



Diocese of Greensburg Curriculum Science Grade 4

Unit	Standards	Content	Skills
<p>Energy (Physical Science)</p>	<p>CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5 CCSS: Grade 4</p> <hr/> <p>Writing Text Types and Purposes 1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.</p> <p>W.4.1a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which related ideas are grouped to support the writer's purpose.</p> <p>2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.</p> <p>W.4.2b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.</p> <p>9. Draw evidence from literary or informational texts to support analysis, reflection, and research.</p> <p>W.4.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.</p> <hr/> <p>CCSS: Mathematics CCSS: Grade 4</p> <hr/> <p>Operations & Algebraic Thinking 4.OA.A. Use the four operations with whole numbers to solve problems.</p>	<ul style="list-style-type: none"> • Focus on waves through the study of heat, light, sound, and electric currents. • Waves have patterns in terms of amplitude and wavelength. • Light reflects, refracts, and transmits. • States of matter • Measuring matter (mass, density, length, and volume) • Energy transfer (sound, light, electrical) • Mixtures and solutions • Physical and chemical changes • How energy, force, and world affect motion • Parallel and series circuits • Magnetism • Gravity • Light • Volume • Pitch 	<p>The students will be able to:</p> <ul style="list-style-type: none"> • Make connections between patterns of relationships between a wave passing, the net of the wave, and the motion of an object caused by the wave as it passes. • Develop and utilize a model to describe that waves of the same type can vary in terms of amplitude and wavelength and describe how this might affect the motion, caused by a wave, of an object. • Identify similarities and differences in patterns underlying waves and use these patterns to describe simple relationships involving wave amplitude, wavelength, and the motion of an object. • Articulate a statement that relates the given situation to a scientific idea, including that the speed of a given object is related to the energy of the object. • Identify and describe the relevant given evidence for the explanation. • Use reasoning to connect the evidence to support an explanation for the occurrence. • Describe a chain of reasoning. • Describe the phenomenon under investigation. • Describe the data to be collected that will serve as the basis for evidence. • Identify and describe how the data will be observed and recorded, including the tools and methods for collecting data. • Make and record observations according to the given investigation plan to provide evidence.

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	<p>4.OA.A.1. Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.</p> <p>4.OA.A.2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.</p> <p>Measurement & Data</p> <p>4.MD.A. Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.</p> <p>4.MD.A.1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.</p> <p>Mathematical Practice</p> <p>MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.</p> <p>MP.3. Construct viable arguments and critique the reasoning of others.</p> <p>NGSS: Science Performance Expectations (2013)</p> <p>NGSS: Grade 4</p> <hr/> <p>4.Energy Performance Expectations</p>		<ul style="list-style-type: none"> • Ask questions and predict reasonable outcomes about the changes in energy that occur when objects collide. • Collaboratively design a solution that converts energy from one form to another. • Evaluate the proposed solution according to how well it meets the specified criteria and constraints of the problem. • Test the device and use the results of the test to address problems in the design and improve its functioning.

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	<p>4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.</p> <p>4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.</p> <p>4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide.</p> <p>4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*</p> <p>4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.</p> <p>NGSS: Disciplinary Core Ideas NGSS: Grade 4</p> <hr/> <p>PS3: Energy PS3.A: Definitions of Energy</p> <p>The faster a given object is moving, the more energy it possesses. (4-PS3-1)</p> <p>PS3.B: Conservation of Energy and Energy Transfer</p> <p>Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by</p>		

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	<p>transforming the energy of motion into electrical energy. (4-PS3-2),(4-PS3-4)</p> <p>PS4: Waves and Their Applications in Technologies for Information Transfer</p> <p>PS4.A: Wave Properties</p> <p>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 except when the water meets the beach. (Note: This grade band endpoint was moved from K–2.) (4-PS4-1)</p> <p>Waves of the same type can differ inamplitude (height of the wave) and wavelength (spacing between wavepeaks). (4-PS4-1)</p> <p>ETS1: Engineering Design</p> <p>ETS1.A: Defining and Delimiting an Engineering Problem</p> <p>Possible solutions to a problem are limited by available materials and resources(constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria).Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1) (secondary to 4-PS3-4)</p> <p>© Copyright 2010. National Governors Association Center for Best Practices and Council of Chief State School Officers. All rights reserved.</p>		
<p>Molecules to Organisms (Life Science)</p>	<p>CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5</p> <p>CCSS: Grade 4</p> <hr/> <p>Capacities of the Literate Individual</p>	<ul style="list-style-type: none"> • Invertebrate and vertebrate • Warm-blooded and Cold-blooded • Inherited and learned behaviors • Parts of a Flower 	<p>The students will be able to:</p> <ul style="list-style-type: none"> • Students use evidence to support the idea that plants and animals have internal and external structures that function together as part of a system to support survival, growth, behavior, and reproduction.

