4th Grade Science

Prioritized Standards and Instructional Units 2022-2023

4th Grade Science

UNIT 1: **Energy** 40 Days	UNIT 2: **Waves** 15 Days
PRIORITY **Science and Engineering Practices** **Asking Questions and Defining Problems** ● Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (4-PS3-3) **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. (4-PS3-2) **Constructing Explanations and Designing Solutions** ● Use evidence (e.g., measurements, observations, patterns) to construct an explanation. (4-PS3-1) ● Apply scientific ideas to solve design problems. (4- PS3-4) **Obtaining, Evaluating, and Communicating Information** ● Obtain and combine information from books and other reliable media to explain phenomena. (4-ESS3-1) **SUPPORTING** **Performance Expectations** **4-PS3-1.** Use evidence to construct an explanation relating the speed of an object to the energy of that object. **4-PS3-2.** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. **4-PS3-3.** Ask questions and predict outcomes about the changes in energy that occur when objects collide. **4-PS3-4.** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. **4-ESS3-1.** Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.	**PRIORITY** **Science and Engineering Practices** **Developing and Using Models** ● Develop a model using an analogy, example, or abstract representation to describe a scientific principle. (4-PS4-1) **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. (4-PS4-3) **SUPPORTING** **Performance Expectations** **4-PS4-1.** Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. **4-PS4-2.** Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. **4-PS4-3.** Generate and compare multiple solutions that use patterns to transfer information.

4th Grade Science

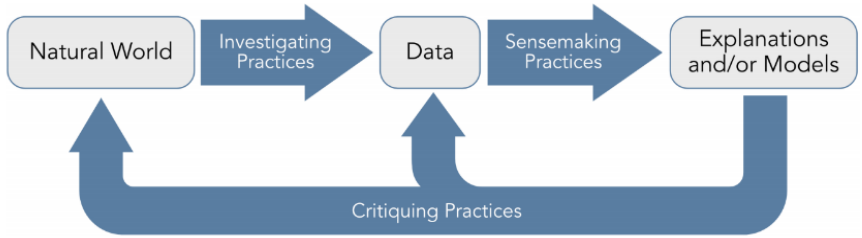
UNIT 3: Earth's Systems: Processes that Shape the Earth 30 Days	UNIT 4: Structure, Function, and Information Processing 30 Days
PRIORITY **Science and Engineering Practices** **Planning and Carrying Out Investigations** ● Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-ESS2-1) **Analyzing and Interpreting Data** ● Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2) **Constructing Explanations and Designing Solutions** ● Identify the evidence that supports particular points in an explanation. (4-ESS1-1) ● Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-ESS3-2) **SUPPORTING** **Performance Expectations** **4-ESS1-1.** Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. **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. **4-ESS2-2.** Analyze and interpret data from maps to describe patterns of Earth's features. **4-ESS3-2.** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.	**PRIORITY** **Science and Engineering Practices** **Developing and Using Models** . ● Develop a model to describe phenomena. (4- PS4-2) ● Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2) **Engaging in Argument from Evidence** ● Construct an argument with evidence, data, and/or a model. (4-LS1-1) **SUPPORTING** **Performance Expectations** **4-LS1-1.** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. **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. **4-PS4-2.** Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

Unit/Core Idea: Energy

Pacing: 40 days

Unit/Core Idea: Energy
Essential Question: What is energy and how is it related to motion? How is energy transferred?

Supporting Questions:
-What is energy?
-How is energy transferred between objects or systems?
-How are forces related to energy?
-How do natural hazards affect individuals and societies?



	Investigating Practices	Sensemaking Practices	Critiquing Practices
Science Practices	1. Asking questions	2. Developing and using models	7. Engaging in argument from evidence
	3. Planning and carrying out investigations	4. Analyzing and interpreting data	8. Obtaining, evaluating, and communication information
	5. Using mathematical and computational thinking	6. Constructing explanations	

Science and Engineering Practices (Priority)	Performance Expectations (Supporting)
Asking Questions and Defining Problems Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. • Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (4-PS3-3) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (4-PS3-2) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and	**4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.** [Assessment Boundary: Assessment does not include quantitative measures of changes in the speed of an object or on any precise or quantitative definition of energy.] **4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.** [Assessment Boundary: Assessment does not include quantitative measurements of energy.] **4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide.** [Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.] [Assessment Boundary: Assessment does not include quantitative measurements of energy.] **4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*** [Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.] [Assessment Boundary: Devices should be limited to those that convert motion energy to electric energy or use

in designing multiple solutions to design problems. ● Use evidence (e.g., measurements, observations, patterns) to construct an explanation. (4-PS3-1) ● Apply scientific ideas to solve design problems. (4- PS3-4) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3– 5 builds on K–2 experiences and progresses to evaluate the merit and accuracy of ideas and methods. ● Obtain and combine information from books and other reliable media to explain phenomena. (4-ESS3-1)	stored energy to cause motion or produce light or sound.] **4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.** [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]

Kentucky Academic Standards Connections	**ELA/Literacy –** 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. (4-PS3-1) RI.4.3 Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. (4-PS3-1) RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS3-1) W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (4-PS3-1) W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-PS3-2),(4-PS3-3),(4-PS3-4),(4-ESS3-1) W.4.8 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. (4- PS3-1),(4-PS3-2),(4-PS3-3),(4-PS3-4),(4-ESS3-1) W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-PS3-1),(4-ESS3-1) **Mathematics –** MP.2 Reason abstractly and quantitatively. (4-ESS3-1) MP.4 Model with mathematics. (4-ESS3-1) 4.OA.A.1 Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 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. (4-ESS3-1) 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. (4-PS3-4)