sources (i.e., oil, coal, natural gas, solar, wind, and moving water) and describe how these energy sources are transformed into useful forms of energy.</p> <p>S7.C.2.1.1 Describe how energy is obtained and used by organisms throughout their lives.</p> <p>S7.C.2.1.2 Describe how energy is transferred and conserved in a closed system.</p> <p>S7.C.2.1.3 Describe energy transformations within an ecosystem.</p>	<p>and describe the transformations of that energy as it moves through the system.</p> <ul style="list-style-type: none"> • Design, implement, record, explain, and justify safe and effective laboratory procedures to determine the relationship between two variables, controlling for other factors that might also affect the relationship. 		
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Vocabulary

heat, light, electricity, magnetism, mechanical motion, radiation, sound, convection, conduction

Cells and Organisms

Big Idea

- Organisms obtain and use energy to carry out their life processes.

Standards

3.1.5.A2

- Describe how life on Earth depends on energy from the sun.

3.1.6.A2

- Describe how energy derived from the sun is used by plants to produce sugars (**photosynthesis**) and is transferred within a food chain from producers (plants) to consumers to decomposers.

3.1.7.A2

- Describes how organisms obtain and use energy throughout their lives.

Essential Questions

How do different organisms obtain and use energy to survive in their environment?

Concepts	Competencies	Resources	Assessments
<p>Forms of energy are required to maintain life.</p> <p>Photosynthesis is the process that transforms light energy into potential chemical energy.</p>	<p>Describe the flow of energy through living systems.</p> <p>Pose questions and provide evidence-based explanations about understanding and observations of biological phenomena and processes.</p>		

	<p>Select and use appropriate tools and techniques when designing and conducting experiments related to the biological sciences and then communicate an analysis of the findings using various types of media.</p> <p>Identify and describe various ways models are used to explain, interpret, and predict, biological phenomena/systems.</p>		
<p>Vocabulary consumers, decomposers, photosynthesis</p>			

4.1.5 Ecology			
Big Idea The survival of living things is dependent upon their adaptations and ability to respond to natural changes in and human influences on the environment.			
Standards 4.1.5.A Describe the role of producers, consumers, and decomposers within a local ecosystem 4.1.5.C Describe different food webs including a food web containing humans. 4.1.7-8.A Describe the relationships between biotic and abiotic components of an ecosystem. <ul style="list-style-type: none"> • Compare and contrast different biomes and their characteristics • Describe symbiotic and predator/prey relationships 		Essential Question What factors affect an organism’s ability to meet its needs? How do adaptations enable an organism to survive?	
Concepts	Competencies	Resources	Assessments

<p>BIO.B.4.2.1 Describe how energy flows through an ecosystem (e.g., food chains, food webs, energy pyramids)</p> <p>S5.B.3.1.1 Describe the roles of producers, consumers, and decomposers within a local ecosystem.</p> <p>S5.B.3.1.2 Describe the relationships between organisms in different food webs.</p>	<ul style="list-style-type: none">• Describe the flow of energy within the ecosystem• Explain predator/prey relationships and the unique roles of producers/consumers and decomposers.• Describe in detail how the living and non-living components of an ecosystem interrelate and directly impact food chains and energy flow.		
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Vocabulary

abiotic, biotic, consumers, decomposers, food web, producers

Origin and Evolution of the Universe

Big Idea

Earth is part of a solar system

Standards

3.3.5.B1

- Provide evidence that the Earth revolves around (orbits) the sun in a year's time and that the Earth rotates on its axis once approximately every 24 hours.

3.3.6.B1

- Compare and contrast the size, composition, and surface features of the planets that comprise the solar system as well as the objects orbiting them.
- Recognize the role of gravity as a force that pulls all things on or near the earth toward the center of the earth and in the formation of the solar system and the motions of objects in the solar system.

Essential Questions

How do objects remain in the solar system?

