

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

Grade 5

3.1.5

*Biological
Science:*

Organisms/Cells

- A2 -Describe how life on earth depends on energy from the sun.
- A3- Compare and contrast the similarities and differences in life cycles of different organisms.
- A5- Explain the concept of a cell as the basic unit of life. Compare/contrast plant and animal cells.

3.1.5

*Biological Science:
Genetics*

- B1- Differentiate between inherited and acquired characteristics of plants and animals. (Heredity)

3.1.5

*Biological Science:
Evolution*

- C1- Describe how organisms meet some of their needs in an environment by using behaviors (patterns of activities) in response to information (stimuli) received from the environment. (Natural Selection)
- C2 – Give examples of how inherited characteristics (i.e. shape of beak, length of neck, location of eyes, shape of teeth) may change over time as adaptations to changes in the environment that enable organisms to survive. (adaptation)

3.2.5

*Physical Science:
Chemistry*

- A1- Describe how water can be changed from one state to another by adding or taking away heat. (properties of matter)

Oxford Area School Science Scope and Sequence – Quarter 2:

Grade 5

3.2.5
*Physical Science:
Physics*

- B1- Explain how mass of an object resists change to motion. (force and motion of particles and rigid bodies)
- B2- Examine how energy can be transferred from one form to another. (energy storage and transformations: conservation laws)
- B3- Demonstrate how heat energy is usually a byproduct of an energy transformation. (heat/heat transfer)
- B4- Demonstrate how electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced. Demonstrate how electromagnets can be made and used. (electrical and magnetic energy)
- Compare the characteristics of sound as it is transmitted through different materials. Relate the rate of vibration to the pitch of sound. (nature of waves- sound and light energy)

3.3.5
*Earth and Space
Sciences: Earth
structure,
process, and
cycles*

- A1- Describe how landforms are the result of a combination of destructive forces such as erosion and constructive erosion, deposition of sediment, etc.. (Earth features and the processes that change it).
- A2- Describe the usefulness of Earth's physical resources as raw materials for the human made world. (earth's resources/materials)
- A3- Explain how geological processes observed today such as erosion, movement of lithospheric plates, and changes in the composition of the atmosphere are similar to those in the past. (earth's history)
- A4- Explain the basic components of the water cycle. (water)
- A5- Differentiate between weather and climate. Explain how the cycling of water, both in and out of the atmosphere, has an effect on climate. (weather and climate)

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

Grade 5

*3.3.5 Earth and
Space Sciences:
Origin and
Evolution of the
Universe*

- 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. (composition and structure)

*3.4.5 Technology
and Engineering
Education:
Scope of
Technology*

- A1- Explain how people use tools and techniques to help them do things.
- A2- Understand that a subsystem is a system that operates as part of a larger system.
- A3- Describe how technologies are often combined.

*3.4.5 Technology
and Engineering
Education:
Technology and
Society*

- B1- Explain how the use of technology can have unintended consequences.
- B2- Describe how waste may be appropriately recycled or disposed of to prevent unnecessary harm to the environment.
- B3- Describe how community concerns support or limit technological developments.
- B4- Identify how the way people live and work has changed history in terms of technology.

*3.4.5 Technology
and Engineering
Education:
Technology and
Engineering
Design*

- C1- Explain how the design process is a purposeful method of planning practical solutions to problems.
- C2- Describe how design, as a dynamic process of steps, can be performed in different sequences and repeated.
- C3- Identify how invention and innovation are creative ways to turn ideas into real things.

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

Grade 5

*3.4.5 Technology
and Engineering
Education:
Abilities for a
Technological
World*

- D1- Identify ways to improve a design solution.
- D2- Use information provided in manuals, protocols, or by experienced people to see and understand how things work.
- D3- Determine if the human use of a product or system creates positive or negative results.

*3.4.5 Technology
and Engineering
Education:
The Designed
World*

- E1- Identify how technological advances have made it possible to create new devices and to repair or replace certain parts of the human body.
- E2- Understand that there are many different tools necessary to maintain an ecosystem, whether natural or man-made.
- E3- Explain how tools, machines, products, and systems use energy in order to do work.
- E4- Describe how the use of symbols, measurements, and drawings promotes clear communication by providing a common language to express ideas.
- E5- Examine reasons why a transportation system may lose efficiency or fail.
- E6- Examine how manufacturing technologies have become an integral part of the engineered world.
- E7- Describe the importance of guidelines when planning a community.

