

# 4th Grade Science



## Prioritized Standards and Instructional Units 2022-2023

## 4th Grade Science

<b>UNIT 1: Energy 40 Days</b>	<b>UNIT 2: Waves 15 Days</b>
<p style="text-align: center;"><b><u>PRIORITY</u></b></p> <p style="text-align: center;"><b><u>Science and Engineering Practices</u></b></p> <p><b>Asking Questions and Defining Problems</b></p> <ul style="list-style-type: none"><li>• Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (4-PS3-3)</li></ul> <p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"><li>• 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)</li></ul> <p><b>Constructing Explanations and Designing Solutions</b></p> <ul style="list-style-type: none"><li>• Use evidence (e.g., measurements, observations, patterns) to construct an explanation. (4-PS3-1)</li><li>• Apply scientific ideas to solve design problems. (4-PS3-4)</li></ul> <p><b>Obtaining, Evaluating, and Communicating Information</b></p> <ul style="list-style-type: none"><li>• Obtain and combine information from books and other reliable media to explain phenomena. (4-ESS3-1)</li></ul> <p style="text-align: center;"><b><u>SUPPORTING</u></b></p> <p style="text-align: center;"><b><u>Performance Expectations</u></b></p> <p><b>4-PS3-1.</b> Use evidence to construct an explanation relating the speed of an object to the energy of that object.</p> <p><b>4-PS3-2.</b> Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.</p> <p><b>4-PS3-3.</b> Ask questions and predict outcomes about the changes in energy that occur when objects collide.</p> <p><b>4-PS3-4.</b> Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.</p> <p><b>4-ESS3-1.</b> Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.</p>	<p style="text-align: center;"><b><u>PRIORITY</u></b></p> <p style="text-align: center;"><b><u>Science and Engineering Practices</u></b></p> <p><b>Developing and Using Models</b></p> <ul style="list-style-type: none"><li>• Develop a model using an analogy, example, or abstract representation to describe a scientific principle. (4-PS4-1)</li></ul> <p><b>Constructing Explanations and Designing Solutions</b></p> <ul style="list-style-type: none"><li>• 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)</li></ul> <p style="text-align: center;"><b><u>SUPPORTING</u></b></p> <p style="text-align: center;"><b><u>Performance Expectations</u></b></p> <p><b>4-PS4-1.</b> Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.</p> <p><b>4-PS4-2.</b> Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.</p> <p><b>4-PS4-3.</b> Generate and compare multiple solutions that use patterns to transfer information.</p>

## 4th Grade Science

<b>UNIT 3:</b> <b>Earth's Systems: Processes that Shape the Earth</b> 30 Days	<b>UNIT 4:</b> <b>Structure, Function, and Information Processing</b> 30 Days
<p style="text-align: center;"><b><u>PRIORITY</u></b></p> <p style="text-align: center;"><b><u>Science and Engineering Practices</u></b></p> <p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"><li>• Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-ESS2-1)</li></ul> <p><b>Analyzing and Interpreting Data</b></p> <ul style="list-style-type: none"><li>• Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2)</li></ul> <p><b>Constructing Explanations and Designing Solutions</b></p> <ul style="list-style-type: none"><li>• Identify the evidence that supports particular points in an explanation. (4-ESS1-1)</li><li>• 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)</li></ul> <p style="text-align: center;"><b><u>SUPPORTING</u></b></p> <p style="text-align: center;"><b><u>Performance Expectations</u></b></p> <p><b>4-ESS1-1.</b> Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.</p> <p><b>4-ESS2-1.</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.</p> <p><b>4-ESS2-2.</b> Analyze and interpret data from maps to describe patterns of Earth's features.</p> <p><b>4-ESS3-2.</b> Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.</p>	<p style="text-align: center;"><b><u>PRIORITY</u></b></p> <p style="text-align: center;"><b><u>Science and Engineering Practices</u></b></p> <p><b>Developing and Using Models .</b></p> <ul style="list-style-type: none"><li>• Develop a model to describe phenomena. (4- PS4-2)</li><li>• Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2)</li></ul> <p><b>Engaging in Argument from Evidence</b></p> <ul style="list-style-type: none"><li>• Construct an argument with evidence, data, and/or a model. (4-LS1-1)</li></ul> <p style="text-align: center;"><b><u>SUPPORTING</u></b></p> <p style="text-align: center;"><b><u>Performance Expectations</u></b></p> <p><b>4-LS1-1.</b> Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p><b>4-LS1-2.</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.</p> <p><b>4-PS4-2.</b> Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.</p>

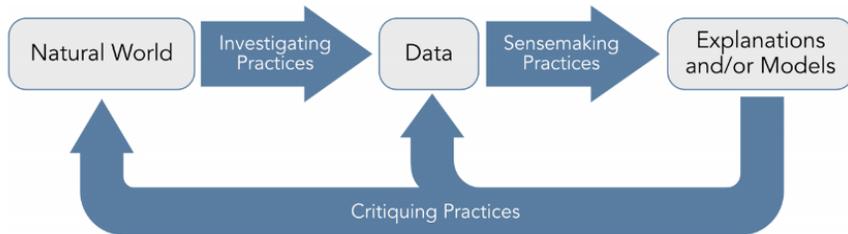
# Unit/Core Idea: Earth's Systems: Processes that Shape the Earth

Pacing: 30 days

**Unit/Core Idea: Earth's Systems: Process that Shape the Earth**  
**Essential Question: How and why is Earth constantly changing?**

**Supporting Questions:**

- How do the properties and movements of water shape Earth's surface and affect its systems?
- How do living organisms alter Earth's processes and structures?
- How do natural hazards affect individuals and societies?



	Investigating Practices	Sensemaking Practices	Critiquing Practices
	1. Asking questions	2. Developing and using models	7. Engaging in argument from evidence
Science Practices	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)**

**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 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**

Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2)

**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

**Performance Expectations (Supporting)**

**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.** [Clarification Statement: Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.] [Assessment Boundary: Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative 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.** [Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.] [Assessment Boundary: Assessment is limited to a single form of weathering or erosion.]

**4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth's features.** [Clarification Statement: Maps can include topographic

explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- 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)

maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]

**4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.\*** [Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.] [Assessment Boundary: Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.]

**Kentucky Academic Standard 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-ESS3-2)
- RI.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS2-2)
- RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-ESS3-2)
- W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS1-1),(4-ESS2-1)
- 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-ESS1-1),(4-ESS2-1)
- W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-ESS1-1)

**Mathematics –**

- MP.2 Reason abstractly and quantitatively. (4-ESS1-1),(4-ESS2-1),(4-ESS3-2)
- MP.4 Model with mathematics. (4-ESS1-1),(4-ESS2-1),(4-ESS3-2)
- MP.5 Use appropriate tools strategically. (4-ESS2-1)
- 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. (4-ESS1-1),(4-ESS2-1)
- 4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. (4-ESS2-1),(4-ESS2-2)
- 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. (4-ESS3-2)