

**DIOCESE OF HARRISBURG
SCIENCE CURRICULUM
GRADE 1
Physical Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.	How can one explain the structure, properties, and interactions of matter?	N/A	N/A	N/A	N/A	N/A		
Interactions between any two objects can cause changes in one or both.	How can one explain and predict interactions between objects within systems?	N/A	N/A	N/A	N/A	N/A		
Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.	How is energy transferred and conserved?	N/A	N/A	N/A	N/A	N/A		
Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.	How are waves used to transfer energy and information?	Sound can make matter vibrate, and vibrating matter can make sound. (PS4.A)	Plan and conduct investigations to provide evidence that vibrating materials can make sound. (1-PS4.1)	Energy Investigation Materials Sound Vibration Waves	3.2.3.B5 3.2.4.B5 3.2.1.B5	S4.A.1.1 S4.1.3.1 S4.A.2.1.4 S4.A.1.3.3		

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Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.	How are waves used to transfer energy and information?	An object can be seen when light reflected from its surface enters the eyes. (PS4.B)	Investigate and explain that for an object to be seen, light must be reflected off the object and enter the eye. (1-PS4-2)	Energy Light Reflection Surface Wave				
		Light travels from place to place. (PS4.B)	Make observations to construct an evidence-based account that light travels from place to place.	Light	3.2.3.B5	S4.A.1.3.3 S4.A.2.1.3		
		Mirrors can be used to reflect light. (PS4.B)	Plan and conduct an investigation to redirect light beams using mirrors. (1-PS4-3)	Light beam Mirror Reflection	3.2.3.B5 3.2.4.B5 3.2.1.B5	S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
		Materials allow light to pass through them in varying degrees. (PS4.B)	Investigate to determine the effect of placing objects made of different materials in a beam of light. (1-PS4.3)	Materials Opaque Translucent Transparent	3.2.3.B5	S4.A.1.3.2 S4.A.2.1.3		

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Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.	How are waves used to transfer energy and information?	Objects can be seen if light is available to illuminate the object or if they give off their own light. (PS4.B)	Make observations to construct an evidence-based account that objects can be seen when illuminated. (1-PS4-2)	Illuminate Light	3.2.1.B5 3.2.1.B7	S4.A.2.1.3		
		A variety of devices are used to communicate over long distances. (PS4.C)	Use tools and materials to design a device that uses light or sound to solve the problem of communicating over a distance. (1-PS4-4)	Communicate Distance Sound	3.4.3.D1 3.2.1.B7	S4.A.2.2		
		People depend on various technologies in their lives; human lives would be different without technology. (PS4.C)	Design and build a device that uses light to communicate. (1-PS4-4)	Communicate Design Device	3.2.1.B7 3.4.3.E4	S4.A.1.1		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 1 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The universe is composed of a variety of different objects, which are organized into systems each of which develops according to accepted physical processes and laws.	What is the universe, and what is Earth’s place in it?	Observable changes and patterns in the sky are caused by motions in the Earth-moon-sun system. (ESS1.A)	Use observations of stars, moon, and sun in the day and night sky to describe patterns that can be predicted. (1-ESS1-1)	Changes Describe Moon Observe Pattern Predict Star Sun System	3.3.2.B1 3.3.4.B1 3.3.4.B2 3.3.PK.B.1	S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3 S4.D.3.1.1 S4.D.3.1.2		
		The motion of the sun, moon and earth relates to time. (days, months, years) (ESS1.B)	Use observations to compare the motion of the sun, earth and moon as it relates to time. (1-ESS1-1)	Earth Moon Motion Sun	3.3.2.B1 3.3.3.B1	S4.A.1.3.1 S4.D.3.1.2		
		Observable changes and patterns in the sky are caused by motions in the Earth-moon-sun system. (ESS1.A)	Observe and describe patterns of objects in the sky that are cyclic and can be predicted. (1-ESS1-2)	Pattern	3.3.2.B1 3.3.4.B2 3.3.3.B1 3.3.3.B3	S4.A.3.3.1 S4.A.3.3.2		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>The universe is composed of a variety of different objects, which are organized into systems each of which develops according to accepted physical processes and laws.</p>	<p>What is the universe, and what is Earth’s place in it?</p>	<p>Patterns of the motion of the sun, moon, and stars in the sky can be observed, described and predicted. (ESS1.A)</p>	<p>Observe, describe, and predict patterns of daily change in the appearance and visibility of the moon and sun. (1.ESS1-2)</p>	<p>Predict Sky Sunrise Sunset</p>	<p>3.3.3.B1 3.3.4.B2</p>	<p>S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3 S4.D.3.1.1 S4.D.3.1.2 S4.D.3.1.3</p>		
		<p>Seasonal patterns of sunrise and set can be observed, described and predicted. (ESS1.B)</p>	<p>Observe, describe, and predict patterns of seasonal change in the timing and position of sunrise and sunset. (1-ESS1-2)</p>	<p>Sunrise Sunset</p>	<p>3.3.2.B1</p>	<p>S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.D.3.1.1 S4.D.3.1.2</p>		
		<p>Through the use of tools and or media, objects can be observed more clearly than with the naked eye.</p>	<p>Use scientific tools such as binoculars or telescopes to enhance observations.</p>	<p>Binocular Telescope Tools</p>	<p>3.3.4.B1 3.3.4.B2</p>	<p>S4.A.1.1 S4.A.1.3 S4.A.1.3.1 S4.A.2.2.1 S4.A.3.2 S4.A.3.3 S4.A.3.3.1 S4.A.3.3.2 S4.D.3.1.1 S4.D.3.1.2</p>		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is the Earth constantly changing?	N/A	N/A	N/A	N/A	N/a		
The Earth's processes affect and are affected by human activities.	How do Earth's processes and human activities affect each other?	N/A	N/A	N/A	N/A	N/A		

**DIOCESE OF HARRISBURG
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Life Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
All organisms are made of cells and can be characterized by common aspects of their structure and functioning.	How do organisms live, grow, respond to their environment and reproduce?	Organisms have external structures that serve various functions in growth, survival, behavior, and reproduction. (LS1.A)	Observe and categorize living and nonliving things by external characteristics. (1-LS1-1)	Organism Structures	3.1.4.A 3.1.4.B	S4.B.1.1.2 S4.B.1.1.3 S4.B.1.1.4 S4.B.1.1.1 S4.B.1.1.2		
		Organisms have external structures that help them survive, grow and meet their needs. (LS1.A)	Make observations and describe the different parts of organisms that help them survive, grow, and meet their needs. (1-LS1-2)	Grow Movement Observations Parts (roots, leaves, flowers, stems, fruit) Reproduce Survival Survive	3.1.2.C	S4.A.3.1.1 S4.B.1.1.1 S4.B.1.1.3		
			Design a model that replicates the function of an organism's structure. (1-LS1-1)	Behavior Model	3.1.4.A	S4.B.1.1.1 S4.B.1.1.3 S4.B.1.1.4 S4.A.2.1.1		
		Parents and offspring engage in behaviors that help the offspring to survive. (LS1.B)	Observe and determine patterns in behavior of parents and offspring that help offspring survive. (1-LS1-2)	Behavior Observe Offspring Patterns	3.1.2.C	S4.A.3.1.1 S4.B.1.1.1 S4.B.1.1.3		

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Organisms have external structures that help them survive, grow and meet their needs.	Organisms have external structures that help them survive, grow and meet their needs.	Organisms have external structures that help them survive, grow and meet their needs. (LS1.A)	Classify plants and animals according to physical characteristics they share. (1-LS1-1)	Classify Physical characteristic	3.1.4.A	S4.B.1.1 S4.B.1.1.1 S4.B.1.1.3		
		Every human made product is designed by applying knowledge of the natural world and is built using material from nature. (LS1.A)	Use materials to design a solution to a human problem by mimicking how plants or animals use their external parts to help them survive, grow and meet their needs. (1-LS3-1)	Mimic Problem Solution	3.1.4.A 3.6.4.A	S4.A.1.1.2 S4.B.1.1.3		
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	N/A	N/A	N/A	N/A	N/A		

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Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explains why offspring resemble, but are not identical to, their parents.	How are the characteristics of one generation passed to the next? How can individuals of the same species and even siblings have different characteristics?	Young animals are very much but not exactly like their parents. Plants also are very much, but not exactly like their parents. (LS3.A)	Make observations and construct an evidence-based account that young plants and animals are alike but not exactly like their parents. (1-LS3-1)	Similar Vary	3.1.4.B 3.1.4.C 3.1.KB1	S4.B.2.2.1		
		Adult plants and animals have young. In many kinds of animals, parents and the offspring engage in behaviors that help the offspring to survive. (LS1.B)	Note patterns in characteristics or behaviors that appear in adult and offspring (e.g. hair color, eye color). (1-LS1-2)	Offspring Patterns	3.1.B.5 3.1.4.B.1 3.1.B.5	S4.A.3.3.1 S4.B.2.1.2 S4.B.2.2.1		
		Offspring resemble their parents, but can also vary in many ways. (LS3.A)	Conduct an investigation (e.g. plant seeds, eggs) and cite evidence of change from young to adult. (1-LS3-1)	Characteristics Evidence Inherit Offspring Parents	3.1.4.B 3.1.4.C 3.1.K.A.3	S4.B.2.2.1		

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<p>Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explains why offspring resemble, but are not identical to, their parents.</p>	<p>How are the characteristics of one generation passed to the next? How can individuals of the same species and even siblings have different characteristics?</p>	<p>Plants and animals have a life cycle.</p>	<p>Observe and compare the stages of life cycles of organisms (plants & animals).</p>	<p>Plants Animals Life cycles</p>	<p>3.1.K.A.3</p>	<p>S4.A.3.3.1 S4.B.1.1.5</p>		
<p>Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.</p>	<p>How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>		

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Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.	How can one explain the structure, properties, and interactions of matter?	Different kinds of matter exist in various states. (PS1.A)	Observe, describe, and classify matter by properties and uses (e.g., size, shape, weight, solid, liquid, gas.) (2-PS1-1)	Classify Describe Gas Liquid Matter Patterns Solid Weight	3.2.3.A1 3.2.4.A1 3.2.2.A2	S4.C.1.1.1 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
		Matter can be described and classified by its observable properties. (PS1.A)	Observe, describe, and classify matter by properties and uses (e.g., size, shape, weight, texture, flexibility, hardness, color, etc.) (2-PS1-1)	Color Flexibility Gas Liquid Matter Properties Solid Texture Weight	3.2.3.A1 3.2.4.A1 3.2.3.A2 3.2.K.A.1	S4.C.1.1.1 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
		Different kinds of matter exist in various states, depending on temperature. (PS1.A)	Plan and carry out investigations to test the idea that warming some materials causes them to change from solid to liquid and cooling causes them to change from liquid to solid. (2-PS1-1)	Investigations Liquid Solid	3.2.1.A.1 3.2.1.A.3 3.2.2.A.3 3.2.3.A.3	S4.C.1.1.1 S4.A.1.1 S4.A.1.3.1 S4.A.2.1.4		

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Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.	How can one explain the structure, properties, and interactions of matter?	Matter can be described and classified by its observable properties. (PS1.B)	Plan and carry out investigations to test the idea that warming some materials causes them to change from solid to liquid and cooling causes them to change from liquid to solid. (2-PS1-1)	Liquid Solid	3.2.1.A.3 3.2.1.A.4 3.2.K.A.1	S4.1.1.2 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
		Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (PS1.B)	Construct an argument and provide evidence that some changes caused by heating and cooling can be reversed and some cannot. (2-PS1-4)	Argument Boiling Cause and effect Evidence Freezing Melting Reverse	3.2.2.A.3 3.2.1.A.4	S4.C.1.1.1 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
		Different properties are suited for different purposes. (PS1.A)	Analyze data from testing objects made from different materials to determine if a proposed object functions as intended. (2-PS1-2)	Data Functions Test		S4.C.1.1.2 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		

