

Abington Heights School District Grade 4 Science, Technology & Engineering, and Environmental Literacy & Sustainability Curriculum



Themes:

- ★ Human Body Systems
- ★ Energy
- ★ Earth and Its Features

Board Approval Date: April 3, 2024
Review Date:

Adoption: 2024 - 2025 SY

Grade 4 Science Curriculum Scope and Sequence

Month	Unit	Estimated Number of Weeks
Quarter 1	Energy Conversions	9 Weeks
Quarter 2	Visions and Light	9 Weeks
Quarter 3	Earth's Features	9 Weeks
Quarter 4	Waves, Energy, and Information	9 Weeks

Grade 4 Comet Connects Curriculum Scope and Sequence

Month	Unit	Estimated Number of Weeks
September	Introduction: What is STEM?	2 Weeks
October-November	Technology: How can technology be used to share information?	4 Weeks
December	Technology: What are the different ways robotics can move? What is digital citizenship?	2 Weeks
January	Technology : What is the importance of block coding? How is blocked coding used in different apps?	2 Weeks
February	Technology and engineering: How do technologies develop and change? How do technologies help us grow and develop as a society?	2 Weeks
March-May	Technology and engineering: How can technology or engineering be used to create a project that meets a specific need?	6 Weeks
June	Technology: What is binary coding?	2 Weeks

AHSD Grade 4 Science Curriculum		Assessment / Evidence of Learning			
Month / Unit	Essential Questions	Standards	Content		
Activities					
Skills					
Energy Conversions	What is energy?	3.2.4.A Use evidence to construct an explanation relating the speed of an object to the energy of that object.	<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 transforming the energy of motion into electrical energy.</p> <p>Energy in Chemical Processes and Everyday Life: The expression “produce energy” typically refers to the conversion of stored energy into a desired form for practical use. Defining Engineering Problems 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</p>	<p>Constructing Explanations and Designing Solutions: Use evidence (e.g., measurements, observations, patterns) to construct an explanation.</p> <p>Energy and Matter: Energy can be transferred in various ways and between objects.</p>	<p>Energy Conversions (Grade 4) TS: Lesson 3.4, Activity 2</p>
	What is meant by conservation of energy? How is energy transferred between objects or systems?	3.2.4.B Make and communicate observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	<p>Energy can be moved from place to place by moving objects or through sound, light, or electric currents. Energy is present whenever there are moving objects, sound, light, or heat. 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.</p>	<p>Planning and Carrying Out Investigations: Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.</p> <p>Asking Questions and Defining Problems: Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.</p> <p>Patterns: Similarities and differences in patterns can be used to sort, classify, and analyze simpler cases of change for natural phenomena. Cause and effect relationships are routinely identified.</p> <p>Connections to Engineering, Technology, and Applications of Science and Independence of Science, Engineering, and Technology Knowledge: of relevant scientific concepts and research findings is important in engineering.</p>	<p>Energy Conversions (Grade 4) PRE: Lesson 1.1 Activity 1 OTEFA 18: Lesson 4.2 Activity 2 CJ 3: Lesson 4.3 Activity 2 EOU: Lesson 4.6 Waves, Energy, and Information (Grade 4) PRE: Lesson 1.1 Activity 4 OTEFA 3: Lesson 1.4 Activity 2 CJ 1: Lesson 1.5 Activity 3 OTEFA 4: Lesson 2.1 Activity 2 OTEFA 8: Lesson 2.5 Activity 2 CJ 2: Lesson 2.6 Activity 3 CW: Lesson 2.6 Activity 3 EOU: Lesson 4.4 Activity 3 (S) Energy Conversions (Grade 4) PRE: Lesson 1.1 Activity 1 OTEFA 3: Lesson 1.4 Activity 3 OTEFA 4: Lesson 1.5 Activity 3 OTEFA 5: Lesson 1.6 Activity 1 OTEFA 7: Lesson 2.1 Activity 2 CJ 1: Lesson 2.3 Activity 1 CW: Lesson 2.4 Activity 4 OTEFA 10: Lesson 3.1 Activity 2 TS: Lesson 3.1 Activity 2 OTEFA 11: Lesson 3.1 Activity 4 OTEFA 12: Lesson 3.2 Activity 2 CJ 2: Lesson 3.3 Activity 1 OTEFA 16: Lesson 4.1 Activity 2 OTEFA 17: Lesson 4.1 Activity 3 OTEFA 18: Lesson 4.2 Activity 2 OTEFA 20: Lesson 4.4 Activity 3 CJ 3: Lesson 4.3 Activity 2 EOU: Lesson 4.6 Activities 1 & 2 (S) Waves, Energy, and Information (Grade 4) OTFA 5: Lesson 2.2 Activity 3 OTEFA 6: Lesson 2.3 Activity 1 OTEFA 7: Lesson 2.4 Activity 1 OTEFA 8: Lesson 2.5 Activity 2 CJ 2: Lesson 2.6 Activity 3 CW: Lesson 2.6 Activity 3 EOU: Lesson 4.4 Activity 3 (S)</p>