*4.1.5
Ecology:
Environment*

- A- Describe the roles of producers, consumers, and decomposers within a local ecosystem.
- B- Explain the basic components of the water cycle.
- C- Describe different food webs including a food web containing humans.
- D- Explain the differences between threatened, endangered, and extinct organisms.

*Watersheds
and
Wetlands*

- A- Explain the water cycle.
- B- Identify important wetlands in the U.S.
- C- Identify physical, chemical and biological factors that affect water quality.

*Agricultural
and
Society*

- A- Explain why animal production is dependent upon plant production.
- C- Investigate the factors influencing plant and animal growth (i.e. soil, water, nutrients, and light).

*Humans
and the
Environment*

- C- Explain the difference between point and non-point source pollution.
- D- Explain how different items are recycled and reused.

Science Curriculum – Grade 5			
Big Idea –Aquatic, terrestrial and human-made ecosystems consist of diverse living and non-living components that change over time and among geographic areas.			
Essential Question- How do ecosystems differ and change over time?			
Concepts	Competencies	Resources	Assessments
<ul style="list-style-type: none"> • Pennsylvania contains several major ecosystems. • Living components in the ecosystem are dependent upon the non-living components • Pest management has long-term effects on an ecosystem. • Climate and soil conditions affect the diversity of plants and animals in an ecosystem. • Watersheds are an integral component of aquatic and terrestrial ecosystems. • Landforms determine the boundaries of a watershed. • Natural and human factors affect water quality and flow through a watershed. 	<ul style="list-style-type: none"> • Compare and contrast two different ecosystems in Pennsylvania including their living and non-living components. • Use evidence to explain how diversity affects the ecological integrity of natural systems. • Discuss how a change of one component in an ecosystem may affect the entire ecosystem. • Explain how an ecosystem can change over time, e.g. succession. • Describe the natural and human factors which affect the water quality and flow through a local or state watershed. • Identify and explain the cycles found within an 		

<ul style="list-style-type: none"> • Cycles exist in an ecosystem. • Wetlands perform unique functions within an ecosystem. 	ecosystem (water, carbon, nitrogen).		
Vocabulary watersheds, landforms, wetlands, water, carbon, nitrogen			

Science Curriculum – Grade 5			
Big Idea –The survival of living things is dependent upon their adaptations and ability to respond to natural changes in human influences on the environment.			
Essential Question- How do adaptations enable an organism to survive?			
Concepts	Competencies	Resources	Assessments
<ul style="list-style-type: none"> • 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. • One species may adapt to environmental change while another may not, making it more susceptible to becoming endangered. • Species can be classified as threatened, 	<ul style="list-style-type: none"> • 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. • Use evidence to explain factors that affect changes in populations. (e.g., deforestation, disease, land use). • Identify PA plants and 	<i>Science Fusion 2017, volume A (Unit 4, Lesson 6)</i>	

<p>endangered, and extinct.</p> <ul style="list-style-type: none"> • Laws exist to protect plant and animal species. • Animal populations change over time. 	<p>animals that are threatened and endangered, and describe ways to protect them.</p>		
<p>Vocabulary</p>			

<p>Science Curriculum – Grade 5</p>			
<p>Big Idea –Humans depend upon the management and practices of agricultural systems.</p>			
<p>Essential Question-How does the growth of food and fiber sustain civilization?</p>			
<p>Concepts</p>	<p>Competencies</p>	<p>Resources</p>	<p>Assessments</p>
<ul style="list-style-type: none"> • Natural resources are an integral component for survival in different parts of the world • Natural resources are necessary for agricultural systems. • Natural resources and technological changes affect the development of civilizations through 	<ul style="list-style-type: none"> • Describe how available natural resources are utilized in agricultural systems throughout the world. • Explain how the development of civilization has been affected by natural resources and technological changes. 		