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Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.	How can one explain the structure, properties, and interactions of matter?	A great variety of objects can be built up from a small set of pieces.(PS1.A)	Design an object built from a small set of pieces to solve a problem and compare solutions designed by peers given the same set of pieces. (2-PS1-3)	Construct Design Engineer Problem solving Solutions		S4.A.3.2.B S4.A.3.2 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
			Make observations of how an object made of small set of pieces can be disassembled and made into a new object. (2-PS1.3)	Construct Design Disassemble Engineer Problem solving Solutions		S4.A.3.2.B S4.A.3.2 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
Interactions between any two objects can cause changes in one or both.	How can one explain and predict interactions between objects within systems?	N/A	N/A	N/A	N/A	N/A		
Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.	How is energy transferred and conserved?	N/A	N/A	N/A	N/A	N/A		
Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.	How are waves used to transfer energy and information?	N/A	N/A	N/A	N/A	N/A		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The universe is composed of a variety of different objects, which are organized into systems each of, which develops according to accepted physical processes and laws.	What is the universe and what is Earth’s place in it?	N/A	N/A	N/A	N/A	N/A		
The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	Earth has changed over time with some changes being rapid and others being slow. Sometimes changes occur over a longer period of time than one may be able to observe. (ESS1.C)	Make observations from multiple sources to provide evidence that Earth’s events can occur quickly or slowly. (2-ESS1.1)	Erosion Weathering	3.3.4.A1	S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3		

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The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	Wind and water change the shape of the landscape. (ESS2.A)	Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. (2-ESS2-1)	Earth materials Erosion Landform Weathering	3.3.3.A1 3.3.4.A1	S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3		
The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	Maps display different land and water features and help show patterns in the distribution of rocks and other geological and geographical features. (ESS2.B)	Describe kinds and shapes of patterns of landforms and bodies of water. (2-ESS2-2)	Geographic Geologic Geological Lentic Lotic Map Pennsylvania features	3.3.4.A6	S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3		

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The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	Maps show where things are located. One can map the shapes and kinds of land and water in an area. (ESS2.B)	Develop a model to represent the shapes and kinds of land and bodies of water in an area. (2-ESS2-2)	Model	3.3.4.A6	S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3		
		Water is found in the ocean, rivers, lakes, ponds, and as groundwater beneath the surface. Water exists as solid ice, in liquid form, and as a vapor. (ESS2.C)	Investigate and represent the various forms of water in their local environment on Earth, and also on other planets and moons. Use observations to construct explanations that water exists in different forms in natural landscapes. (2-ESS2-3)	Accumulation Condensation Earth Evaporation Groundwater Lake Landscape Liquid Moon Ocean Planet Pond Precipitation River Solid/Ice Types of clouds Vapor/Gas	3.3.3.A4 3.3.4.A4	S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3		

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The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	Water is found in the ocean, rivers, lakes, ponds, and as groundwater beneath the surface. Water exists as solid ice, in liquid form, and as a vapor. (ESS2.C)	Use observations to construct explanations that water exists in different forms in natural landscapes. (2-ESS2-3)	Accumulation Earth Groundwater Ice Lake Landscape Liquid Moon Ocean Planet Pond River Solid	3.3.4.A5 3.3.3.A5 3.3.3.A4 3.3.4.A4	S4.A.1.1 S4.A.1.2 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3		
The Earth's processes affect and are affected by human activities.	How do Earth's processes and human activities affect each other?	All materials, energy, and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways.	Investigate what resources are used in the construction of buildings, preparation of food, transportation, and other aspects of the community.	Community Energy Materials Resources Transportation	3.3.4.A2	S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3		

**DIOCESE OF HARRISBURG
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Life Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
All organisms are made of cells and can be characterized by common aspects of their structure and functioning.	How do organisms live, grow, respond to their environment, and reproduce?	N/A	N/A	N/A	N/A	N/A		
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	Animals can move around, but plants cannot, and they often depend on animals for pollination or seed dispersal. (LS2.A)	Develop a model to demonstrate different modes of seed dispersal. Plan and investigate effectiveness of different types of seed dispersal. (2-LS2-2)	Pollination Seed dispersal	3.1.4.A 3.1.4.B 3.1.4.C 4.1.4.A 4.5.4.D 4.2.4.C	S4.B.1.1.1 S4.B.1.1.5 S4.B.2.1.1		
		Different plants survive better in different settings because they have varied needs for water, nutrients, and sunlight. (LS2.A)	Plan and carry out investigations to test whether plants from different settings have different needs for water, sunlight, and type of soil. (2-LS2-1)	Soil Sunlight Minerals Water	3.1.4.A.2 3.1.4.B.5 3.1.4.C.1 4.1.4.A 4.5.4.D 4.2.4.C 3.1.5.C.1	S4.B.2.1.1 S4.B.2.1.2		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	Organisms obtain the materials they need to grow and survive from their environment. (LS2.A)	Obtain, evaluate, and communicate information that in any particular environment, some kinds of organisms survive well and some do not. (2-LS2-2)	Environment Survive	3.1.4.A.2 3.1.4.C.1 4.5.4.D 4.2.4.C 3.1.5.C.1	S4.B.2.1.1 S4.B.2.1.2		
		Plants depend on water and light to grow. (LS2.A)	Plan and conduct an investigation to determine if plants need sunlight and water to grow. (2-LS2-2)	Minerals Soil Sunlight Water	3.1.4.A.2 3.1.4.B.5 3.1.4.C.1 4.1.4.A 4.5.4.D 4.2.4.C 3.1.5.C.1	S4.B.2.1.1 S4.B.2.1.2		
Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explains why offspring resemble, but are not identical to their parents.	How are the characteristics of one generation passed to the next? How can individuals of the same species and even siblings have different characteristics?	N/A	N/A	N/A	N/A	N/A		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 2 Life Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.	How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?	Living things can survive only where their needs are met. (LS4.D)	Construct an explanation about why living things can only survive where their needs are met. (2-LS4-1)	Biodiversity Microorganisms Needs Organism Survive	3.1.4.A 3.1.4.C 4.5.4.D 4.2.4.C	S4.B.2.1.1 S4.B.2.1.2		
		There are many different kinds of living things in any area, and they exist in different places on land and in water. (LS4.D)	Observe and compare the different kinds of living things that are found in different habitats. (2-LS4-1)	Biodiversity Exist Habitats Land Living things Water	3.1.4.A 3.1.4.C 4.5.4.D 4.2.4.C	S4.B.2.1.4 S4.B.2.1.2		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 3 Physical Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.	How can one explain the structure, properties, and interactions of matter?	N/A	N/A	N/A	N/A	N/A		
Interactions between any two objects can cause changes in one or both.	How can one explain and predict interactions between objects within systems?	Each force acts on one particular object and has both strength and a direction. (PS2.A)	Investigate the variables that may affect how objects move across a floor, down a ramp, etc. (3-PS2-1)	Acceleration Force Speed Velocity	3.2.3.B1 3.2.3.B2 3.2.4.B1 3.2.4.B2 3.2.3.B6	S4.C.3.1		
		An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. (PS2.A)	Construct an explanation for why an object subjected to multiple pushes and pulls might stay in one place or move. (3-PS2-1)	Systems	3.2.4.B1	S4.C.3.1		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 3 Physical Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions between any two objects can cause changes in one or both.	How can one explain and predict interactions between objects within systems?	Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (PS2.A)	Through the use of objects, design an investigation and demonstrate that forces can cause changes on an object's speed or direction of motion. (3-PS2-1)	Design Direction Investigation Motion Speed	3.2.3.B1	S4.A.2.1 S4.A.2.1.4 S4.A.2.2 S4.A.2.2.1 S4.C.3.1 S4.C.3.1.1		
		Patterns of an object's motion in various situations can be observed and measured. (PS2.A)	Take measurements of objects in motion and represent the movement of objects in multiple representations. (3-PS2-1)	Motion Net Zero Pattern Prediction	3.2.3.B1	S4.A.1.3 S4.A.4 S4.A.1.3.1 S4.C.3.1.3		
		When past motion exhibits a regular pattern, future motion can be predicted from it. (PS2.A)	Investigate the motion of objects to determine observable and measurable patterns to predict future motions. (3-PS2-2)	Gravity Net force Pattern Predict	3.2.3.B1	S4.C.3.1		
			Provide evidence that a pattern can be use to predict future motion. (3-PS2-2)	Force Pattern	3.2.3.B1 3.2.4.B1	S4.C.3.1		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 3 Physical Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions between any two objects can cause changes in one or both.	How can one explain and predict interactions between objects within systems?	Objects in contact exert forces on each other. (PS2.B)	Design and implement an investigation to demonstrate that objects in contact exert forces on each other. (3-PS2-1)		3.2.3.B1	S4.A.2.1 S4.A.2.1.4 S4.A.2.2 S4.A.2.2.1 S4.C.3.1 S4.C.3.1.1		
Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.	How is energy transferred and conserved?	N/A	N/A	N/A	N/A	N/A		
Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.	How are waves used to transfer energy and information?	N/A	N/A	N/A	N/A	N/A		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 3 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The universe is composed of a variety of different objects, which are organized into systems each of which develops according to accepted physical processes and laws.	What is the universe, and what is Earth’s place in it?	N/A	N/A	N/A	N/A	N/A		
The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	Scientists record patterns of the weather across different times and areas of the weather so they can make predictions about what kind of weather might happen next. (ESS2.D)	Organize simple weather data sets to record local weather data and identify day-to-day variations, as well as, long-term patterns of weather. (3-ESS2-1)	Atmosphere Data Weather	3.3.3.A4 3.3.3.A5	S4.A.1.1 S4.A.1.3 S4.A.1.3.1 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 3 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	Climate describes a range of an area’s typical weather conditions and the extent to which those conditions vary over a period of many years. (ESS2.D)	Record and communicate information to describe climates in different regions of the world. (3-ESS2-2)	Climate Conditions Weather	3.3.3.A4 3.3.3.A5	S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.1.3.1 S4.A.3.2 S4.A.3.3		
			Display simple data sets in tables and graphs to display previous weather conditions to make predictions for future seasons. (3-ESS2-2)	Climate Weather	3.3.3.A4 3.3.3.A5	S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3		
The Earth’s processes affect and are affected by human activities.	How do Earth’s processes and human activities affect each other?	N/A (Note:ESS3.B is addressed by 4-ESS3-2)	N/A (Note: 3-ESS3-1 is addressed by 4-ESS3-2)	N/A	N/A	N/A		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 3 Life Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
All organisms are made of cells and can be characterized by common aspects of their structure and functioning.	How do organisms live, grow, and respond to their environment, and reproduce?	Reproduction is essential to the continued existence of every kind of organism. (LS1.B)	Use models to explain how reproduction is essential for every kind of organism. (3-LS1-1)	Life cycle Offspring Parents Reproduce Survival	3.1.4.A 3.1.4.B 3.1.4.C 4.1.4.A 4.5.4.D 4.2.4.C	S4.A.3.2 S4.B.1.1.5		
		Plants and animals have unique and diverse life cycles that include birth, growth, reproduction, and death. (LS1.B)	Develop a model to describe the commonalities of life cycles of different organisms. (3-LS2-1)	Life cycle Offspring Parents Reproduce Survival	3.1.4.A 3.1.4.B 3.1.4.C 4.1.4.A 4.5.4.D 4.2.4.C	S4.A.3.2 S4.B.1.1.5		
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	Animals depend on each other and their surroundings to get what they need, including food, water, shelter, and a stable temperature. Groups serve different functions and vary in size. (LS2.D)	Based on observations, construct an argument that some animals form groups that help members survive. (3-LS2-1)	Basic needs Consumer Heterotroph Representation Stable	3.1.4.A 3.1.4.C 3.2.4.A 3.2.4.B 3.3.4.B 3.4.4.A 3.4.4.B 3.4.4.E 4.1.4.A 4.1.4.B 4.1.4.C 4.2.4.A 4.2.4.B 4.2.4.C 4.4.4.B 4.5.4.D	S4.A.3.1.2 S4.A.3.1.3 S4.B.2.1.1 S4.B.3.1.1		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	When the environment changes in physical characteristics, temperature, availability of resources, some organisms survive, others move, yet others may die. (LS4.C)	Construct an argument with evidence that within a specific habitat, some organisms survive well, and others cannot survive at all. (3-LS4-3)		3.1.4.A 3.1.4.B 3.1.4.C 3.1.4.E 3.2.4.A 3.2.4.B 3.3.4.A 3.3.4.B 3.4.4.B 3.4.4.D 3.4.4.E 4.1.4.A 4.1.4.E 4.4.4.A 4.4.4.D 4.5.4.A 4.5.4.C	S4.B.3.2.1 S4.B.3.2.2 S4.B.3.2.3 S4.A.1.1.1 S4.A.1.3.2 S4.A.1.3.4 S4.A.3.2.1 S4.A.3.3.2		
Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explains why offspring resemble, but are not identical to their parents.	How are the characteristics of one generation passed to the next? How can individuals of the same species and even siblings have different characteristics?	Different organisms vary in how they look and function because they have different inherited information. (LS3.B)	Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. (3-LS3-1;3-LS3-2)	Inheritance Traits	3.1.3.B1	S4.A.2.1.3 S4.B.2.2		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explains why offspring resemble, but are not identical to their parents.	How are the characteristics of one generation passed to the next? How can individuals of the same species and even siblings have different characteristics?	The environment also affects the traits that an organism develops. (LS3.B)	Use evidence to support explanation that the environment can influence traits. (3-LS3-2)	Environment Evidence Influence	3.1.3.B1	S4.A.2.1.3 S4.B.2.2		
		Many characteristics involve both inherited and environmental factors. (LS3.B)	Use evidence to compare characteristics inherited from parents, characteristics caused by the environment, and those resulting from both. (3-LS3-1; 3-LS3-2)	Characteristics Environmental factors Generation Inherited Siblings Traits Variation	3.1.4.A 3.1.4.B 3.1.4.C 4.5.4.D 4.2.4.C	S4.B.2.1.1 S4.B.2.2.1		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.</p>	<p>How can there be so many similarities among organisms yet so many different kinds of plants, animals and microorganisms?</p>	<p>Some plants and animals that once lived on earth are no longer found anywhere. (LS4.A)</p>	<p>Analyze and interpret data from fossils to provide evidence of the organisms and environments in which they lived long ago. (3-LS4-1)</p>	<p>Extinct Fossils</p>		<p>S4.A.2.1.4</p>		
		<p>Fossils provide evidence about types of organisms that lived long ago as well as about the nature of the environment. (LS4.A)</p>	<p>Analyze and interpret data from fossils to provide evidence of the organisms and environments in which they lived long ago. (3-LS4-1)</p>	<p>Extinct Fossils</p>	<p>3.1.2.C3 3.1.3.C3</p>	<p>S4.A.2.1.4</p>		
		<p>Changes in an organism’s habitat can be beneficial or harmful to the organism. (LS4.D)</p>	<p>Use evidence to argue that when the environment changes in ways that affect a place’s physical characteristics, organisms may survive, move to new locations, or die. (3-LS4-3)</p>	<p>Adapt Endangered Habitat</p>	<p>3.1.4.A 3.1.4.B 3.1.4.C 3.1.4.E 3.2.4.A 3.2.4.B 3.3.4.A 3.3.4.B 3.4.4.B 3.4.4.D 3.4.4.E 4.1.4.A 4.1.4.E 4.4.4.A 4.4.4.D 4.5.5.A 4.5.4.C</p>	<p>S4.B.3.2.1 S4.B.3.2.2 S4.B.3.2.3 S4.A.1.1.1 S4.A.1.3.2 S4.A.1.3.4 S4.A.3.2.1 S4.A.3.3.2</p>		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 3 Life Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.	How can there be so many similarities among organisms yet so many different kinds of plants, animals and microorganisms?	Populations live in a variety of habitats and changes in those habitats impacts the organisms living there. (LS4-D)	Using evidence, make a claim about merits of solutions to problems caused when the environment changes and types of animals and plants that live there may change. (3-LS4-4)	Habitats Populations	3.1.4.A 3.1.4.B 3.1.4.C 3.1.4.E 3.2.4.A 3.2.4.B 3.3.4.A 3.3.4.B 3.4.4.B 3.4.4.D 3.4.4.E 3.1.3.A 4.1.4.E 4.4.4.A 4.4.4.D 4.5.4.A 4.5.4.C	S4.B.3.2.1 S4.B.3.2.2 S4.B.3.2.3 S4.A.1.1.1 S4.A.1.3.2 S4.A.1.3.4 S4.A.3.2.1 S4.A.3.3.2		
		Sometimes differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (LS4.B)	Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates and reproducing. (3-LS4-S)			S4.A.1.3.4		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.</p>	<p>How can there be so many similarities among organisms yet so many different kinds of plants, animals and microorganisms?</p>	<p>Fossils provide evidence about the types of organisms (both visible and microscopic) that lived long ago and also about the nature of their environments. (LS4-A)</p>	<p>Use evidence to construct an explanation that some rocks and minerals record the remains of organisms. (3-LS4-1)</p>	<p>Fossils Microscopic</p>	<p>3.1.4.A 3.1.4.C 4.5.4.D 4.2.4.C</p>	<p>S4.B.2.1.2</p>		
			<p>Obtain and communicate information that some organisms that once lived on earth are no longer found anywhere, although other organisms now may resemble them. (3-LS4-1)</p>	<p>Microscopic organism Organism Visible organism</p>	<p>3.1.4.A 3.1.4.C 4.5.4.D 4.2.4.C</p>	<p>S4.B.2.1.2</p>		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 3 Life Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.	How can there be so many similarities among organisms yet so many different kinds of plants, animals and microorganisms?	Fossils can be compared with one another and to living organisms according to their similarities and differences. (LS4.A)	Use evidence from fossil records to construct an explanation of the relationship between types of organisms living today and types of organisms that lived in the past. (3-LS4-4)	Explanation Fossil record	3.1.4.A 3.1.4.C 4.5.4.D 4.2.4.C	S4.B.2.1.2		
			Use evidence to construct explanations for how environments today may be different from past environments in which fossilized organisms once lived. (3-LS4-4)	Fossil	3.1.4.A 3.1.4.C 4.5.4.D 4.2.4.C	S4.B.2.1.2		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.	How can there be so many similarities among organisms yet so many different kinds of plants, animals and microorganisms?	Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (LS4.B)	Use evidence to explain how some characteristics that vary among individuals of the same kind of organism can provide advantages to survive, find mates, and reproduce. (3-LS4-2)	Reproduce Survive	3.1.3.C1 3.1.4.A 3.1.4.C 4.5.4.D 4.2.4.C	S4.B.2.1.2		
		Humans, like all other organisms, obtain living and nonliving resources from their environments.	Use evidence to demonstrate how humans, like all other organisms, obtain living and nonliving resources from their environment.	Living Nonliving	3.1.4.A 3.1.4.C 3.1.4.E 3.2.4.A 3.2.4.B 3.3.4.B 3.4.4.A 3.4.4.B 3.4.4.E 3.4.4.D 4.1.4.A 4.1.4.B 4.1.4.E 4.2.4.A 4.3.4.A 4.4.4.A 4.4.4.B 4.4.4.D 4.5.5.A 4.5.4.C	S4.B.3.3.1 S4.B.3.3.2 S4.B.3.3.3 S4.B.3.3.4 S4.B.3.3.5 S4.A.1.1.2 S4.A.1.3.5 S4.A.3.1.4		