AHSD Grade 4 Science Curriculum		Content	Skills	Activities	Assessment / Evidence of Learning
Month / Unit	Essential Questions	Standards	Content	Skills	Assessment / Evidence of Learning
Energy Conversions	How do food and fuel provide energy? If energy is conserved, why do people say it is produced or used?	3.2.4.D Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	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 transforming the energy of motion into electrical energy. Energy in Chemical Processes and Everyday Life: The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. Defining Engineering Problems: 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.	<p>Constructing Explanations and Designing Solutions: Apply scientific ideas to solve design problems.</p> <p>Connections to Nature of Science: Science is a Human Endeavor. Most scientists and engineers work in teams. Science affects everyday life.</p>	<p>Energy Conversions (Grade 4) PRE: Lesson 1.1 Activity 1 OTFA 3: Lesson 1.4 Activity 3 OTFA 7: Lesson 2.1 Activity 2 CJ 1: Lesson 2.3 Activity 1 CW: Lesson 2.4 Activity 4 OTFA 10: Lesson 3.1 Activity 2 OTFA 11: Lesson 3.1 Activity 4 OTFA 12: Lesson 3.2 Activity 2 CJ 2: Lesson 3.3 Activity 1 OTFA 16: Lesson 4.1 Activity 2 OTFA 17: Lesson 4.1 Activity 3 OTFA 18: Lesson 4.2 Activity 2 CJ 3: Lesson 4.3 Activity 2 EOU: Lesson 4.6 Activities 1 & 2(S) Energy Conversions (Grade 4) OTFA 12: Lesson 3.2 Activity 2 CJ 2: Lesson 3.3 Activity 1 OTFA 16: Lesson 4.1 Activity 2 OTFA 17: Lesson 4.1 Activity 3 OTFA 13: Lesson 3.4 Activity 3 OTFA 14: Lesson 3.5 Activity 1 OTFA 15: Lesson 3.6 Activity 3 CW: Lesson 3.6 Activity 4 OTFA 19: Lesson 4.3 Activity 4 OTFA 21: Lesson 4.5, Activity 1</p>
	How do Earth's surface processes and human activities affect each other? How do humans depend on Earth's resources?	3.3.4.D Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	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.	<p>Obtaining, Evaluating, and Communicating Information: Obtain and combine information from books and other reliable media to explain phenomena.</p> <p>Cause and Effect: Cause and effect relationships are routinely identified and used to explain change.</p> <p>Connections to Engineering, Technology, and Applications of Science and Interdependence of Science, Engineering, and Technology: Knowledge of relevant scientific concepts and research findings is important in engineering.</p>	<p>Energy Conversions Unit</p>