<ul style="list-style-type: none"> • Explain why the planets orbit the sun in nearly circular paths. • Describe how the planets change their position relative to the background of the stars • Explain how the tilt of the earth and its revolution around the sun cause an uneven heating of the earth which in turn causes the seasons and weather patterns. <p>3.3.6.B2</p> <ul style="list-style-type: none"> • Use models to demonstrate that the phases of the moon are a result of its orbit around Earth. <p>3.3.7.B2</p> <ul style="list-style-type: none"> • Identify a variety of instruments used to gather evidence about the universe. • Describe repeating patterns in the Sun-Earth-Moon system and the positions of stars • Relate planetary size and distance in our solar system using an appropriate scale model. 			
Concepts	Competencies	Resources	Assessments
<p>The Earth exists in a solar system including the sun, the planets, their moons and other smaller objects.</p> <p>Objects in the solar system are illuminated by sunlight. Object brightness depends on a number of factors.</p> <p>Orbits are the result of a</p>	<p>Explain the origin and composition of the solar system and universe.</p>	<p><i>Science Fusion 2017 Module G</i></p>	

<p>perfect balance between the forward motion of a body in space, such as a planet or moon, and the pull of gravity on it from another body in space, such as a large planet or star resulting in near circular or elliptical shapes.</p> <p>The orbits and rotations of the Earth-moon-sun system account for lunar and solar eclipses, phases of the moon, and tides.</p> <p>Direct and indirect measurements provide evidence that the sun, Earth and most of the planets formed at the same time.</p>			
<p>Vocabulary lunar eclipse, orbit, revolution, rotation, solar eclipse, solar system</p>			

<p>Agriculture and Society</p>	
<p>Big Idea Humans depend upon the management and practices of agricultural systems.</p>	
<p>Standards 4.4.6.A Explain how different plants and animals in the United States have specific growing requirements related to climate and soil conditions.</p> <p>4.4.6.B</p>	<p>Essential Questions How does the growth of food and fiber sustain civilization?</p>

<p>Analyze how soil types and geographic regions have impacted agriculture in Pennsylvania.</p> <p>4.4.7.B Describe the economic importance of agriculture to society.</p>			
Concepts	Competencies	Resources	Assessments
<p>Describe the ecological levels of organization in the biosphere.</p> <p>Describe interactions and relationships in an ecosystem.</p> <p>Explain how certain inherited traits and/or behaviors allow some organisms to survive and reproduce more successfully than others.</p> <p>Identify evidence of change to infer and explain the ways different variable may affect change in natural or human-made systems.</p>	<p>Describe the levels of ecological organization (i.e. organism, population, community, ecosystem, biome, biosphere).</p> <p>Describe the effects of limiting factors on a population dynamics and potential species extinction.</p> <p>Distinguish between instinctive and learned animal behaviors that relate to survival.</p> <p>Recognize that extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival.</p> <p>Describe the behavioral and physical responses of organisms to environmental changes and how those responses affect survival.</p>	<p><i>Science Fusion 2017 Module E</i></p>	

<p>Describe the interactions and relationships in an ecosystem.</p> <p>Describe how constructive and deconstructive natural processes can influence different biomes.</p> <p>Apply scientific thinking, processes, tools, and technologies in the study of biology.</p>	<p>Describe how limiting factors on population dynamics and potential species extinction.</p> <p>Describe how soil fertility, composition, resistance to erosion, and texture are affected by many factors.</p> <p>Identify the three basic rock types and describe their formation (i.e. igneous [granite, basalt, obsidian, and pumice]; sedimentary [limestone, sandstone, shale, and coal; and metamorphic [slate, quartzite, marble, and gneiss]).</p> <p>Explain how genetic engineering has impacted the fields of medicine, forensics, and agriculture (e.g., selective breeding, gene splicing, cloning, genetically modified organisms, gene therapy).</p>		
<p>Vocabulary Igneous rock, sedimentary rock, metamorphic rock, agriculture,</p>			