**DIOCESE OF HARRISBURG
SCIENCE CURRICULUM
GRADE 4
Physical Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions between any two objects can cause changes in one or both.	How can one explain and predict interactions between objects within systems?	When objects touch or collide, they push on one another and can change motion or shape. Magnets create a magnetic field that can exert an attracting or repelling force on other objects that can affect motion. (PS2.B) (PS3.C)	Investigate the forces between two or more magnets to identify patterns. (3-PS2-4) (3-PS2-2)	Attract Collision Friction Gravity Magnets Repel	3.2.3.B1 3.2.3.B2 3.2.4.B1 3.2.4.B2 3.2.4.B4	S4.C.3.1		
		Magnets create a magnetic field that can exert an attracting or repelling force on other objects that can affect motion. (PS2.B)	Investigate the push-and-pull forces between objects not in contact with one another. (3-PS2-3)	Attract Collision Magnets Repel	3.2.3.B1 3.2.3.B2 3.2.4.B1 3.2.4.B2 3.2.4.B4	S4.C.3.1		

**DIOCESE OF HARRISBURG
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GRADE 4
Physical Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions between any two objects can cause changes in one or both.	How can one explain and predict interactions between objects within systems?	When objects touch or collide, they push on one another and can change motion or shape. Magnets create a magnetic field that can exert an attracting or repelling force on other objects that can affect motion. (PS2.A)	Design and refine solutions to a problem by using magnets to move objects not in contact with one another. (3-PS2-3)	Attract Collision Magnets Repel	3.2.3.B1 3.2.3.B2 3.2.4.B1 3.2.4.B2 3.2.3.B6 3.2.4.B4	S4.C.3.1		
		Materials that allow electricity to flow are conductors; those that do not are insulators. (PS3.A)	Investigate and describe conductors and insulators.	Conductor Electricity Insulator	3.2.4.B4	S4.C.1.1.1 S4.C.2.1.3		
		Electrical circuits require a complete loop through which an electrical current can pass. (PS3.A)	Construct serial and parallel circuits and describe the path of electrons in the circuit. (4-PS3-1)	Parallel circuit Serial circuit System	3.2.4.B4	S4.C.2.1.3		
		An open circuit is an incomplete electric pathway; a closed circuit is a complete pathway. (PS3.A)	Demonstrate and explain open and closed circuits utilizing switches. (4-PS3-1)	Closed circuit Open circuit Switch System	3.2.3.B4 3.2.4.B4	S4.C.2.1.3		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 4 Physical Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions between any two objects can cause changes in one or both.	How can one explain and predict interactions between objects within systems?	A core of iron or steel becomes an electromagnet when electricity flows through a coil of insulated wire surrounding it. (PS3.B) (PS2.B)	Construct an electromagnet and plan an investigation to determine how one can make the electromagnet stronger or weaker. (4-PS3-4) (3-PS2-3)	Current Electromagnet System	3.2.6.B 3.2.4.B6 3.2.5.B3 3.2.5.B4	S4.A.2.1.3		
		Electromagnetic forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects. (PS3.B) (PS2.B)	Plan and carry out an investigation to determine factors that affect the strength of electric and magnetic forces. (4-PS3-4) (3-PS2-3)	Current Electromagnetic Forces	3.2.5.B4 3.4.7.C 3.6.7.C	S4.A.2.1.3		

