

### 4th Grade Topical Model

*Narrative and Rationale:* The five bundles in this Grade 4 model all have a particular topical focus. Bundle 1 focuses on organism structure and function and information processing. In Bundle 2, the abstract concept of energy transfer is introduced alongside a focus on information transfer. Bundle 3 extends the study of energy to include cause and effect relationships between energy and collisions. In Bundle 4, students are introduced to waves and their properties. The idea that waves can cause objects to move can be used to facilitate student understanding of the scale of the rate of weathering or erosion in certain environments. Bundle 5 builds on the third grade focus on force to facilitate students’ understanding of Earth systems and their processes of change. Opportunities also exist to connect back to concepts of energy transfer introduced earlier in the year.

There are a variety of opportunities to incorporate the 3–5 engineering design performance expectations throughout the year. Although these performance expectations are included in this 4<sup>th</sup> grade model, they will be fully assessable at the end of grade five. The science and engineering practices and crosscutting concepts in the fourth grade performance expectations enable students to develop a concrete understanding of phenomena associated with energy transfer. Note that the practices and crosscutting concepts described are intended as end-of-instructional unit expectations and not curricular designations—additional practices and crosscutting concepts should be used throughout instruction in each bundle.

<b>Bundle 1:</b> How do organisms receive and process information? ~6 weeks	<b>Bundle 2:</b> How do we move energy and information from place to place? ~9 weeks	<b>Bundle 3:</b> What happens when objects collide? ~6 weeks	<b>Bundle 4:</b> What effect can water have on land? ~6 weeks	<b>Bundle 5:</b> How can we reduce negative impacts of natural hazards and of resource use? ~9 weeks
<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-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>3-5-ETS1-1.</b> Define a simple design problem reflecting a</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-PS3-4.</b> Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*</p> <p><b>4-PS4-3.</b> Generate and compare multiple solutions that use patterns to transfer information.*</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-PS3-3.</b> Ask questions and predict outcomes about the changes in energy that occur when objects collide.</p> <p><b>3-5-ETS1-3.</b> 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.*</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.<sup>1</sup></p> <p><b>4-ESS1-1.</b> 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><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>3-5-ETS1-2.</b> Generate and compare multiple possible</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-ESS2-2.</b> Analyze and interpret data from maps to describe patterns of Earth’s features.</p> <p><b>4-ESS3-1.</b> Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.</p> <p><b>4-ESS3-2.</b> Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.*</p> <p><b>3-5-ETS1-2.</b> Generate and compare multiple possible solutions to a problem based on</p>

NGSS Example Bundles

<p>need or a want that includes specified criteria for success and constraints on materials, time, or cost.*</p>			<p>solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.<sup>1*</sup></p>	<p>how well each is likely to meet the criteria and constraints of the problem.*</p>
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<sup>1</sup> The bundle only includes part of this PE; the PE is not fully assessable in a unit of instruction leading to this bundle.

4<sup>th</sup> Grade Topics Model Flowchart

