

Boone County 4th Grade Science Curriculum Map

Unit 1: Transfer of Energy	Duration:
<i>Key Essential Questions:</i>	
<ul style="list-style-type: none"> • What is energy? • How is energy transferred? 	
<i>Transfer Goals:</i>	
<i>Students will be able to use their learning to</i>	
<ul style="list-style-type: none"> • Design, test and refine a device [that converts energy from one form into another.] • Make observations to produce data to serve as evidence for an explanation or to test a design solution [when energy is transferred by sound, light, heat and electricity.] 	
Performance Expectation	
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.	
Notes:	

Unit 2: Force and Motion using Engineering	Duration:
<i>Key Essential Questions:</i>	
<ul style="list-style-type: none"> • How is energy transferred? • What is energy and how is it related to motion? • How can energy be used to solve a problem? 	
<i>Transfer Goals:</i>	
<i>Students will be able to use their learning to</i>	

- Use evidence (measurements, observations, patterns) to construct an explanation [of how speed of an object relates to the energy of an object.]
- Design, test and refine a device [that converts energy from one form to another.]
- Ask questions that can be investigated and predict outcomes based on patterns such as cause and effect relationships [of energy change when objects collide.]

Performance Expectation

4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.

4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Notes:

Unit 3: Waves and Information

Duration:

Key Essential Questions:

- What are waves?
- What are some things waves can do?
- What are some ways humans interpret waves?

Transfer Goals:

Students will be able to use their learning to

- Develop a model to describe [how light reflecting from objects and entering the eye allows objects to be seen.]
- Develop a model using an analogy, example or abstract representation to describe [patterns in terms of amplitude and wavelength and that waves cause objects to move.]
- Generate and compare multiple solutions to a problem [involving waves and energy] based on how well they meet the criteria and constraints.

Performance Expectation

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.*

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Notes: PS4-2 is also included in unit seven (how organisms process information).

Unit 4: Weathering and Erosion

Duration:

Key Essential Questions:

- How has the earth’s landscape changed over time?
- How do natural forces cause landscape changes?
- Why are past landscape changes and the forces that cause them important to our energy supply?

Transfer Goals:

Students will be able to use their learning to

- Identify the patterns of evidence that supports an explanation [of how landforms change over time.]
- Make observations and measurements to provide data [explaining the impact of weathering and erosion.]
- Use information from books and other reliable media to explain[how humans use energy obtained from natural resources, and how using

that energy affects the environment.]

- Explain the cause and effect relationship between [the causes of weathering and erosion and the landforms that result, and between energy sources and their impact on the environment.]

Performance Expectation

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-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

Notes:

Unit 5: Earth Processes

Duration:

Key Essential Questions:

- How can we use maps to describe patterns of Earth’s features?
- What are solutions that could reduce the impact of Natural Earth processes on humans?

Transfer Goals:

Students will be able to use their learning to

- Analyze and interpret data [from maps to describe patterns of Earth’s features.]
- Generate and compare multiple solutions to a problem based on how well they meet the criteria of the design solution [in reference to natural Earth processes.]
- Explain the cause and effect relationship [between the Earth processes and the impact of the environment.]

Performance Expectation

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.*

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Notes:

Unit 6: Structures and Function

Duration:

Key Essential Questions:

- How do internal and external structures support the survival, growth, behavior and reproduction of plants and animals?

Transfer Goals:

Students will be able to use their learning to

- Construct an argument with evidence, data, and or a model [that plants and animals have internal and external structures that function to support a specific purpose.]
- Describe a system [within a living organism] in terms of components and their interactions.

Performance Expectation

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Notes:

Unit 7: How Organisms Process Information

Duration:

Key Essential Questions:

- How do internal and external structures support the survival, growth, behavior and reproduction of plants and animals?

Transfer Goals:

Students will be able to use their learning to

- Use a model to test interactions concerning the functioning of a natural system [of animals or plants.]
- Identify cause and effect relationships [between structures of organisms and their functions.]

Performance Expectation

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.

Notes: PS4-2 is also included in unit five (waves and information).