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GRADE 4
Physical Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions between any two objects can cause changes in one or both.	How can one explain and predict interactions between objects within systems?	A system can appear to be unchanging when processes within the system are going on at opposite but equal rates (e.g., water behind a dam is at a constant height because water is flowing in at the same rate that water is flowing out).	Construct an explanation using data why an object subjected to multiple pushes or pulls might stay in one place or move.	Pull Push Systems	3.2.4.B1	S4.C.3.1		
Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.	How is energy transferred and conserved?	Magnets can exert forces on other magnets or on materials, causing energy transfer between them (e.g., leading to changes in motion) even when the objects are not touching. (PS2.B)	Demonstrate the energy transfer between two objects using a magnet and another object. (3-PS2-3)	Energy Force Magnet Transfer	3.2.4.B2 3.2.5.B.4	S4.A.1.1 S4.1.3.1 S4.A.2.1.4		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.	How is energy transferred and conserved?	The faster a given object is moving, the more energy it possesses. (PS3.A)	Use evidence to construct an explanation for the relationship between speed, energy and motion. (4-PS3-2)	Energy Motion	3.2.3.B2	S4.C.2.1 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
		Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (PS3.A)	Carry out investigations to provide evidence that energy is transferred from place to place by sound, light, heat, electric currents, interacting magnets, and moving or colliding objects. (4-PS3-2)	Collision Electric current Energy Heat Light Magnets Sound Transformation	3.2.4.B.2 3.2.3.B.2	S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
			Obtain and communicate information for how technology allows humans to concentrate, transport, and store energy for practical use.	Electric current Energy Light Sound	3.2.3.B2 3.2.4.B.2	S4.C.2.1 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.	How is energy transferred and conserved?	Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (PS3.A)	Design and construct a device that converts energy from one form to another using given design criteria. (4-PS3-4)	Electric current Energy Energy conversion Light Sound	3.2.3.B.2 3.2.4.B.2 3.2.5.B.2	S4.C.2.1 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
			Design and test a solution to a problem that utilizes the transfer of electric energy in the solution using given design constraints. (4-PS3-4)	Electric current Energy Light Sound Transfer	3.2.3.B2	S4.C.2.1 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
		Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (ESS3.A)	Develop a model using examples to explain differences between renewable and non-renewable sources of energy. (4-ESS3-1)	Electric current Light Non-renewable energy Renewable energy Sound	3.2.3.B2	S4.C.2.1 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.	How is energy transferred and conserved?	Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (P S3.B)	Carry out investigations to provide evidence that energy is transferred from place to place by sound, light, heat, electric currents, interacting magnets, and moving or colliding objects. (4-PS3-4)	Collision Electric current Energy transfer Light Magnet Sound	3.2.4.B.2 3.2.5.B.4	S4.C.3.1 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
			Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electrical currents. (4-PS3-2)	Electric current Energy transfer Light Sound	3.2.3.B2	S4.C.2.1 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
		Energy is present whenever there are moving objects, sound, light, or heat. (PS3.B)	Construct an explanation for the relationship between energy and motion. (4-PS3-2) (4-PS3-3)	Energy Light Sound	3.2.3.B2 3.2.4.B6	S4.C.2.1 S4.a.1.1 S4.1.3.1 S4.A.2.1.4		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.	How is energy transferred and conserved?	When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air. As a result, the air gets heated and sound is produced. (PS3.C)	Construct an investigation to demonstrate the relationship between energy and motion. (4-PS3-3)	Collision Energy Energy transfer Heat Force Light Motion Sound	3.2.3.B2 3.2.4.B6	S4.C.2.1 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
		When objects collide, the contact forces transfer energy so as to change the motion of each object. (PS3.C)	Ask questions and predict outcomes about the changes in energy that occur when objects collide. (4-PS3-3)	Collision Energy Energy transfer Force Motion	3.2.4.B2	S4.C.3.1 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.	How is energy transferred and conserved?	The expression “produce energy” typically refers to the conversion of stored energy into a desired form for practical use. It is important to be able to concentrate energy so that it is available for use where and when it is needed (e.g., batteries). (PS3.D)	Obtain and communicate information explaining how technology allows humans to concentrate, transport, and store energy for practical use. (4-PS3-4)	Battery Conversion Energy Production Stored Energy	3.2.12.B5	S4.C.2.1.1 S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.	How are waves used to transfer energy and information?	Waves are regular patterns of motion, and can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; it does not move horizontally. (PS4.A)	Identify the patterns of waves by observing their motion in water. (4-PS4-1)	Energy Information Motion Waves	3.2.4.B5 3.2.4.B6	S4.A.1.1 S4.1.3.1 S4.A.2.1.4		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.	How are waves used to transfer energy and information?	Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; it does not move in the direction of the wave—observe, for example, a bobbing cork, or seabird—except when the water meets the beach. (PS4.A)	Plan data collection methods and make observations to provide evidence that waves transfer energy to objects. (4-PS4-1)	Energy transfer Waves	3.2.4.B5 3.2.4.B6	S4.A.1.1 S4.1.3.1 S4.A,.2.1.4		
		Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (PS4.A)	Use a model to describe the amplitude and wave. (4-PS4-1)	Amplitude Wavelength Waves	3.2.4.B5 3.2.4.B6	S4.A.1.1 S4.1.3.1 S4.A.2.1.4		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.	How are waves used to transfer energy and information?	Earthquakes cause seismic waves, which are waves of motion in the Earth's crust. (PS4.A)	Describe how similar seismic waves are to other types of waves. (4-PS4-1)	Earthquake Seismic Waves	3.2.4.B5 3.2.4.B6	S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
		An object can be seen when light reflected from its surface enters the eyes. (PS4.B)	Investigate and provide evidence that the color people see depends on the color of the available light sources as well as the properties of the surface of the object reflecting the light. (4-PS4-2)	Reflection Refraction	3.2.3.B5 3.2.4.B5	S4.A.1.1 S4.1.3.1 S4.A.2.1.4		
		The color people see depends on the color of the available light sources as well as the properties of the surface. (PS4.B)	Investigate and provide evidence that the color people see depends on the color of the available light sources as well as the properties of the surface of the object reflecting the light. (4-PS4-2)	Color Reflection	3.2.3.B5 3.2.4.B5	S4.A.1.1 S4.1.3.1 S4.A.2.1.4		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.	How are waves used to transfer energy and information?	Digitized information (e.g., the pixels of a picture) can be stored for future recovery or transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (PS4.C)	Obtain and communicate information about modern devices that are used to transmit and receive digital information. (4-PS4-3)	Decode Digitized information Encode Pixels Transmit	3.4.4.B1 3.4.4.B3	S4.A.1.1 S4.1.3.1 S4.A.2.1.4		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 4 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed.	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. (4-ESS1-1)	Fossils Rock formations	3.3.3.A1 3.3..A.3			
The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms and gravity break rocks, soils, and sediments into smaller particles and move them around. (ESS2.A)	Make observations and measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation (heating cooling, volume of water, speed of wind, deposition, slope, angles, etc.). (4-ESS2-1)	Deposition Erosion Vegetation Weathering	3.3.5.A1	S4.D.11 S4.A.1.3.3		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	Living things affect the physical characteristics of their regions.	Make observations and document how living things affect the physical characteristics in different regions. (4-ESS2-1)	Physical characteristics				
		The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. (ESS2.B)	Analyze and interpret data from maps to describe patterns of Earth’s features. (4-ESS2-2)	Biogeology Earthquake Geographic Geologic Hazards Mountain range Natural Plate tectonics Trench Volcano	3.3.4.A1 4.5.4.D	S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 4 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns.	Analyze and interpret data from maps to describe Earth’s features (e.g., mountains, valleys, caves, sinkholes, lakes, rivers, peninsulas, lentic/lotic water systems, etc.). (4-ESS2-3)	Analyze Features Interpret				
		Water occurs underground, above ground, and in the atmosphere.	Identify various types of water environments in Pennsylvania.	Lakes Lentic Lotic Ponds Rivers Streams Watersheds		S4.D.1.1.1 S4.D.1.1.2 S4.D.1.1.3		
		Many types of rocks and minerals are formed from the remains of organisms or are altered by their activities. (ESS1.C)	Use fossils as evidence to infer that some rocks were formed from the remains of once living organisms. (4-ESS1-1)	Erosion Fossil Landform Organism	3.3.4.A3 4.4.4.C	S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	The presence and location of certain fossil types indicate the order in which rock layers were formed. (ESS1-C)	Use evidence from patterns in rock formations and fossils in rock layers to support the explanation for a change in landforms and environments over time. (4-ESS1-1)	Minerals Rock layers	3.3.4.A3 4.4.4.C	S4.A.1.1 S4.A.1.3 S4.A.2.1 S4.A.2.2 S4.A.3.1 S4.A.3.2 S4.A.3.3		
The Earth's processes affect and are affected by human activities.	How do Earth's processes and human activities affect each other?	Energy that humans use is derived from multiple natural sources and their use affects the environment in many ways.	Research multiple sources to describe ways that energy and fuels are derived from natural resources and their impact.	Dams Fissile materials Fossil Fuels Natural resources Solar	4.3.4.A 4.3.4.A	S4.D.1.2.3		
		A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, etc.). Humans cannot eliminate the hazards, but can take steps to reduce the impact. (ESS3.B)	Generate and compare solutions to reduce the impacts of natural earth processes on humans. (4-ESS3-2)	Earthquake Natural hazard Tsunami Volcanic eruptions Weather				

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 4 Life Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
All organisms are made of cells and can be characterized by common aspects of their structure and functioning.	How do organisms live, grow, respond to their environment, and reproduce?	Plants and animals have internal and external structures that serve various functions to survive. (LS1.A)	Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. (4-LS1-1)	Behaviors Cause and effect Function Offspring Reproduce Structure Survival System System Models	3.1.4.A 3.1.4.B 3.1.4.C 4.1.4.A 4.5.4.C 4.2.4.C 3.1.3.A.1	S4.B.1.1.5		
			Construct an argument that the Skeletal and Muscular systems work together to provide movement.					

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 5 Physical Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.	How can one explain the structure, properties, and interactions of matter?	When two or more different substances are mixed, a new substance with different properties may be formed. (PS1.B)	Plan and conduct an investigation to determine whether the mixing of two or more substances results in new substances (e.g., cooking, baking, burning, etc.) (5-PS1-4)	Chemical change vs. physical change Mass Temperature Volume	3.2.5.A6 3.2.3.A4	S8.C.1.1.3 S8.A.1.3 S8.A.2.2 S8.A.2.1		
		Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. (PS1.A)	Develop a model to describe that matter is made of particles too small to be seen. (5-PS1-1)	Condensation Evaporation Matter Particles	3.2.5.A6	S8.C.1.1.2 S8.A.1.3 S8.A.2.2 S8.A.2.1		
		Measurements of a variety of properties can be used to identify materials. (PS1.A)	Make observations and measurements to identify given materials based on their properties. (5-PS1-3)	Hardness Mass Moh's scale Porosity Properties Solubility Streak tests Volume	3.2.5.A6	S8.C.1.1.2 S8.A.1.3 S8.A.2.2 S8.A.2.1		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.	How can one explain the structure, properties, and interactions of matter?	The amount of matter is conserved when it changes form. (PS1.A)	Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total mass of matter is conserved. (5-PS1-2)	Conservation of mass	3.2.5.A6	S8.C.1.1.3 S8.A.1.3 S8.A.2.2 S8.A.2.1		
		When two or more different substances are mixed, a new substance with different properties may be formed; such occurrences depend on the substances and the temperature. (PS1.B)	Investigate the interaction of two or more substances to provide evidence that when different substances are mixed, one or more new substances with different properties may or may not be formed. (5-PS1-4)	Chemical change Mixtures vs. compounds	3.2.6.A4 3.2.7.A4	S8.C.1.1.1 S8.A.1.3 S8.A.2.2 S8.A.2.1 S8.C.1.1.2 S8.C.1.1.3		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.	How can one explain the structure, properties, and interactions of matter?	No matter what reaction or change in properties occurs, the total mass of the substances does not change. (PS1.B)	Plan and carry out investigations to determine the effect on the total mass of a substance when the substance changes shape, phase, and/or is dissolved. (5-PS1-2)	Chemical change Dissolve Physical changes	3.2.5.A6	S8.C.1.1.3 S8.A.1.3 S8.A.2.2 S8.A.2.1		
Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.	How can one explain and predict interactions between objects within systems?	Gravitational force of Earth acting on another object near Earth's surface pulls that object toward the planet's center. (PS2.B)	Construct and support an argument that the gravitational force exerted by Earth on objects is directed. (5-PS2-1)	Gravitational force	3.3.6.B1 3.3.7.B1	S8.C.3.1 S8.D.3.1 S8.D.3.1.1 S8.D.3.1.2		
	How is energy transferred and conserved?	Energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant matter. (PS3.D)	Use a model to describe that energy in animal's food was once energy from the sun. (5-PS3-1)	Energy flow Flow chart Model Photosynthesis	4.1.7.C	S8.B.3.1.1 S8.B.3.1.2 S8.B.3.1.3 S8.B.C.2.1 S8.C.2.1.1 S8.C.2.2.1		
Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.	How are waves used to transfer energy and information?							

