

**Fourth Grade  
2016 Science Standards Resource Guide**

<b>Physical Science</b>				
<b>2016 Indiana Academic Standards</b>	<b>Clarifying Statements</b>	<b>Vocabulary</b>	<b>Crosscutting Concept</b>	<b>Disciplinary Core Idea</b>
<p><b>4.PS.1</b> Investigate transportation systems and devices that operate on or in land, water, air and space and recognize the forces (lift, drag, friction, thrust and gravity) that affect their motion.</p>		<p><b>lift</b> – to raise to a higher position or level  <b>drag</b> – pull (someone or something) along forcefully, roughly, or with difficulty  <b>friction</b> – the resistance that one surface or object encounters when moving over another  <b>thrust</b> – push (something or someone) suddenly or violently in the specified direction  <b>gravity</b> – the force that attracts a body toward the center of the earth, or toward any other physical body having mass</p>	<p>Energy &amp; Matter</p> <p>Structure and Function</p>	<p>PS2.A: Forces and Motion</p> <p>PS3.C: Relationship Between Energy and Forces</p>
<p><b>4.PS.2</b> Investigate the relationship of the speed of an object to the energy of that object.</p>		<p><b>speed</b> – the rate at which someone or something is able to move or operate  <b>velocity</b> – the speed of something in a given direction  <b>acceleration</b> – increase in the rate or speed of something</p>	<p>Energy and Matter</p>	<p>PS3.A: Definitions of Energy</p>

**Fourth Grade**  
**2016 Science Standards Resource Guide**

<p><b>4.PS.3</b> Investigate how multiple simple machines work together to perform everyday tasks.</p>		<p><b>pulley</b> – uses grooved wheels and a rope to raise, lower, or move a load  <b>lever</b> – a stiff bar that rests on a support called a fulcrum which lifts or moves loads  <b>wedge</b> – an object with at least one slanting side ending in a sharp edge  <b>wheel and axle</b> – a wheel with a rod, called an axle, through its center lifts or moves loads  <b>inclined plane</b> – a slanting surface connecting a lower level to a higher level  <b>screw</b> – an inclined plane wrapped around a pole which holds things together or lifts materials</p>	<p style="text-align: center;">Structure and Function</p>	<p style="text-align: center;">PS2.A: Forces and Motion</p> <p style="text-align: center;">PS2.B Types of Interactions</p>
<p><b>4.PS.4</b> Describe and investigate the different ways in which energy can be generated and/or converted from one form of energy to another form of energy.</p>		<p><b>kinetic energy</b> – energy possessed by a system or object as a result of its motion  <b>potential energy</b> – energy an object has because of its position, rather than its motion</p>	<p style="text-align: center;">Stability and Change</p>	<p style="text-align: center;">PS3.A: Definitions of Energy</p> <p style="text-align: center;">PS3.B: Conservation of Energy and Energy Transfer</p>

**Fourth Grade**  
**2016 Science Standards Resource Guide**

<p><b>4.PS.5</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>(1)</b> Examples could include electrical circuits that convert electrical energy into motion energy of a vehicle, light, or sound and a passive solar heater that converts light into heat.</p>	<p><b>series circuit</b> – a closed circuit in which the current follows one path <b>parallel circuit</b> – a closed circuit in which the current divides into two or more paths before recombining to complete the circuit</p>	<p style="text-align: center;">Energy and Matter</p>	<p style="text-align: center;">PS3.A: Definitions of Energy  PS3.B: Conservation of Energy and Energy Transfer</p>
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**Fourth Grade  
2016 Science Standards Resource Guide**

<b>Earth and Space Science</b>				
<b>2016 Standards</b>	<b>Clarifying Statements</b>	<b>Vocabulary</b>	<b>Crosscutting Concepts</b>	<b>Disciplinary Core Idea</b>
<b>4.ESS.1</b> Investigate how the moon appears to move through the sky and it changes day to day, emphasizing the importance of how the moon impacts the Earth, the rising and setting times, and solar and lunar eclipses.		<p><b>phases</b> – a distinct period or stage in a process of change or forming part of something’s development</p> <p><b>waxing</b> – have a progressively larger part of its visible surface illuminated, increasing its apparent size</p> <p><b>waning</b> – have a progressively smaller part of its visible surface illuminated, so that it appears to decrease in size</p>	<p>Patterns</p> <p>Systems and System Models</p> <p>Stability and Change</p>	<p>ESS1.B: Earth and the Solar System</p>
<b>4.ESS.2</b> Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	<p>(1) Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials.</p> <p>(2) 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.</p>	<p><b>natural resource</b> – materials or substances such as minerals, forests, water, and fertile land that occur in nature and can be used for economic gain</p>	<p>Cause and Effect</p>	<p>ESS3.A: Natural Resources</p>

