

Unit 2: Forces and Interactions

Unit #:	APSDO-00034889	Duration:	10.0 Day(s)	Date(s):	
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Team:
 Jodi Kryzanski (Author), Jodi Kryzanski, John Salerni, Virginia Conn, Christopher Grgach, Peter Higgins, Mary Labowsky, Kevin Caselli, Lori Henderson, Melinda Krusz, Rene Kuhrt, Deborah Zacchio, Ashley Lacasse, Emily Ogalin

Grades:
 3

Subjects:
 Science

Unit Focus

In this unit, students will learn how forces can be balanced or unbalanced and how this affects the motion of an object. Students will learn that gravity, electrical, and magnetic forces affect objects without being in contact. Students will recognize patterns of motion such as a swing and be able to predict the future position and behavior of an object. Summative assessments include a performance task and written component that assesses mastery or content and skills. Supporting instructional materials may include related mentor text(s), online and print resources, and teacher generated inquiry tasks.

Stage 1: Desired Results - Key Understandings

Established Goals	Transfer	
<p>Next Generation Science Standards (DCI) <i>Science: 3</i></p> <ul style="list-style-type: none"> • Each force acts on one particular object and has both strength and a direction. 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. <i>PS2.3.A1</i> • Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the 	<p>T1 (T2) Design an investigation or model using appropriate scientific tools, resources, and methods.</p> <p>T2 (T5) Communicate scientific information clearly, thoroughly, and accurately.</p>	
	Meaning	
	Understandings	Essential Questions
	<p>U1 (U426) Pushes and pulls can have different strengths and directions.</p> <p>U2 (U427) Pushes and pulls cause objects to speed up, slow down, or change direction.</p> <p>U3 (U441) Objects that touch or collide push on one another and can change motion</p>	<p>Q1 (Q439) What forces (push or pull) are acting on this object to make it move or stay still?</p> <p>Q2 (Q426) What makes objects remain at rest or move the way they do?</p> <p>Q3 (Q440) How can I describe patterns of</p>

<p>forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. <i>PS2.3.B2</i></p> <ul style="list-style-type: none"> • Objects in contact exert forces on each other. <i>PS2.3.B1</i> • 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. <i>PS2.3.A2</i> 	<p>(direction and speed).</p> <p>U4 (U444) An object at rest typically stays at rest unless a greater (or different) force causes it to move.</p> <p>U5 (U443) The pattern of an object's motion in various situations can be observed and measured from which predictions can be made.</p> <p>U6 (U440) Electric and magnetic fields act as forces on objects, even when not in contact directly.</p> <p>U7 (U431) The gravitational force of the earth pulls objects towards its center.</p>	<p>motion of object(s)? What predictions can I make from the description?</p> <p>Q4 (Q431) What causes particular objects to remain at rest, move at a constant speed, turn, speed up, or slow down?</p> <p>Q5 (Q913) How can I use science to figure out the answer, solve a problem, or design a solution?</p>
Acquisition of Knowledge and Skill		
<p><i>Science: 5</i></p> <ul style="list-style-type: none"> • The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. <i>PS2.5.B1</i> 	<p>Knowledge</p> <p>K1</p> <p>An object's motion will not change if it has balanced forces acting on it (e.g., book sitting still on a table)</p> <p>K2</p> <p>One object cannot push on another object without the second object pushing back (e.g., the weight of a bottle pushes it down against a table and the table pushes back up against it with an equal force)</p> <p>K3</p> <p>Gravity pulls objects toward the center of the Earth (not "down")</p>	<p>Skills</p> <p>S1</p> <p>Identify all the forces acting upon an object</p> <p>S2</p> <p>Demonstrate how some forces can act over a distance even when the objects are not in contact</p> <p>S3</p> <p>Create a model that shows how objects speed up, slow down, or change direction if there are unbalanced forces acting upon it</p> <p>S4</p> <p>Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion (e.g., child swinging on a swing, a ball rolling back and forth in a bowl, two children on a see-saw)</p>