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<p>The universe is composed of a variety of different objects, which are organized into systems each of, which develops according to accepted physical processes and laws.</p>	<p>What is the universe, and what is Earth’s place in it?</p>	<p>The sun is a star that appears larger and brighter than other stars because it is closer. (ESS1.A)</p>	<p>Support an argument that the apparent brightness of the sun and stars is due to their relative distances from Earth. (5-ESS1-1)</p>	<p>Relative Distance Stars Sun</p>	<p>3.3.8.B1</p>	<p>S8.D.3.1 S8.D.3.1.1 S8.D.3.1.3</p>		
		<p>Stars range greatly in their distance from Earth. (ESS1.A)</p>	<p>Support an argument that the apparent brightness of the sun and stars is due to their relative distances from Earth. (5-ESS1-1)</p>	<p>Apparent Brightness Earth Relative Distance Stars Sun</p>	<p>3.3.8.B1</p>	<p>S8.D.3.1 S8.D.3.1.1 S8.D.3.1.3</p>		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>The universe is composed of a variety of different objects, which are organized into systems each of which develops according to accepted physical processes and laws.</p>	<p>What is the universe, and what is Earth’s place in it?</p>	<p>The orbits of Earth around the sun and of the moon around Earth, together with rotation of Earth about an axis between its North and South poles, cause observable patterns (e.g., day and night, length and direction of shadows, different positions of sun, moon, and stars). (ESS1.B)</p>	<p>Represent data in graphical displays to reveal patterns of daily changes in the length and direction of shadows, day and night, and seasonal appearance of stars in the sky. (5-ESS1-2)</p>	<p>Data Graphical Display Patterns Representation Shadows</p>	<p>3.3.5.B1</p>	<p>S8.D.3.1 S8.D.3.1.1 S8.D.3.1.3</p>		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth is complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	All Earth processes are the result of energy flowing and matter cycling within and among the planet’s systems. The energy is derived from the sun and the earth’s interior. These flows and cycles produce chemical and physical changes in Earth’s materials and living organisms. (ESS2.A)	Construct and analyze models to describe systems interactions among the geosphere, hydrosphere, atmosphere, and biosphere. (5-ESS2-1)	Atmosphere Biosphere Chemical Change Energy flow Geosphere Hydrosphere Model Physical change	3.3.4.A4 3.3.4.A5	S8.A.1.1 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.1.4 S8.D.1.1.1		
			Through the creation of a model, explain that the chemical and physical processes that cycle earth materials and form rocks. (5-ESS2-1)	Atmosphere Biosphere Chemical Change Energy flow Geosphere Hydrosphere Model Physical change	3.3.4.A4 3.3.4.A5	S8.A.1.1 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.1.4 S8.D.1.1.1		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>The Earth is complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.</p>	<p>How and why is Earth constantly changing?</p>	<p>Earth’s major systems are the geosphere, hydrosphere, and biosphere, which interact in multiple ways to affect the Earth’s surface materials and processes. (ESS2.A)</p>	<p>Develop a model to describe the ways the geosphere, hydrosphere, and biosphere interact. This could include the influence of atmosphere on landforms and ecosystems through weather and climate, mountain ranges on winds and clouds, etc. (5-ESS2-1)</p>	<p>Atmosphere Biosphere Geosphere Hydrosphere</p>	<p>3.3.4.A.4 3.3.4.A.5</p>	<p>S8.A.1.1 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.1.4 S8.D.1.1.1</p>		
		<p>The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. (ESS2.A)</p>	<p>Develop a model to describe the ways the geosphere, hydrosphere, and biosphere interact. (5-ESS2-1)</p>	<p>Atmosphere Biosphere Geosphere Hydrosphere</p>	<p>3.3.4.A4 3.3.4.A5</p>	<p>S8.A.1.1 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.1.4 S8.D.1.1.1</p>		
		<p>Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (ESS2.A)</p>	<p>Utilizing observations and data, explain the patterns of weather in a given location. (5-ESS2-1)</p>	<p>Weather</p>	<p>3.3.5.A5 3.3.6.A5</p>	<p>S8.D.2.1 S8.D.2.1.1 S8.D.2.1.2 S8.D.2.1.3</p>		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 5 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth is complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	Most fresh water is in glaciers or underground with the remainder in streams, lakes, wetlands, and atmosphere. (ESS2.C)	Using real time data, graph amounts of water in various reservoirs to provide evidence about the distribution of water on earth. (5-ESS2-2)	Distribution	3.3.6.A4	S8.D.1.3 S8.D.1.3.4		
		Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation as well as downhill flows on land.	Investigate movement of water in the Earth's systems and research and develop models for the cycling of water.	Atmosphere Precipitation Transpiration Water Cycle Water system	3.3.5.A4 3.3.6.A4 3.3.8.A4	S8.A.1.1 S8.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.D.1.3.1		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 5 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth's processes affect and are affected by human activities.	How do Earth's processes and human activities affect each other?	Human activities in agriculture, industry, and everyday life have had major effects on land, vegetation, streams, ocean, and air. (ESS3.C)	Research and communicate how communities are using science to protect resources and environments. (5-ESS3-1)	Atmosphere Human impact Research Resources	4.3.10.A	S8.A.1.1 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.2 S8.D.1.1 S8.B.3.3 S8.C.2.2.3		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 5 Life Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
All organisms are made of cells and can be characterized by common aspects of their structure and functioning.	How do organisms live, grow, respond to their environment, and reproduce?	Food provides animals with materials needed for body repair and growth. (PS3.D)	Use a model to describe that energy in animal's food was once energy from the sun. (5-PS3-1)	Food chain Food web	3.1.7.A8	S8.B.3.1.1 S8.B.3.1.3 S8.A.3.2.1 S8.A.3.2.3		
		Food provides animals with materials needed for energy and to maintain body warmth and for motion. (LS1.C)	Use a model to describe that energy in animal's food was once energy from the sun. (5-PS3-1)	Food chain Food web	3.1.7.A8	S8.B.3.1.1 S8.B.3.1.3 S8.A.3.2.1 S8.A.3.2.3		
		Plants require their material for growth primarily from air and water. (LS1.C)	Using evidence, present an argument that plants get the materials they need for growth primarily from air and water. (5-PS3-1)	Argument Evidence Minerals	3.1.7.A8	S8.B.3.1.1 S8.B.3.1.3 S8.A.3.2.1 S8.A.3.2.3		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 5 Life Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
All organisms are made of cells and can be characterized by common aspects of their structure and functioning.	How do organisms live, grow, respond to their environment, and reproduce?	Animals and plants alike take in gases and water and release waste matter into the environment; animals must take in food, and plants, need light and minerals. (LS2.B)	Construct and communicate models of food webs that demonstrate the transfer of matter and energy among organisms within an ecosystem. (5-LS2-1)	Ecosystem Food webs	3.1.7.A8	S8.B.3.1.1 S8.B.3.1.3 S8.A.3.2.1 S8.A.3.2.3		
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	Organisms can survive only in environments in which their particular needs are met. (LS2.A)	Ask researchable questions about the ways organisms obtain matter and energy across multiple and varied ecosystems. (5-LS2-1)	Researchable Species Web of life	3.1.6.A2	S8.B.3.1.1		
		A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. (LS2.A)	Construct a model of a food web to demonstrate the transfer of matter and energy among organisms within an ecosystem. (5-LS2-1)	Ecosystem Transfer energy	3.1.6.A2	S8.B.3.1.1		

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Life Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	Newly introduced species can damage the balance of an ecosystem. (LS2.A)	Identify a newly introduced species to an ecosystem and provide evidence that it is an invasive species or noninvasive species. (5-LS2-1)	Ecosystem Invasive Noninvasive Species System	3.1.6.A2	S8.B.3.1.1 S8.B.3.1.2 S8.B.3.1.3		
		Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. (LS2.B)	Use models to trace the cycling of particles of matter between the air and soil and among plants, animals, and microbes. (5-LS2-1)	Cycles Matter Microbes	3.1.6.A2	S8.B.3.1.1 S8.B.3.1.2		
			Use models to describe how decomposition eventually restores (recycles) some materials back to the soil for plants to use. (5-LS2-1)	Decomposers Decomposition Microbes	3.1.6.A2	S8.B.3.1.1 S8.B.3.1.2 S8.B.3.1.3		
		The Human Body has systems that work together to transport energy, waste, and oxygen through the system.	Construct an argument that the Digestive, Circulatory, and Respiratory systems work together to transport energy, waste, and oxygen.					

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. (LS2.A)	Describe a healthy ecosystem as a system in terms of the components and interactions. (5-LS2-a)	Ecosystem Components System System models	3.1.6.A2	S8B.3.1.1 S8.B.3.1.2 S8.B.3.1.3		
Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explains why offspring resemble, but are not identical to their parents.	How are the characteristics of one generation passed to the next? How can individuals of the same species and even siblings have different characteristics?							

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.</p>	<p>How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?</p>							

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 6 Physical Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.	How can one explain the structure, properties, and interactions of matter?	The amount of matter is conserved regardless of what reaction or change and properties occurs, the total mass of the substances involved does not change.	Plan and carry out investigations to determine the effect on the total mass of a substance when the substance changes shape, phase and/or is dissolved.	Dissolve Mass Open vs. Closed Phase change Physical change Product Reactant System Yields (boiling, melting, freezing, sublimation)	3.2.6.A2	S8.C.1.1.3 S8.A.1.3 S8A.2.1 S8.A.2.2		
		In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations.	Construct models comparing the arrangement and motion of molecules within solid, liquids and gases of the same substance.	Gas Liquid Kinetic vs. Potential Energy Molecular Motion Solid States of Matter Temperature Thermal Energy	3.2.6.A1 3.2.10.A3	S8.A.3.2 S8.C.1.1.2 S8.C.3.1.2		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 6 Physical Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.	How can one explain the structure, properties, and interactions of matter?	The changes of state that occur with variations in temperature or pressure can be described and predicted.	Interpret a heating curve to determine the temperature at which a substance is solid, liquid and/or gas.	Phase change (boiling, melting, freezing, sublimation) Pressure Temperature	3.2.4.A5 3.2.6.A1	S8.C.1.1.2 S8.C.3.1.2 S8.A.1.1 S8.A.2.2 S8.A.2.1		
Interactions between any two objects can cause changes in one or both of them.	How can one explain and predict interactions between objects within systems?	Electromagnetic forces can be attractive or repulsive, and their sizes depend on the magnitude of the charges, current or magnetic strength involved, and on the distances between the interacting objects.	Plan and carry out investigations to illustrate the factors that affect the strength of electric and magnetic forces.	Current Electric charge Electromagnetic forces Resistance	3.2.6.B4 3.2.10.B4	S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.C.3.1.1		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 6 Physical Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions between any two objects can cause changes in one or both of them.	How can one explain and predict interactions between objects within systems?	Explain that the mechanical advantages produced by simple machines helps us to do work (physics) by either overcoming of force or changing the direction of the applied force.	Given a scenario involving simple machines, qualitatively compare the mechanical advantage of each. Based on this analysis, argue which machine is best for the task.	Distance Force Simple machines		S8.A.1.1 S8.C.3.1.3		
Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.	How is energy transformed and conserved?	Energy is transferred from hotter regions or objects and into colder ones by the process of conduction, convection, and radiation.	Use and/or construct models to communicate the means by which thermal energy is transferred during conduction, convection, and radiation.	Conduction Convection energy Insulator Radiation Transfer Thermal energy	3.2.7.B3 3.2.6.B3 3.2.6.B6	S8.A.3.2 S8.C.2.1.2		

**DIOCESE OF HARRISBURG
SCIENCE CURRICULUM
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Earth and Space Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The universe is composed of a variety of different objects, which are organized into systems, each of which develops according to accepted physical processes and laws.	What is the universe and what is Earth’s place in it?	The phases of the moon are caused by the orbit of the moon around the Earth.	Identify and explain monthly patterns and the phases of the Moon.	Orbit Pattern Phase Waning Waxing	3.3.4.B2	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.3.1.1		
		The phases of the moon are caused by the orbit of the moon around the Earth.	Use a model of the relative positions of the Sun, earth and moon to explain the phases of the Moon.	Orbit Pattern Phase Waning Waxing	3.3.4.B2	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.3.1.1		
		Observable patterns and changes in tides are caused by the Earth-Moon-Sun system.	Use models of the Earth-Sun-Moon system to support explanations and predict the cyclic patterns of tides.	Gravity Neap tide Spring tide System Tide	3.3.7.A4 3.3.6.B1	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.3.1.1 S8.D.3.1.2		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 6 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The universe is composed of a variety of different objects, which are organized into systems, each of which develops according to accepted physical processes and laws.	What is the universe and what is Earth's place in it?	Observable eclipses are caused by motions in the Earth-Moon-Sun system.	Use models of the Earth- Sun-Moon system to support explanations and predict the cyclic pattern of eclipses.	Lunar eclipse Penumbra Solar Eclipse Umbra	3.3.7.B2	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.3.1.1		
		Earth's spin axis is fixed in direction and tilted relative to its orbit around the sun. The seasons are a result of the Earth's tilt on its axis and are caused by the differential intensity of sunlight on different areas of Earth throughout the year.	Use models of Earth's orientation and motion to explain how changes in intensity and duration of daily sunlight lead to seasons.	Axis Cyclical pattern Earth Orbit Orientation Position Revolution Rotation Season Tilt	3.3.4.B2 3.3.6.B2 3.3.7.B2	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.3.1.1		