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Vision and Light	How do the structures of organisms enable life's functions?	3.1.4.A Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.	Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.	Engaging in Argument from Evidence: Construct an argument with evidence, data, and/or a model. Systems and System Models: A system can be described in terms of its components and their interactions.	Vision and Light Unit	Vision and Light (Grade 4) OTFA 1; Lesson 1.2 Activity 3 CJ 1; Lesson 1.4 Activity 1 OTFA 9; Lesson 3.3 Activity 2 OTFA 10; Lesson 3.4 Activity 1 CJ 3; Lesson 3.5 Activity 4 CW; Lesson 3.5 Activity 4 OTFA 12; Lesson 4.3 Activity 1 CJ 4; Lesson 4.4 Activity 2 EOU; Lesson 4.6 Activity 2 (S) INV; Lesson 5.2 Activities 1-4 (S)					
	How do organisms detect, process, and use information about the environment?	3.1.4.B 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.	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.	Developing and Using Models: Use a model to test interactions concerning the functioning of a natural system. Systems and System Models: A system can be described in terms of its components and their interactions.	Vision and Light Unit	Vision and Light (Grade 4) OTFA 1; Lesson 1.2 Activity 3 CJ 1; Lesson 1.4 Activity 1 OTFA 9; Lesson 3.3 Activity 2 CJ 3; Lesson 3.5 Activity 4 CW; Lesson 3.5 Activity 4 OTFA 12; Lesson 4.3 Activity 1 CJ 4; Lesson 4.4 Activity 2 EOU; Lesson 4.6 Activity 2 (S)					
	What is light? How can one explain the varied effects that involve light? What other forms of electromagnetic radiation are there?	3.2.4.F Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.	An object can be seen when light reflected from its surface enters the eyes.	Developing and Using Models: Develop a model to describe phenomena. Cause and Effect: Cause and effect relationships are routinely identified.	Vision and Light Unit	Vision and Light (Grade 4) OTFA 4; Lesson 2.2 Activity 3 OTFA 5; Lesson 2.3 Activity 2 OTFA 6; Lesson 2.3 Activity 3 CJ 2; Lesson 2.5 Activity 3 CW; Lesson 2.5 Activity 3 OTFA 9; Lesson 3.3 Activity 2 OTFA 10; Lesson 3.4 Activity 1 EOU; Lesson 4.6 Activity 2 (S)					
	Pre-requisite knowledge necessary, use to activate background knowledge:	3.2.K.C Make observations to determine the effect of sunlight on Earth's surface. 3.2.K.D Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.									

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	How do people reconstruct and date events in Earth's planetary history?	3.3.4.A Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.	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.	Constructing Explanations and Designing Solutions: Identify the evidence that supports particular points in an explanation. Patterns: Patterns can be used as evidence to support an explanation. Connections to Nature of Science Scientific knowledge assumes an order and consistency in natural systems. Science assumes consistent patterns in natural systems.	Earth's Features Unit	Earth's Features (Grade 4) OTFA 2: Lesson 1.3 Activity 4 OTFA 3: Lesson 1.4 Activity 4 CJ 1: Lesson 1.6 Activity 1 OTFA 5: Lesson 2.2 Activity 3 OTFA 6: Lesson 2.3 Activity 3 OTFA 7: Lesson 2.4 Activity 4 CW: Lesson 2.6 Activity 1 CJ 2: Lesson 2.6 Activity 3 OTFA 8: Lesson 3.1 Activity 4 OTFA 9: Lesson 3.2 Activity 2 CJ 3: Lesson 3.4 Activity 2 EOU 1: Lesson 3.5 Activity 2(S)
	How and why is Earth constantly changing?	3.3.4.B Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	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. Living things affect the physical characteristics of their regions.	Planning and Carrying Out Investigations: Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. Cause and Effect: Cause and effect relationships are routinely identified, tested, and used to explain change.	Earth's Features Unit	Earth's Features (Grade 4) OTFA 12: Lesson 4.3 Activity 2 OTFA 13: Lesson 4.5 Activity 1 EOU 2: Lesson 4.5 Activity 3(S) TS: Lesson 2.2 Activity 3
Earth's Features	Why do the continents move, and what causes earthquakes and volcanoes?	3.3.4.C Analyze and interpret data from maps to describe patterns of Earth's features.	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.	Analyzing and Interpreting Data: Analyze and interpret data to make sense of phenomena using logical reasoning. Patterns: Patterns can be used as evidence to support an explanation.	Earth's Features Unit	Earth's Features (Grade 4) TS: Lesson 4.5 Activity 4
	How do natural hazards affect individuals and societies?	3.3.4.E Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.	A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts. Designing Solutions to Engineering Problems: Testing a solution involves investigating how well it performs under a range of likely conditions.	Constructing Explanations and Designing Solutions: Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. Cause and Effect: Cause and effect relationships are routinely identified, tested, and used to explain change.	Earth's Features Unit	Energy Conversions (Grade 4) OTFA 14: Lesson 3.5 Activity 1 Waves, Energy, and Information (Grade 4) TS: Lesson 1.3 Activity 3 Also addressed in 3rd grades: Weather and Climate (Grade 3) OTFA 11: Lesson 4.2 Activity 2 EOU 2: Lesson 4.4 Activities 1 & 2(S) Environments and Survival (Grade 3) OTFA 7: Lesson 2.7 Activity 3 OTFA 10: Lesson 4.3 Activity 3