<p>the advancement of agricultural production</p> <ul style="list-style-type: none"> • Pennsylvania soil types impact the types of plants and animals grown, and the profitability of Pennsylvania farms. • Agricultural changes have been made to meet society's needs. • Agricultural production, cost, and, quality are related to environmental conditions. 	<ul style="list-style-type: none"> • Identify the soils in Pennsylvania and their impact on the growth of plants and animals on Pennsylvania farms. • Analyze the ways in which societal needs have prompted agricultural changes. 		
<p>Vocabulary</p>			

<p>Science Curriculum – Grade 5</p>			
<p>Big Idea –Sustainable use of natural resources is essential to provide for the needs and wants of all living things now and in the future.</p>			
<p>Essential Question- Why is the sustainable use of natural resources necessary?</p>			
Concepts	Competencies	Resources	Assessments
<ul style="list-style-type: none"> • Raw materials come from natural resources. • Resources are either renewable or nonrenewable • Natural resources are 	<ul style="list-style-type: none"> • Identify renewable and nonrenewable resources and describe their uses in providing humans with energy, food, housing and water 	<p>Science Fusion 2017 (volume 1) Unit 7, lessons 1-3</p>	

<p>found in specific locations on the earth.</p> <ul style="list-style-type: none"> • Recycling and waste management have an effect on the available resources. • Sustainable use of natural resources is essential for the survival of humans and other organisms. • Technological advancements impact our use of resources 	<p>and the waste derived from them.</p> <ul style="list-style-type: none"> • Identify the locations of different concentrations of fossil fuels and mineral resources, their time spans for renewability and how consumption affects their availability. • Identify the locations of different concentrations of fossil fuels and mineral resources, their time spans for renewability and how consumption affects their availability. • Analyze the effects of management practices on natural resources. • Explain how a dynamically changing environment provides for the sustainability of living systems. • 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). 		
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<p>Vocabulary sustainable use, fossil fuels, mineral resources, consumption</p>
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<p>Science Curriculum – Grade 5</p>			
<p>Big Idea –Matter has observable physical properties and the potential to mix and form new materials.</p>			
<p>Essential Question-How do scientists identify and sort materials?</p>			
Concepts	Competencies	Resources	Assessments
<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 with the smallest motion in solids progressing to the largest motion in gases. • 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, 	<ul style="list-style-type: none"> • 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 (volume 2) Unit 13, lessons 2 and 3</i></p>	

<p>solubility, all of which are independent of the mass or volume of the sample.</p> <ul style="list-style-type: none"> • Changing a substance’s state of matter may change its density but not its composition • All matter is made up of building blocks called atoms. Atoms are characterized by their parts including protons, electrons, and neutrons • Elements are the basic building blocks of matter that cannot be broken down chemically and are made up all of the same type of atoms. • There are over one hundred known elements each with characteristic properties from which all other matter is made • When two or more substances are combined, they may form a mixture and maintain their original properties or they may react chemically to form a new substance with new properties. • Compounds may only 	<ul style="list-style-type: none"> • Intentionally left blank- repeat of above two competencies 		
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<p>be broken down into simpler types of matter (elements) by chemical means.</p>			
<p>Vocabulary matter, atoms, protons, electrons, neutrons, elements, mixture, compounds</p>			

<p>Science Curriculum – Grade 5</p>			
<p>Big Idea –Populations of organisms evolve by natural selection</p>			
<p>Essential Question- What allows some populations of organisms to change and survive while others cannot?</p>			
<p>Concepts</p>	<p>Competencies</p>	<p>Resources</p>	<p>Assessments</p>
<ul style="list-style-type: none"> • Individual organisms with certain traits are more likely than others to survive and have offspring. • 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) 	<ul style="list-style-type: none"> • Identify examples of the relationship(s) between structure and function in the living world. • Provide examples of when it is correct to use the terms “scientific theory” as opposed to an opinion. 	<p>Science Fusion, 2017</p>	

<ul style="list-style-type: none"> • Genes can randomly change or mutate, causing changes in certain traits of the offspring. • Changes in environmental conditions can affect the survival of populations and entire species. • Inherited traits can increase their frequency in successive generations so that descendants are very different from their ancestors. • Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival. 			
<p>Vocabulary traits, hereditary, chromosomes, cells, organisms, reproduce, offspring, genes, inherited traits, generations, extinction</p>			