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Earth and Space Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>The universe is composed of a variety of different objects, which are organized into systems, each of which develops according to accepted physical processes and laws.</p>	<p>What is the universe and what is Earth’s place in it?</p>	<p>Earth’s spin axis is fixed in direction and tilted relative to its orbit around the sun. The seasons are a result of the Earth’s tilt on its axis and are caused by the differential intensity of sunlight on different areas of Earth across the year.</p>	<p>Identify and explain the position and orientation of the Earth as it orbits the Sun.</p>	<p>Axis Cyclical pattern Earth Orbit Orientation Position Revolution Rotation Season Tilt</p>	<p>3.3.4.B2 3.3.6.B2 3.3.7.B2</p>	<p>S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.3.1.1 S8.D.3.1.2</p>		
		<p>Our solar system is a collection of objects, including planets, their moons, and asteroids that are held in orbit around the Sun by its gravitational pull on them.</p>	<p>Construct and use scale models of the solar system to support the explanation of the role of gravity in the motions of the planets of the observed system.</p>	<p>Asteroids Gravity Moon Satellite Solar system</p>	<p>3.3.5.B1 3.3.6.B1 3.3.7.A4 3.3.7.B1 3.3.6.B2 3.3.7.B2</p>	<p>S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1</p>		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 6 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The universe is composed of a variety of different objects, which are organized into systems, each of which develops according to accepted physical processes and laws.	What is the universe and what is Earth’s place in it?	Our solar system is a collection of objects, including planets, their moons, and asteroids that are held in orbit around the Sun by its gravitational pull on them.	Analyze and interpret data to determine scale properties (i.e. distance from sun, diameter, etc.) of objects in the solar system.	Asteroids Gravity Moon Satellite Solar system	3.3.5.B1 3.3.6.B1 3.3.7.A4 3.3.7.B1 3.3.6.B2 3.3.7.B2 3.3.8.B1	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.3.1.1 S8.D.3.1.3		
		All Earth processes are the result of energy flowing and matter cycling within and among the planet’s systems. The energy is derived from the Sun and the Earth interior. These flows and cycles produce chemical and physical changes in Earth’s materials and living organisms.	Compare and contrast various soil types and their characteristics found in different biomes (e.g. regionally and explain how they were formed.)	Biome Geosphere Energy flow Erosion Rock cycle Soil horizons Weathering	3.3.4.A4 3.3.4.A5 3.3.6.A2 3.3.7.A2	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.3.1.3		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 6 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The universe is composed of a variety of different objects, which are organized into systems, each of which develops according to accepted physical processes and laws.	What is the universe and what is Earth’s place in it?	Water continually cycles among geosphere, hydrosphere, biosphere, and atmosphere via transpiration, evaporation, condensation, and precipitation.	Develop models for the movement of water within the Earth’s spheres (i.e., geosphere, hydrosphere, biosphere, atmosphere).	Atmosphere Condensation Evaporation Hydrosphere Infiltration Precipitation Runoff Transpiration Water cycle Water system	3.3.4.A4 3.3.6.A4 3.3.8.A4	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.3.1		
		Water continually cycles among geosphere, hydrosphere, biosphere, and atmosphere via transpiration, evaporation, condensation, and precipitation as well as downhill flows on land.	Assess the physical characteristics of a stream to determine the types of organisms found within the stream environment.	Biological diversity Flow rate River systems Stream Tributary Watershed	3.3.5.A4 3.3.6.A4 3.3.8.A4	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.3.2 S8.D.1.3.3 S8.D.1.3.4		

**DIOCESE OF HARRISBURG
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GRADE 6
Life Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>All organisms are made of cells and can be characterized by common aspects of their structure and functioning.</p>	<p>How do organisms live, grow, respond to their environment, and reproduce?</p>	<p>All living things have a common set of characteristic needs and functions that separate them from nonliving things such as: gas exchange, energy usage, water usage, response, reproduction, elimination of waste, growth, and made of one or more cells.</p>	<p>Use evidence of characteristics of life to differentiate between living and nonliving things.</p>	<p>Dead Dormant Living Nonliving</p>	<p>3.1.6.A 3.1.7.A</p>			
		<p>All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).</p>	<p>Conduct investigations to provide evidence that living things are made up of cells and that cells can be differentiated.</p>	<p>Eukaryote Multicellular Prokaryote Unicellular</p>	<p>3.1.6.A 3.1.7.A 3.1.8.A</p>	<p>S8.B.1.1.1 S8.B.1.1.2 S8.B.1.1.3</p>		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 6 Life Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
All organisms are made of cells and can be characterized by common aspects of their structure and functioning.	How do organisms live, grow, respond to their environment, and reproduce?	Within cells, special structures are responsible for particular functions.	Create and use models to describe the basic structures and functions of cells within a system framework.	Cell membrane Cell wall Chloroplast Cytoplasm Mitochondria Nucleus Organelles	3.1.6.A 3.1.7.A 3.1.8.A	S8.B.1.1.1 S8.B.1.1.2		
		Living organisms reproduce in a variety of ways that may involve sexual or asexual reproduction. Reproduction usually follows a cycle.	Describe and distinguish between various types of reproductive methods of cells and organisms.	Asexual reproduction Cell division Life cycles Sexual reproduction	3.1.6.A 3.1.7.A 3.1.8.A			
		Some organisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen.	Create a scientific, evidence-based explanation of the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.	Carbon dioxide Glucose Oxygen Photosynthesis Products Water Reactants	3.1.6.A 3.1.7.A 3.1.8.A	S8.C.1.1.3 S8.C.2.1.1 S8.C.2.1.3 S8.C.2.2.1		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 6 Life Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
All organisms are made of cells and can be characterized by common aspects of their structure and functioning.	How do organisms live, grow, respond to their environment, and reproduce?	Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy.	Create a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.	Aerobic respiration Anaerobic respiration Cellular respiration Fermentation	3.1.6.A 3.1.7. A3.1.8.A	S8.C.1.1.3 S8.C.2.1.1 S8.C.2.1.3 S8.C.2.2.1		
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	Organisms and populations of organisms are dependent on their environmental interactions, both biotic and abiotic factors.	Analyze data to provide evidence for the impact of resource availability on organisms and populations in an ecosystem.	Abiotic Biotic Consumer Ecosystem Energy pyramid Food chain Food web Niche Predator Prey Producer Symbiosis	3.1.6.A2 3.1.7.A 3.1.8.A	S8.B.3.1.1 S8.B.3.1.3		

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Life Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level.	Design and/or construct a model to describe the cycling of matter and flow of energy within the biotic and abiotic parts of an ecosystem.	Autotroph Carnivore Competition Consumer Decomposer Energy pyramid Food chain Food web Herbivore Heterotroph Omnivore Photosynthesis	3.1.7.A2	S8.B.3.1.3 S8.B.3.1.1		
		Biodiversity describes the variety of species found in Earth’s terrestrial and aquatic ecosystems. The completeness or integrity of an ecosystem’s biodiversity is often used as a measure of its health.	Design or evaluate solutions for maintaining biodiversity and/or ecosystems services.	Biodiversity Food web Freshwater Oceanic Resiliency Species Terrestrial	3.1.7.A.2	S8.B.3.1.1 S8.B.3.2.2		

**DIOCESE OF HARRISBURG
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GRADE 6
Life Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.	Design or evaluate solutions for maintaining biodiversity and/or ecosystems services.	Ecosystem	3.1.8.A 3.4.8.A 4.2.8.C	S8.B.3.2.1 S8.B.3.2.3		
		Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems.		Biodiversity Oceanic Terrestrial	3.1.8.A 3.4.8.A 4.2.8.C 3.1.8.C1	S8.B.3.2.2		
Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.	How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?	Explain how to use a dichotomous key to identify organisms.	Construct and utilize dichotomous keys to identify organisms.	Dichotomous key Genus Species		S8.B.1.1.3		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions between any two objects can cause changes in one or both of them.	How can one explain and predict interactions between objects within systems?	Gravitational forces are always attractive. There is a gravitational force between all objects. This force is dependent upon mass and distance between the objects.	Develop a simple model using given data that represents the relationship of gravitational interactions (force, mass, distance) and the motion of objects in space.	Gravitation Gravitational forces Law of universal gravity Mass Weight	3.2.5.B1 3.2.6.B1 3.2.7.B1	S8.A.3.2 S8.C.3.1.1		
		The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change.	Communicate qualitative observations and information graphically and mathematically to represent how an object's relative position, velocity, and direction of motion are affected by forces acting on the object.	Acceleration Balanced Displacement Distance Force Motion graphs Newton's 1 st law Newton's 2 nd law Position Reference frame Speed Unbalanced Velocity	3.2.6.B1 3.2.5.B1 3.2.7.B1	S8.A.1.1 S8.C.3.1.1		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 7 Physical Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions between any two objects can cause changes in one or both of them.	How can one explain and predict interactions between objects within systems?	A pair of interacting objects apply equal and opposite forces on one another.	Design a qualitative solution to a problem involving the motion of colliding objects. (e.g. pool table, model car collision)	Acceleration Force Force pairs Mass Newton’s 3 rd law	3.2.5.B1 3.2.6.B1 3.2.7.B1	S8.C.3.1.1 S8.A.2.1 S8.A.2.2		
		Explain that the mechanical advantages produced by simple machines helps to do work (physics) by either overcoming a force or changing the direction of the applied force.	Given a scenario involving simple machines, qualitatively compare the mechanical advantage of each. Based on this analysis, argue which machine is best for the task.	Distance Force Mechanical advantage Simple machines Work		S8.A.1.1 S8.C.3.1.3		
		Temperature is a measure of the average kinetic energy of particles of matter.	Generate and defend a model that explains the Kinetic Theory.	Kinetic energy Temperature System Potential energy Total energy	3.2.8.B3	S8.A.3.2 S8.C.3.1.2		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 7 Physical Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.	How are waves used to transfer energy and information?	A wave has a repeating pattern with a specific wavelength, frequency and amplitude.	Use a drawing or physical representation of wave properties to explain amplitude, frequency, and wavelength of different waves through different mediums.	Amplitude Compressions Crest Frequency Trough Rarefactions Wave Wavelength	3.2.7.B5	S8.A.1.1		
		A sound wave needs a medium through which it is transmitted.	Through the use of models, explain the transmission of sound waves through different mediums.	Longitudinal Medium Sound wave Vacuum	3.2.5.B5	S8.A.3.2		
		When light shines on an object, it is reflected, absorbed, or transmitted through the object.	Construct explanations of how waves are reflected, absorbed or transmitted through an object.	Absorption Color Frequency Light Reflection Transmission	3.2.7.B5	S8.A.1.1		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The universe is composed of a variety of different objects, which are organized into systems, each of which develops according to accepted physical processes and laws.	What is the universe, and what is Earth’s place in it?	Earth and its solar system are part of the Milky Way Galaxy, which is one of the many galaxies in the universe.	Construct and use scale models to describe the relationship of Earth to the rest of the solar system, the Milky Way Galaxy, and the universe.	Galaxy Moon Satellite Solar system Universe	3.3.6.B1 3.3.5.B1 3.3.7.B1 3.3.7.B2 3.3.8.B1	S8.A.1.1 S8.A.2.3 S8.A.2.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.3.1.1 S8.D.3.1.2 S8.D.3.1.3		
The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	All Earth processes are the result of energy flowing and matter cycling within and among the plant’s systems. The energy is derived from the sun and the earth’s interior. These flows and cycles produce chemical and physical changes in Earth’s materials and living organisms.	Classify rocks as one of three different types and explain the interrelationship of the rock types as part of the rock cycle (e.g. igneous: granite, basalt, obsidian, pumice; sedimentary: limestone, sandstone, shale, coal; and metamorphic: slate, quartzite, marble, gneiss).	Erosion Geosphere Igneous rock Metamorphic rock Sedimentary rock Rock Cycle Weathering	3.3.4.A4 3.3.4.A5 3.3.7.A1	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.1.1		

