

Grade 3: Forces and Interactions

Stage 1 Desired Results		
ESTABLISHED GOALS: <u>Competencies:</u> <u>Nature of Science and Engineering</u> - Students will demonstrate the ability to work collaboratively and individually to generate testable questions or define problems, plan and conduct investigations using a variety of research methods in various settings, analyze and interpret data, reason with evidence to construct explanations in light of existing theory and previous research, and effectively communicate the research processes and conclusions. <u>Patterns</u> - Students will demonstrate the ability to observe and describe patterns in natural and human designed phenomena and use those patterns to support claims about the observed or predicted relationships among phenomena. <u>Cause & Effect</u> - Students will demonstrate the ability to investigate, explain, and evaluate potential causal relationships by using evidence to support claims and predictions about the mechanisms that drive those relationships. <u>Content Standards:</u> 3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. 3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. 3-PS2-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. 3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets.	Transfer	
	<i>Students will be able to independently use their learning to identify causal relationships in the physical environment.</i>	
	Meaning	
	ENDURING UNDERSTANDINGS <i>Students will understand that...</i> - patterns of change can be used to make predictions. - cause and effect relationships are routinely identified. - cause and effect relationships are routinely identified, tested, and used to explain change. - Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process.	ESSENTIAL QUESTIONS - What makes objects move the way they do? - How do equal and unequal forces on an object affect the object?
	Acquisition	
	<i>Students will know...</i> - that pushes and pulls are forces that cause things to change how they are moving. Magnets push and pull at a distance. - that each force acts on one particular object and has both strength and a direction. Different materials have different strengths and weaknesses when used to push or pull. - that an object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. - that the patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. - that objects in contact exert forces on each other. - that electric and magnetic forces between a pair of objects do not require that the objects be in contact. - that the sizes of the forces in each situation depend on	<i>Students will be skilled at...</i> - asking questions about the patterns and cause/effect relationships of forces to investigate. - planning and conducting an investigation of the effects of balanced and unbalanced forces on the motion of an object. - creating a simple invention that uses magnets to solve a problem. - making observations and/or measurements of an object's motion to provide evidence that a pattern exists. - using an object's pattern of motion to predict future motion. - identifying cause and effect relationships of magnetic interactions between two objects not in contact with one another.

	<i>the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.</i> <u><i>student vocabulary:</i></u> arch bridge, attract, balanced forces, force, friction, gravity, magnet, magnetic, magnetize, metal, motion, pillar bridge, pull, push, repel, suspension bridge, truss bridge, unbalanced forces <u><i>teacher vocabulary:</i></u> design, engineer, experiment, material, model, observe, pattern, predict, property	
Content Area Literacy Standards		21st Century Skills
not applicable		• reason effectively • use systems thinking • think creatively

Stage 2 - Evidence	
Evaluative Criteria	Assessment Evidence
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

Stage 3 – Learning Plan	
Summary of Key Learning Events and Instruction	
Language Arts Integration • RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. • RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. • RI.3.8 Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence).	Mathematics Integration • MP.2 Reason abstractly and quantitatively. • MP.5 Use appropriate tools strategically. • 3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.

• W.3.7 Conduct short research projects that build knowledge about a topic. • W.3.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories • SL.3.3 Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.	
<i>Technology Integration</i>	<i>District Materials</i>