<p>Science Curriculum – Grade 5 Big Idea –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>

Essential Question- What causes the great variation at Earth’s surface?			
Concepts	Competencies	Resources	Assessments
<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. • Everything on or near the earth is pulled toward Earth’s center by a gravitational force. Celestial revolutions are caused by gravitational attraction. • The rhythms of the Earth are caused by 3 celestial motions: The Earth’s rotation, revolution around the sun, and the Moons’ revolution around the Earth. • The Earth’s rotation around its tilted axis causes day and night. • The Earth’s revolution around the Sun causes the seasons and the year. Because of the Earth’s tilted axis, sunlight falls more intensely on different parts of the earth during 	<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><i>Science Fusion, 2017- volume 2- unit 8 lessons 1 and 2</i></p> <p><i>Science Fusion, 2017 digital lessons- grade 4, unit 5</i></p>	

<p>different parts of the year, producing the seasons and seasonal patterns in weather.</p> <ul style="list-style-type: none"> • The Moon’s revolution around the earth once in about 28 days changes what part of the moon is lighted by the sun and how much of that part we can see from the earth, giving rise to lunar phases. • The cycling of water in and out of the atmosphere plays an important role in determining climatic patterns. • The atmosphere circulates in large scale patterns which steer weather systems due to heat from the sun. • Large scale wind patterns drive surface currents in the oceans and affects weather. • The circulation of the ocean and atmosphere carries heat energy and has a strong influence on climate around the world. • Interaction of circulating air masses gives rise to 			
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<p>a wide variety of weather phenomena including fronts, mid-latitude cyclones (and anti-cyclones), and severe weather (tropical storms, tornados, severe thunderstorms, etc.).</p> <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 leads to the creation and destruction of ocean basins, motion of continents relative to one another, earthquakes, volcanic eruptions, and development of mountain belts. • Some changes in Earth’s surface are abrupt, such as earthquakes, volcanoes, meteor impacts, and landslides. Others are gradual, such as the lifting up of mountains or their wearing away by erosion. • Thousands of layers of 			
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<p>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.</p> <ul style="list-style-type: none"> • 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. • Human activities change land cover and land use patterns, add or remove nutrients from ecosystems and modify some of the fundamental cycles of the earth system, including the carbon cycle. These changes can have unexpected and far-reaching effects due to the complex interconnections among earth systems. 			
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Vocabulary
 metallic core, gravitational force, celestial revolutions, rhythms, revolution, axis, lunar phases, climatic patterns, weather systems, weather phenomena, fronts, mid-latitude cyclones, anti-cyclones, tropical storms, tornados, thunderstorms, earthquakes, volcanic

eruptions, development of mountain belts, meteor impacts, landslides, sedimentary rock, interconnections

Science Curriculum – Grade 5			
Big Idea –Energy is neither created nor destroyed. Energy can be transformed from one form to another, but transformation between forms often results in the loss of useable energy trough the production of heat.			
Essential Question- How do energy transformations explain that energy is neither created nor destroyed?			
Concepts	Competencies	Resources	Assessments
<ul style="list-style-type: none"> • Energy appears in different forms and can be transformed within a system. • Energy can be transformed within a system or transferred from one system to another (or from a system to its environment) in different ways. Thermal energy is transferred from warmer objects to cooler objects. Mechanical energy can be transferred when two objects push or pull on one another. Electromagnetic energy can be transferred when an electrical source such as a 	<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. • Compare and contrast characteristics of celestial bodies found in the solar system. 	<p>Science Fusion, 2017</p>	

<p>battery or generator is connected in a complete circuit to an electrical device. Chemical energy is transferred when particles are rearranged in a chemical reaction.</p> <ul style="list-style-type: none"> • Heat energy is usually a by-product of an energy transformation • Heat moves in predictable ways, normally flowing from warmer objects to cooler ones, until the objects reach the same temperature • Batteries store chemical energy and transform it into electrical energy. • The sun is the main source of energy for biological systems on the surface of the earth. • Plants transform light energy into chemical energy, which then can be used by other living things. • Energy from the sun warms air and water, which creates moving currents within them. This movement causes changes on the earth's 			
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surface.			
Vocabulary			