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Earth and Space Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>The Earth is a complex and dynamic set of interconnects systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.</p>	<p>How and why is Earth constantly changing?</p>	<p>All Earth processes are the result of energy flowing and matter cycling within and among the plant's systems. The energy is derived from the sun and the earth's interior.</p>	<p>Plan and carry out investigations that investigate models of the chemical and physical processes that cycle earth materials and forms rocks.</p>	<p>Geosphere Energy flow Erosion Igneous Metamorphic Rock Cycle Sedimentary Weathering</p>	<p>3.3.4.A4 3.3.4.A5 3.3.7.A1 3.3.8.A1</p>	<p>S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.1.1 S8.D.1.1.2</p>		
		<p>These flows and cycles produce chemical and physical changes in Earth's materials and living organisms.</p>	<p>Compare and contrast various soil types and their characteristics found in different biomes (nationally) and explain how they were formed.</p>	<p>Biome Geosphere Energy flow Erosion Rock cycle Soil horizons Weathering</p>	<p>3.3.4.A4 3.3.4.A5 3.3.6.A2 3.3.7.A2</p>	<p>S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.1.3</p>		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 7 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth is a complex and dynamic set of interconnects systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	Water continually cycles among geosphere, hydrosphere, biosphere, and atmosphere via transpiration, evaporation, condensation, and precipitation.	Compare and contrast characteristics of fresh water and saltwater systems on the basis of their physical characteristics.	Density Freshwater Hydrosphere Salinity Saltwater	3.3.5.A4 3.3.6.A4 3.3.8.A4	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.3.2		
		Water continually cycles among geosphere, hydrosphere, biosphere, and atmosphere via transpiration, evaporation, condensation, and precipitation as well as downhill flows on land.	Assess the physical characteristics of a stream to determine the types of organisms found within the stream environment. (focus on local watershed)	Biological diversity Flow rate River systems Stream Tributary Watershed	3.3.5.A4 3.3.6.A4 3.3.8.A4	S8.A.1.1 S8.A.1.2 S8.a.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.3.2 S8.D.1.3.3 S8.D.1.3.4		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>The Earth is a complex and dynamic set of interconnects systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales</p>	<p>How and why is Earth constantly changing?</p>	<p>Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography resulting in complex patterns that are difficult to predict.</p>	<p>Collect data and generate evidence to show how changes in weather conditions result from the movement, interactions, and area of origin of air masses (e.g. cold, dry Canadian air mass vs. warm, moist, southern air mass).</p>	<p>Air pressure Atmosphere Altitude Barometer Climate Density Geography Latitude Weather Weather front</p>	<p>3.3.7.A6 3.3.6.A6 3.3.6.A5 3.3.8.A4</p>	<p>S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.2.1.2</p>		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>The Earth is a complex and dynamic set of interconnects systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.</p>	<p>How and why is Earth constantly changing?</p>	<p>Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude and local and regional geography resulting in complex patterns that are predicted with varying degrees of reliability.</p>	<p>Analyze weather patterns using cloud types, wind directions, and barometric pressure.</p>	<p>Air pressure Atmosphere Barometer Cirrus Cumulus Stratus Weather</p>	<p>3.3.7.A6 3.3.6.A6 3.3.6.A5 3.3.8.A4</p>	<p>S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.2.1.3</p>		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>The Earth is a complex and dynamic set of interconnects systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.</p>	<p>How and why is Earth constantly changing?</p>	<p>The Earth’s systems interact on various time and size scales. These interactions have shaped Earth’s history and will determine its future.</p>	<p>Construct an explanation based on evidence for how various processes have changed Earth’s surface at varying time and spatial scales (e.g. short-term deposition vs. mountain building; short-term weathering and erosion vs. canyon or valley formation).</p>	<p>Erosion Geosphere Plate tectonics Sea floor spreading Subduction Weathering</p>	<p>3.3.6.A1 3.3.7. A1 3.3.8.A1 3.3.10.A1</p>	<p>S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.1.2 S8.D.1.1.4</p>		
		<p>Plate tectonics is the unifying theory that explains the past, current, and future movements, of the rocks at Earth’s surface and provides a framework for understanding its geological history. Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches.</p>	<p>Develop and use models of past plate motions to support explanations of existing patterns in the fossil record, rock record, continental shapes and seafloor structures.</p>	<p>Asthenosphere Continent Continental drift Convection Fossil record Geosphere Lithosphere Mantle Rock record Plate motion Plate tectonics Sea floor spreading</p>	<p>3.3.6.A1 3.3.7.A6 3.3.8.A6</p>	<p>S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.1.2 S8.D.1.1.4</p>		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth's processes affect and are affected by human activities.	How do Earth's processes and human activities affect each other?	Humans depend on Earth's land, ocean, atmosphere, and living things for many different resources.	Describe a product's transformation process from production to consumption.	Atmosphere Consumption Geosphere Hydrosphere Natural resources Nonrenewable resources Ore production Renewable resources	3.3.8.A2 3.3.8 A3	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.B.3.2 S8.D.1.2.1		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction.	Analyze data to provide evidence for the impact of resource availability on organisms and populations in an ecosystem.	Capacity Carrying Dynamics Limiting factor Population	3.1.6.A2	S8.B.3.1.1 S8.B.3.1.2 S8.B.3.2.1 S8.B.3.2.2		
		Growth of organisms and population increases are limited by access to resources.	Analyze data to provide evidence for the impact of resource availability on organisms and populations in an ecosystem	Carry capacity Community Competition Limiting factors Population	3.1.8.A 3.4.8.A 3.4.8.B 4.2.8.C 4.4.8.A 4.5.8.A 4.5.8.C 4.5.8.D	S8.B.3.2.1 S8.B.3.2.2 S8.B.3.2.3		

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Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	<p>Predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions or organisms with their environments, both living and nonliving, are shared.</p>	Develop an explanation that describes patterns on interactions among organisms across multiple ecosystems.	Commensalism Mutualism Parasitism Predator Prey Resource availability Symbiosis	3.1.8.A 3.3.8.A 3.4.8.B 4.3.8.A 4.4.8.A 4.5.8.A 4.5.8.C 4.5.8.D	S8.B.3.3.1 S8.A.1.2.4 S8.B.3.1.1 S8.B.3.1.2 S8.B.3.1.3		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How and why do organisms interact with their environment and what are the effects of these interactions?	Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.	Construct an argument supported by evidence that changes to the physical or biological parts of an ecosystem impact populations.	Conservation of matter Consumer Decomposer Flow of energy Producer	3.1.7.A2	S8.B.3.1.1 S8.B.3.2.2 S8.B.3.2.3 S8.B.3.3.1 S8.B.3.2.1 S8.A.1.3.3 S8.A.1.3.4		
		Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on – for example, water purification and recycling matter.	Design or evaluate solutions for maintaining biodiversity and/or ecosystem services.	Carbon cycle Decomposition Nitrogen cycle Water cycle Photosynthesis	3.1.7.A2	S8.B.3.1.1 S8.B.3.3.3 S8.B.3.3.4 S8.B.3.3.2		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.	How can there be so many similarities among organisms, yet so many different kinds of plants, animals, and microorganisms?	In artificial selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed on to offspring.	Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.	Biotechnology Selective breeding	3.1.8.C 3.4.8.E	S8.B.2.1.4 S8.B.2.1.3		
Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explain why offspring resemble, but are not identical to their parents.	How are characteristics of one generation passed to the next?	Genetic contribution from each parent through sexual reproduction results in variation in offspring, and asexual reproduction results in offspring with identical genetic information.	Construct a model that demonstrates how gene mutations occur.	Alleles Chromosomes DNA Genes Genetic Heredity	3.1.8.C 3.1.7.B1	S8.B.2.2.2 S8.B.2.1.3		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 7 Life Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explain why offspring resemble, but are not identical to their parents.	How are characteristics of one generation passed to the next?	In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. There versions may be identical or may differ from each other.	Demonstrate using a model illustrating how offspring acquire genes from each parent during sexual reproduction.	Egg cell Sperm cell	3.1.8.C 3.4.8.E	S8.B.2.1.1 S8.B.2.2.2		
		Humans can select for specific traits, using technology for genetic modification, which leads to selective breeding.	Research and present a report that addresses the use of technologies allowing for the selection of specific genetic traits.	Selective breeding		S8.B.2.1.4		

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<p>Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explain why offspring resemble, but are not identical to their parents.</p>	<p>How can individuals of the same species and even siblings have different characteristics?</p>	<p>Organisms reproduce, either sexually or asexually, and transfer their genetic information through inheritance to their offspring.</p>	<p>Use a model that distinguishes how genetic information is conserved during asexual reproduction while sexual reproduction results in variation.</p>	<p>Asexual reproduction DNA Punnett squares Sexual reproduction Mitosis</p>	<p>3.1.8.C</p>	<p>S8.B.2.2.1</p>		

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<p>Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explain why offspring resemble, but are not identical to their parents.</p>	<p>How can individuals of the same species and even siblings have different characteristics?</p>	<p>Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn, affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby changes traits.</p>	<p>Research and report on how gene structural changes may be beneficial or harmful to the organism.</p>	<p>Mutation Protein Synthesis</p>	<p>3.1.7.B1</p>	<p>S8.B.2.1.3</p>		

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<p>Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explain why offspring resemble, but are not identical to their parents.</p>	<p>How can individuals of the same species and even siblings have different characteristics?</p>	<p>In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism.</p>	<p>Use a model that demonstrates how genetic mutations can result in changes in the associated protein.</p>	<p>Daughter cells gametes</p>	<p>3.1.7.C1 3.1.8.A 3.1.8.C 3.4.8.B 4.4.8.A 4.5.8.A 4.5.8.C 4.5.8.D 3.1.7.C2</p>	<p>S8.B.2.2.2 S8.B.3.2.3</p>		
		<p>Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited.</p>	<p>Provide an explanation for the relationship among changes (mutations) to genes, changes to the formation of proteins, and the effect on the structure and function of the organisms and thereby trait.</p>		<p>3.1.8.C 2.4.8.E</p>	<p>S8.B.2.1.3</p>		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 8 Physical Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.	How can one explain the structure, properties, and interactions of matter?	Pure substances are made from a single type of atom or compound; each pure substance has characteristic physical and chemical properties that can be used to identify it.	Plan investigations to generate evidence supporting the claim that one pure substance can be distinguished from another based on given characteristic properties.	Boiling point Characteristic Conductivity Density Flammability Malleability Melting point Odor Properties Pure substance Reactivity Solubility	3.2.6.A2 3.2.6.A 3.2.6.A5 3.2.7.A1	S8.C.1.1.1 S8.C.1.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2		
		The relationships of chemical properties of elements are represented in the repeating patterns within the periodic table.	Using what you know about the repeating pattern of chemical properties and atomic structure within the periodic table, predict the location of an unknown element based on its properties.		3.2.8.A2	S8.C.1.1.1 S8.A.3.3 S11.C.1.1.4		
		All substances are made of atoms, which combine with one another in various ways.	Compare and contrast models of simple molecules to those with extended structures.	Atoms Bonding Compounds Elements	3.2.7.A2 3.2.10.A2	S8.A.3.2		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.</p>	<p>How can one explain the structure, properties, and interactions of matter?</p>	<p>Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it.</p>	<p>Give certain conditions (ex. Temperature, pressure, space available), select appropriate materials, based on their physical and/or chemical properties, to be used to solve a problem.</p>	<p>Chemical change (e.g. Combustion, precipitation) Conditions (e.g. Concentration, alloy, pH, pressure, catalysts) Physical change (e.g. Phase change/change of state, solubility)</p>	<p>3.2.3.A1 3.2.3.A4 3.2.4.A4 3.2.6.A5 3.2.7.A1</p>	<p>S8.A.1.3 S8.A.2.1 S8.A.2.3 S8.C.1.1.2</p>		
		<p>When two or more different substances are mixed, a new substance with different properties may be formed; such occurrences depend on the substances and conditions (e.g. Temperature, pressure, pH, catalysts, etc).</p>	<p>Investigate the interaction of two or more substances to determine whether a new substance is formed when materials are mixed.</p>	<p>Chemical change Compounds Elements Endothermic Exothermic Mixtures Precipitate Products Reactants</p>	<p>3.2.6.A4 3.2.7.A4</p>	<p>S8.C.1.1.1 S8.C.1.1.3 S8.A.1.3 S8.A.2.1 S8.A.2.2</p>		