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Month / Unit	Essential Questions	Standards	Content
		Skills	Activities
Waves Energy and Information	<p>How are forces related to energy?</p> <p>3.2.4.C Ask questions and predict outcomes about the changes in energy that occur when objects collide.</p>	<p>Constructing Explanations and Designing Solutions: Apply scientific ideas to solve design problems.</p> <p>Energy and Matter: Energy can be transferred in various ways and between objects.</p>	<p>Unit 2: Waves, Energy, and Information</p> <p>Energy Conversions (Grade 4) PRE: Lesson 1.1 Activity 1 OTEA 18; Lesson 4.2 Activity 2 Cj 3; Lesson 4.3 Activity 2 EOU; Lesson 4.6 Activities 1 & 2 (S)</p> <p>Waves, Energy, and Information (Grade 4) PRE: Lesson 1.1 Activity 4 OTEA 3; Lesson 1.4 Activity 2 Cj 1; Lesson 1.5 Activity 3 OTEA 4; Lesson 2.1 Activity 2 OTEA 8; Lesson 2.5 Activity 2 Cj 2; Lesson 2.6 Activity 3 CW; Lesson 2.6 Activity 3 EOU; Lesson 4.4, Activity 3 (S)</p> <p>Energy Conversions (Grade 4) PRE: Lesson 1.1, Activity 1 OTEA 4; Lesson 1.5, Activity 3 OTEA 5; Lesson 1.6, Activity 1 OTEA 7; Lesson 2.1, Activity 2 CJ 1; Lesson 2.3, Activity 1 OTEA 20; Lesson 4.4, Activity 3</p> <p>Waves, Energy, and Information (Grade 4) OTEA 5; Lesson 2.2, Activity 3 OTEA 6; Lesson 2.3, Activity 1 OTEA 7; Lesson 2.4, Activity 1 OTEA 8; Lesson 2.5, Activity 2 CJ 2; Lesson 2.6, Activity 3 CW; Lesson 2.6, Activity 3 EOU; Lesson 4.4, Activity 3 (S)</p>
	<p>3.2.4.E Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.</p>	<p>Developing and Using Models: Develop a model using an analogy, example, or abstract representation to describe a scientific principle.</p> <p>Patterns: Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena.</p>	<p>Unit 2: Waves, Energy, and Information</p> <p>Waves, Energy, and Information (Grade 4) OTEA 1; Lesson 1.2 Activity 3 OTEA 3; Lesson 1.4 Activity 2 Cj 1; Lesson 1.5 Activity 3 OTEA 9; Lesson 3.1 Activity 2 OTEA 10; Lesson 3.2 Activity 3 OTEA 11; Lesson 3.3 Activity 4 OTEA 12; Lesson 3.5 Activity 3 OTEA 13; Lesson 3.6 Activity 1 Cj 3; Lesson 3.7 Activity 2 EOU; Lesson 4.4 Activity 3 (S)</p>
	<p>What are the characteristic properties and behaviors of waves?</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; there is no net motion in the direction of the wave.</p>	
	<p>How are instruments that transmit and detect waves used to extend human senses?</p>	<p>Constructing Explanations and Designing Solutions: Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.</p> <p>Patterns: Similarities and differences in patterns can be used to sort and classify designed products.</p>	<p>Unit 2: Waves, Energy, and Information</p> <p>Waves, Energy, and Information (Grade 4) OTEA 14; Lesson 4.3 Activity 2 OTEA 15; Lesson 4.4 Activity 2 EOU; Lesson 4.4 Activity 3 (S)</p> <p>Energy Conversions (Grade 4) OTEA 14; Lesson 3.5, Activity 1</p> <p>Also addressed in 5th Grade: The Earth System (Grade 5) OTEA 8; Lesson 3.4, Activity 3 OTEA 11; Lesson 4.5, Activity 3</p>
	<p>3.2.4.G Generate and compare multiple solutions that use patterns to transfer information.</p>	<p>Digitized information can be 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 to voice—and vice versa.</p>	