**Fourth Grade  
2016 Science Standards Resource Guide**

<p><b>4.ESS.3</b> Describe how geological forces change the shape of the land suddenly and over time.</p>	<p><b>(1)</b> Look at the impact of weathering and erosion on land. 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.</p>	<p><b>landslide</b> – the sliding down of a mass of earth or rock from a mountain or cliff  <b>earthquake</b> – a sudden and violent shaking of the ground as a result of movements within the earth’s crust or volcanic action  <b>volcano</b> – a mountain or hill having a crater or vent through which lava, rock fragments, hot vapor, and gas are being or have been erupted from the earth’s crust  <b>erosion</b> – the process of eroding or being eroded by wind, water, or other natural agents  <b>weathering</b> – the various mechanical and chemical processes that cause exposed rock to decompose</p>	<p>Patterns  Cause and Effect  Stability and Change</p>	<p>ESS2.A: Earth’s Materials and Systems  ESS2.B: Plate Tectonics and Large-Scale System Interactions</p>
<p><b>4.ESS.4</b> Develop solutions that could be implemented to reduce the impact of humans on the natural environment and the natural environment on humans.</p>		<p><b>reclamation</b> – the reclaiming of desert, marshy, or submerged areas or other wasteland for cultivation or other use  <b>conservation</b> – the careful utilization of a natural resource in order to prevent depletion</p>	<p>Cause and Effect</p>	<p>ESS3.C: Human Impacts on Earth Systems</p>

**Fourth Grade  
2016 Science Standards Resource Guide**

<b>Life Science</b>				
<b>2016 Indiana Academic Standards</b>	<b>Clarifying Statements</b>	<b>Vocabulary</b>	<b>Crosscutting Concepts</b>	<b>Disciplinary Core Ideas</b>
<p><b>4.LS.1</b> Observe, analyze, and interpret how offspring are very much, but not exactly, like their parents or one another. Describe how these differences in physical characteristics among individuals in a population may be advantageous for survival and reproduction.</p>		<p><b>traits</b> – a distinguishing characteristic or quality  <b>inherited</b> – to receive by the transmission of hereditary factors  <b>population</b> – (a) the assemblage or a specific type of organism living in a given area; (b) all the individuals of one species in a given area</p>	<p>Patterns</p>	<p style="text-align: center;">LS3.A: Inheritance of Traits</p> <p style="text-align: center;">LS3.B: Variation of Traits</p>
<p><b>4.LS.2</b> Use evidence to support the explanation that a change in the environment may result in a plant or animal will survive and reproduce, move to a new location, or die.</p>			<p>Cause and Effect</p>	<p style="text-align: center;">LS2.A: Interdependent Relationships in Ecosystems</p> <p style="text-align: center;">LS2.C: Ecosystem Dynamics, Functioning, and Resilience</p>

**Fourth Grade**  
**2016 Science Standards Resource Guide**

<p><b>4.LS.3</b> Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction in a different ecosystems.</p>		<p><b>ecosystem</b> – a system, or a group of interconnected elements, formed by the interaction of a community of organisms with their environment</p>	<p>LS1.A: Structure and Function</p> <p>LS1.B: Growth and Development of Organisms</p>
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**Fourth Grade  
2016 Science Standards Resource Guide**

<b>Engineering</b>				
<b>2016 Indiana Academic Standards</b>	<b>Clarifying Statements</b>	<b>Vocabulary</b>	<b>Crosscutting Concepts</b>	<b>Disciplinary Core Ideas</b>
<b>3-5.E.1</b> Identify a simple problem with the design of an object that reflects a need or a want. Include criteria for success and constraints on materials, time, or cost.			Influence of Engineering, Technology, and Science on Society and the Natural World	ETS1.A: Defining and Delimiting an Engineering Problem
<b>3-5.E.2</b> Construct and compare multiple plausible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.			Influence of Engineering, Technology, and Science on Society and the Natural World	ETS1.B: Developing Possible Solutions



**Fourth Grade**  
**2016 Science Standards Resource Guide**

<p><b>3-5.E.3</b> Construct and perform fair investigations 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>prototype</b> – the original or model on which something is based or formed</p>		<p>ETS1.B: Developing Possible Solutions</p> <p>ETS1.C: Optimizing the Design Solution</p>
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