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Physical Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.</p>	<p>How can one explain the structure, properties, and interactions of matter?</p>	<p>In a chemical process, the atoms that make up the original substances (reactants) are regrouped, and these new substances (products) have different properties from those of the reactants.</p>	<p>Develop representations of reactants and products showing how atoms regroup during chemical reactions and have new properties.</p>	<p>Balancing equations Products Reactants Yields Conservation of mass</p>	<p>3.2.7.A4</p>	<p>S8.A.3.2 S8.C.1.1.3</p>		
		<p>Using water as an example, explain the relationship between the physical properties of a substance and its molecular or atomic structure.</p>	<p>Compare and contrast the properties of water with other substances (freezing point, high specific heat, cohesion).</p>	<p>Cohesion Polarity Specific heat</p>	<p>3.2.12.A1</p>	<p>S8.A.3.2 S8.C.1.1.2 S11.C.1.1.2 B10.A.2.1.1</p>		
		<p>Some chemical reactions release energy, others absorb energy.</p>	<p>Design, construct and carry out experiments that either releases or absorbs energy by chemical processes.</p>	<p>Electrical Endothermic Exothermic Colorimetric Photometric</p>	<p>3.2.7.A3 3.2.8.A3</p>	<p>S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.C.1.1.3 S8.C.2.1.3</p>		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.	How is energy transferred and conserved?	The term “heat” as used in everyday language refers both to thermal motion (the motion of atoms or molecules within a substance) and electromagnetic radiation (particularly infrared and light).	Demonstrate different methods of heat transfer used in technological systems. Cite advantages and disadvantages of each method.	Atoms Conduction Convection Electromagnetic Radiation Heat Kinetic Molecules Potential Substance Temperature Thermal energy	3.2.5.B3 3.2.6.B3 3.2.8.B3	S8.A.3.1 S8.C.2.1.2		
		The amount of energy transfer needed to change the temperature of a sample depends on the nature of the matter, the size of the sample, and the environment.	Develop and conduct an experiment to rank the specific heat of various materials by comparing their rate of change in temperature.	Conduction Heat transfer Specific heat	3.2.6.B3 3.2.7.B3 3.2.7.B6	S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.C.2.1.2		
		Whenever a transformation of energy occurs, some of the energy in the system appears as thermal energy.	Compare, evaluate, and design a device that improves thermal energy transfer, and defend the selection of materials chosen to construct the device.	Energy transfer Thermal energy Law of conservation of energy	3.2.5.B3 3.2.7.B6	S8.A.2.2 S8.A.2.2 S8.C.2.1.3		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 8 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth is a complex and dynamic set of interconnected systems (geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	All Earth processes are the result of energy flowing and matter cycling within and among the planet’s systems. The energy is derived from the sun and the Earth’s interior. These flows and cycles produce chemical and physical changes in Earth’s materials and living organisms.	Construct and analyze models to describe systems interactions among the geosphere, hydrosphere, atmosphere, and biosphere.	Atmosphere Biosphere Geosphere Hydrosphere	3.3.4.A4 3.3.4.A5 3.3.8.A1	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.1.2 S8.D.1.1.3 S8.D.2.1.2		
			Compare and contrast various soil types and their characteristics found in different biomes (globally) and how they were formed.	Biome Geosphere Energy flow Erosion Rock cycle Soil horizons Weathering	3.3.4.A4 3.3.4.A5 3.3.6.A2 3.3.7.A2	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.1.3		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 8 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth is a complex and dynamic set of interconnected systems (geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	Water continually cycles among geosphere, hydrosphere, biosphere, and atmosphere via transpiration, evaporation, condensation, and precipitation.	Investigate water systems to identify seasonal and annual variations in precipitation and stream flow and the causes of those variations.	Flow rate Hydrosphere Ocean systems River systems Watershed Wetland	3.3.5.A4 3.3.6.A4 3.3.8.A4	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.3.2 S8.D.1.3.3 S8.D.1.3.4		
		Water continually cycles among geosphere, hydrosphere, biosphere, and atmosphere via transpiration, evaporation, condensation, and precipitation, as well as, downhill flows on land.	Assess the physical characteristics of a stream to determine the types of organisms found within the stream environment. Focus: Regional Watershed	Biological diversity Flow rate River systems Stream Tributary Watershed	3.3.5.A4 3.3.6.A4 3.3.8.A4	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.3.2 S8.D.1.3.3 S8.D.1.3.4		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>The Earth is a complex and dynamic set of interconnected systems (geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.</p>	<p>How and why is Earth constantly changing?</p>	<p>Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography resulting in complex patterns that are difficult to predict.</p>	<p>Construct and use models to support the explanation of how the uneven distribution of solar energy affects global patterns in atmospheric and oceanic circulation.</p>	<p>Air pressure Altitude Atmosphere Barometer Circulation Climate Downwelling Geography Hydrosphere Latitude Oceanic Upwelling Weather</p>	<p>3.3.7.A6 3.3.6.A6 3.3.6.A5 3.3.8.A4</p>	<p>S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.2.1.1 S8.D.2.1.2</p>		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth is a complex and dynamic set of interconnected systems (geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?	The ocean and other large bodies of water exert a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents that are driven by differences in density relative to temperature and salinity.	Construct explanations from models of oceanic and atmospheric circulation, and for the development of local and regional climates.	Atmosphere Atmospheric circulation Climate Density Hydrosphere Oceanic circulation Salinity	3.3.7.A6 3.3.6.A6 3.3.6.A5 3.3.8.A4	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.2.1.1 S8.D.2.1.2		
		Major events in Earth’s history leave evidence in the geologic record that allow the construction of a geologic time scale based on relative ages.	Use geologic evidence to construct patterns and determine the relative ages and sequence of geologic events in Earth’s 4.6 billion year history.	Geosphere Geologic time Index fossils Law of superposition Relative age Scale	3.3.7.A3	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.1.2 S8.D.1.1.4		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>The Earth is a complex and dynamic set of interconnected systems (geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal spatial scales.</p>	<p>How and why is Earth constantly changing?</p>	<p>Plate tectonics is the unifying theory that explains the past, current, and future movements of the rocks at Earth’s surface and provides a framework for understanding its geological history. Tectonic processes continually generate new ocean seafloor at ridges and destroy old seafloor at trenches.</p>	<p>Incorporate a variety of data including geological evidence from maps and representations of current plate motions to predict future plate motions.</p>	<p>Asthenosphere Continental drift Convection Geosphere Fossil record Lithosphere Mantle Plate motion Plate tectonics Rock record Seafloor spreading</p>	<p>3.3.6.A1 3.3.7.A6 3.3.8.A6</p>	<p>S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.1.2</p>		
			<p>Use models to explain how the flow of energy (convection of heat) drives the cycling of matter between Earth’s surface and deep interior.</p>	<p>Convection Convergence Crust Divergence Geosphere Inner core Mantle Outer core Plate tectonics</p>	<p>3.3.6.A1 3.3.7.A6 3.3.8.A6</p>	<p>S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.1.2</p>		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>The Earth is a complex and dynamic set of interconnected systems (geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.</p>	<p>How and why is Earth constantly changing?</p>	<p>Some natural hazards, such as volcanic eruptions and severe weather may be preceded by phenomena that allow for reliable prediction. Others, such as earthquakes occur suddenly with no notice and are not yet predictable.</p>	<p>Investigate or develop a map of the past and present natural hazards in a region to demonstrate an understanding of forecasting the likelihood of future events and to inform designs for development of technologies to mitigate their effects.</p>	<p>Earthquake Floods Geosphere Hurricane Natural hazard Tornado Tsunami Volcanoes</p>	<p>3.3.8.A6 3.3.10.A1 3.3.10.A6</p>	<p>S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.1.2</p>		
		<p>Evolution is shaped by Earth’s varying geological and environmental conditions. Sudden changes in conditions (meteor impacts, major volcanic eruptions) have caused mass extinctions, but these changes, as well as more gradual ones, have ultimately allowed other life forms to flourish.</p>	<p>Use evidence from the rock and fossil records to construct arguments that explain how past changes in Earth’s conditions have caused major extinctions of some life forms and allowed others to flourish.</p>	<p>Eruption Extinction Fossil record Geosphere Mass Meteor impact Volcanic</p>	<p>3.3.7.A3</p>	<p>S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.1.4</p>		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth's processes affect and are affected by human activities.	How do Earth's processes and human activities affect each other?	Minerals, fresh water, and living resources are limited and many are not renewable or replaceable over human lifetimes.	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.	Atmosphere Consumption Geosphere Hydrosphere Mineral Natural Nonrenewable resources Population growth Renewable resources Resources	3.3.8.A2 3.3.8.A3 3.3.10.A2	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.B.3.3 S8.D.1.2.2		
		Human activities influence Earth's global temperature, and these effects can be mitigated through applying knowledge of climate science, engineering, etc.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures of the past century.	Atmosphere Biosphere Carbon dioxide Climate Global warming	3.3.7.A5 3.3.8.A5 3.3.10.A6	S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.2.1.1 S8.D.2.1.2 S8.D.2.1.3		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 8 Earth and Space Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
The Earth's processes affect and are affected by human activities.	How do Earth's processes and human activities affect each other?	Human activities have significantly altered the biosphere and geosphere, sometimes damaging or destroying natural habitats causing the extinction of other species.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	Biosphere		S8.A.1.1 S8.A.1.2 S8.A.1.3 S8.A.2.1 S8.A.2.2 S8.A.3.1 S8.A.3.2 S8.A.3.3 S8.D.1.2.2		

DIOCESE OF HARRISBURG SCIENCE CURRICULUM GRADE 8 Life Science								
Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
All organisms are made of cells and can be characterized by common aspects of their structure and functioning.	How do organisms live, grow, respond to their environment and reproduce?	In multi-cellular organisms, there is systems framework or organization from cells to tissues, to organs to organ systems. These systems are specialized for particular body functions of an organism.	Provide evidence to support the concept of an organism is composed of interacting subsystems composed of a group of cells. (Body Systems)	Cells Molecules Organ systems Organelles Organs Tissues	3.1.6.A 3.12.7.A 3.1.8.A	S8.B.1.1.1 S8.B.1.1.2 S8.B.1.1.3 S8.B.1.1.4		
		Genetic factors as well as local condition affect the growth of organisms.	Provide a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	Environmental factors Genetic factors Scientific explanation	3.1.6.A 3.1.7.A 3.1.8.A	S8.C.1.1.3 S8.C.2.1.1 S8.C.2.1.3 S8.C.2.2.1		

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Life Science**

Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
All organisms are made of cells and can be characterized by common aspects of their structure and functioning.	How do organisms live, grow, respond to their environment and reproduce?	Organisms have sense receptor that responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to a brain or processing center. These signals are processed and result in immediate behaviors or memories.	Gather information that sensory receptors respond to stimuli by sending messages to the brain or processing center for immediate behavior or storage as memories.	Brain Nerves Neurons Response Signal Stimuli		S8.B.2.1.1		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.</p>	<p>How can there be so many similarities among organisms, yet so many different kinds of plants, animals, and microorganisms?</p>	<p>The collection of fossils and their placement in chronological order (e.g. through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, change, and extinction of many life forms throughout the history of life on Earth.</p>	<p>Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.</p>	<p>Evolution Evolutionary descent Evolutionary history Fossil Fossil record Homologous structures Radioactive dating</p>	<p>3.1.8.A 3.4.8.A 4.2.8.C 3.1.8.C</p>	<p>S8.B.2.1.5 S8.B.2.1.1</p>		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.</p>	<p>How can there be so many similarities among organisms, yet so many different kinds of plants, animals, and microorganisms?</p>	<p>Anatomical similarities and differences among various organisms living today and between them and organisms in the fossil record, enable the reconstruction of evolutionary history and the inference of lines of evolutionary descent.</p>	<p>Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.</p>	<p>Anatomical Anatomical fossil record Evolutionary descent Evolutionary history Fossil Fossil record Homologous structures Natural selection</p>	<p>3.1.8.C 3.4.8.E</p>	<p>S8.B.2.1.2 S8.B.2.1.5 S8.B.2.1.1</p>		
		<p>Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully-formed anatomy.</p>	<p>Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.</p>	<p>Embryological relationships</p>	<p>3.1.8.C 3.4.8.E</p>	<p>S8.2.1.5</p>		

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<p>Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.</p>	<p>How can there be so many similarities among organisms, yet so many different kinds of plants, animals, and microorganisms?</p>	<p>Adaptations allow organisms to survive in their environment. Natural selection leads to the predominance of certain traits in the population, and the suppression of others.</p>	<p>Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.</p>	<p>Genetic variation Natural selection Predominance suppression</p>	<p>3.1.8.C 3.4.8.E</p>	<p>S8.B.2.1.5 S8.B.3.2.3 S8.B.2.1.1 S8.B.2.1.2 S8.B.2.1.3</p>		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
<p>Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.</p>	<p>How can there be so many similarities among organisms, yet so many different kinds of plants, animals, and microorganisms.</p>	<p>Adaptation by natural selection acting over generations is a process by which species change over time in response to changes in environmental conditions. Traits that support survival and reproduction in the new environment become more common; those that do not, less common.</p>	<p>Use mathematical representation to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. If organisms cannot adapt to new environmental conditions, extinction can happen.</p>	<p>Adaptation Evolve Natural selection Variation</p>	<p>3.1.8.A 3.1.8.C 3.4.8.B 3.4.8.E 4.4.8.A 4.5.8.A 4.5.8.C 4.5.8.D</p>	<p>S8.B.2.1.5 S8.B.2.1.1 S8.B.3.2.3 S8.B.3.2.2</p>		

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Big Idea	Essential Questions	Concepts	Competencies	Vocabulary	PA SAS Standards	Assessment Anchor Eligible Content	Text pages or supplementary material	Date Assessed
Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explains why offspring resemble, but are not identical to, their parents.	How are the characteristics of one generation passed to the next? How can individuals of the same species and even siblings have different characteristics?	Animals engage in characteristic behaviors that increase the odds of reproduction.	Develop supporting statements based on scientific evidence and reasoning that explains how organismal behaviors and structures increase the probability of successful reproduction in living things.			S8.B2.1.2		
		Organisms have characteristic behaviors and structures that increase their odds of reproduction.	Utilize empirical evidence to support an argument that organisms have characteristic behaviors and structures that increase their odds of reproduction.	Adaptations: structural, behavioral	3.1.8.C	S8.B.2.1.1 S8.B.2.1.2		