

Grade 1 - Unit 2 - Forces and Motion

Unit Focus

Students will explore forces and motion through a series of inquiry investigations that will help them visualize and experience the fundamentals of physics. Students will focus on inertia while experimenting with dominoes, marbles, and other toys and also creating several objects and designs that will demonstrate the laws of physics. Students will record the results of their investigations on a data table and use this data to explain their conclusions. The culminating project will require students to apply their understanding while they engage in the Engineering Design Process to improve the distance a "Boxcar" can travel by redesigning the car or track.

Stage 1: Desired Results - Key Understandings

Established Goals	Transfer	
<p>Next Generation Science <i>Elementary Standards: K</i></p> <ul style="list-style-type: none"> Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull. <i>K-PS2-2</i> Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. <i>K-2-ETS1-2</i> Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. <i>K-PS2-1</i> <p>Next Generation Science Standards (DCI) <i>Science: K</i></p> <ul style="list-style-type: none"> A bigger push or pull makes things speed up or slow down more quickly. <i>PS3.0.C1</i> Pushes and pulls can have different strengths and directions. <i>PS2.0.A1</i> Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. <i>PS2.0.A2</i> When objects touch or collide, they push on one another and can change motion. <i>PS2.0.B1</i> <p>Student Growth and Development 21st Century Capacities Matrix <i>Creative Thinking</i></p> <ul style="list-style-type: none"> Design: Students will be able to engage in an appropriate process to refine their product. <i>MM.2.3</i> <p><i>Collaboration/Communication</i></p> <ul style="list-style-type: none"> Collective Intelligence: Students will be able to work respectfully and responsibly with others, exchanging and evaluating ideas to achieve a common objective. <i>MM.3.1</i> 	<p>T1 Use the scientific process to generate evidence that addresses the original questions. T2 Create models to explore complex systems, show mastery of key science concepts, and/or develop solutions through creation of a product open to testing and redesign.</p>	
	Meaning	
	Understandings	Essential Questions
	<p>U1 Forces influence the world around us. U2 Pushes and pulls have different strengths and directions. U3 A bigger push or pull makes things speed up or slow down more quickly. U4 Inertia is what causes objects to move or stay still. Forces that act on objects can change inertia.</p>	<p>Q1 How do forces influence the world around me? Q2 What makes an object move the way it does? Q3 How can I change the speed or direction of an object?</p>
	Acquisition of Knowledge and Skill	
	Knowledge	Skills
<p>K1 Pushes and pulls on an object can change the speed or direction of its motion and can start or stop it (changing the speed and direction). K2 The size of the push or the pull affects the speed of the object. K3 Collisions change the motion of an object. K4 Vocabulary: Inertia, friction, gravity, force, motion, push, pull, angle, collide, motion weight, repel, attract</p>	<p>S1 Investigate, through inquiry how objects move. S2 Share and analyze data to form conclusions. S3 Engage in the Engineering Design Process to plan, create, test and redesign.</p>	