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	<p>Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, & Language They demonstrate independence.</p> <p>They build strong content knowledge.</p> <p>They comprehend as well as critique.</p> <p>Reading: Informational Text Key Ideas and Details 1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.</p> <p>RI.4.1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.</p> <p>2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.</p> <p>RI.4.2. Determine the main idea of a text and explain how it is supported by key details; summarize the text.</p> <p>Writing Text Types and Purposes 1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.</p> <p>W.4.1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.</p> <p>W.4.1b. Provide reasons that are supported by facts and details.</p> <p>2. Write informative/explanatory texts to examine and convey complex ideas and</p>	<ul style="list-style-type: none"> • Classification of plants • Germination • Animal classification (5 groups) • Food Chains and Webs • Herbivore, carnivore, and omnivore • Producers, consumers, and decomposers • Adaptions for survival • Ecosystems • Plant and animal life processes • Compare and contrast plant and animal life cycles • Organism adaptation • Threats to survival of species • Endangered species • Predator and prey • Compare and contrast plant and animal cell structures 	<ul style="list-style-type: none"> • Evaluate and critique evidence (Strengths/Weaknesses of evidence) • Reason and Synthesize (Connect relevant and appropriate evidence and construct and argument that includes the idea that plants and animals have structures.) • Determine strengths and weaknesses of the evidence including whether the evidence is relevant and sufficient to support a claim about the role of internal and external structures of plants and animals in supporting survival, growth, behavior and reproduction • Use reasoning to connect the relevant and appropriate evidence and construct an argument that includes the idea that plants and animals have structures that together support survival, growth, behavior, and reproduction

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	<p>information clearly and accurately through the effective selection, organization, and analysis of content.</p> <p>W.4.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.</p> <p>5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.</p> <p>W.4.5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.</p> <p>NCTM: Mathematics NCTM: Grades 3 - 5</p> <hr/> <p>Number & Operations Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p> <p>use models, benchmarks, and equivalent forms to judge the size of fractions;</p> <p>describe classes of numbers according to characteristics such as the nature of their factors.</p> <p>NGSS: Science Performance Expectations (2013) NGSS: Grade 4</p> <hr/> <p>4.Structure, Function, and Information Processing Performance Expectations</p> <p>4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.</p> <p>4-LS1-1. Construct an argument that plants and animals have internal and external structures that</p>		

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	<p>function to support survival, growth, behavior, and reproduction.</p> <p>4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.</p> <p>NGSS: Disciplinary Core Ideas NGSS: Grade 4</p> <hr/> <p>LS1: From Molecules to Organisms: Structures and Processes LS1.A: Structure and Function</p> <p>Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)</p> <p>LS1.D: Information Processing</p> <p>Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)</p> <p>© Copyright 2010. National Governors Association Center for Best Practices and Council of Chief State School Officers. All rights reserved.</p>		
<p>Earth and Human Activity (Earth Science)</p>	<p>CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5 CCSS: Grade 4</p> <hr/> <p>Capacities of the Literate Individual Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, & Language</p> <p>They demonstrate independence.</p> <p>They build strong content knowledge.</p>	<ul style="list-style-type: none"> • Fossils • Rock classification • Rock cycle • The various types of climates • 4 layers of the Earth • Volcanoes and earthquakes • Mineral classification 	<p>The students will be able to:</p> <ul style="list-style-type: none"> • Explain how landscapes change over time. • Identify evidence relevant to supporting the explanation including local and regional patterns. • Categorize the various types of climates on Earth

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	<p>Reading: Literature Key Ideas and Details 1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.</p> <p>RL.4.1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.</p> <p>Reading: Foundational Skills Fluency RF.4.4. Read with sufficient accuracy and fluency to support comprehension.</p> <p>a. Read grade-level text with purpose and understanding.</p> <p>CCSS: Mathematics CCSS: Grade 4</p> <hr/> <p>Operations & Algebraic Thinking 4.OA.A. Use the four operations with whole numbers to solve problems.</p> <p>4.OA.A.1. Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.</p> <p>4.OA.A.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.</p>	<ul style="list-style-type: none"> • Weathering and erosion • Water Cycle • Various types of natural disasters (hurricanes, volcanic eruptions, tsunamis, flooding) and their effects on living things • Methods to predict natural disasters and techniques used to keep people safe in a natural disaster. • How humans affect Earth and how the Earth affects us • Renewable resources and non-renewable resources • Pollution • Rapid and slow surface changes 	<ul style="list-style-type: none"> • Specific rocks, lower and upper layers, irregularities • Understand that human impact directly affects the environment and natural resources • Support evidence • Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. • Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. • Conduct short research projects that build knowledge through investigation of different aspects of a topic. • Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information and provide a list of sources. • Identify given explanation for an occurrence (i.e. earthquake) which includes a statement about the idea that landscapes change over time. • Use reasoning to connect the evidence to support particular points, including specific pattern of rock layers, etc.

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	<p>Mathematical Practice MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.</p> <p>MP.1. Make sense of problems and persevere in solving them.</p> <p>NGSS: Science Performance Expectations (2013) NGSS: Grade 4</p> <hr/> <p>4.Earth’s Systems: Processes that Shape the Earth Performance Expectations</p> <p>4-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers for changes in a landscape over time to support an explanation for changes in a landscape over time.</p> <p>4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.</p> <p>4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth’s features.</p> <p>4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.*</p> <p>NGSS: Disciplinary Core Ideas NGSS: Grade 4</p> <hr/> <p>ESS1: Earth’s Place in the Universe</p>		

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	<p>ESS1.C: The History of Planet Earth</p> <p>Local, regional, and global patterns of rock formations reveal changes overtime due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1)</p> <p>ESS2: Earth's Systems</p> <p>ESS2.A: Earth Materials and Systems</p> <p>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. (4-ESS2-1)</p> <p>ESS2.B: Plate Tectonics and Large-Scale System Interactions</p> <p>The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. (4-ESS2-2)</p>		

