

Curriculum Map

Course Title: Science Curriculum

Grade: 4th Grade

Unit 1: Forces and Interactions		<u>Engineering Design</u> Science and Engineering Practices • <i>Asking Questions and Defining Problems</i> • <i>Planning and Carrying Out Investigations</i> • <i>Constructing Explanations and Designing Solutions</i> Disciplinary Core Ideas • <i>Defining and Delimiting Engineering Problems</i> • <i>Developing Possible Solutions</i> • <i>Optimizing the Design Solution</i> Crosscutting Concepts • <i>Influence of Science, Engineering, and Technology on Society and the Natural World</i>
Unit 2: Energy		
Unit 3: Waves: Waves and Information		
Unit 4: Structure, Function, and Information Processing		
Unit 5: Earth's Systems: Processes that Shape the Earth		

Unit (Name/Number): Unit 1- Forces and Interactions	Pacing:
Essential Question(s): How can one explain and predict interactions between objects within systems? (3-PS2-2, 3-PS2-3, 3-PS2-4); How is energy transferred and conserved? (3-PS2-3)	

Content/Key Concepts	Standards	Key Vocabulary	Learning Activities/Resources	Evidence of Learning (Assessments; Performance Tasks)
When objects touch or collide, they push on one another and can change motion or shape. Magnets create a magnetic field that can exert an attracting or repelling force on other objects that can affect motion.	3-PS2-2 (NG) 3-PS2-4 (NG) 3.2.3.B1 (SAS) 3.2.3.B2 (SAS) 3.2.4.B1 (SAS) 3.2.4.B2 (SAS) 3.2.4.B4 (SAS) 3.2.3.B6 (SAS)	• Attract • Collision • Friction • Gravity • Magnets • Repel	Investigate the forces between two or more magnets to identify patterns. Design and refine solutions to a problem by using magnets to move objects not in contact with one another.	
Magnets create a magnetic field that can exert an attracting or repelling force on other objects that can affect motion.	3-PS2-3 (NG) 3.2.3.B1 (SAS) 3.2.3.B2 (SAS) 3.2.4.B1 (SAS) 3.2.4.B2 (SAS)	• Attract • Collision • Magnets • Repel	Investigate the push-and-pull forces between objects not in contact with one another. Video: 9 Awesome Science Tricks Using	

	3.2.4.B4 (SAS)		Static Electricity http://ngss.nsta.org/DisplayStandard.aspx?view=topic&id=11	
A system can appear to be unchanging when processes within the system are going on at opposite but equal rates (e.g., water behind a dam is at a constant height because water is flowing in at the same rate that water is flowing out).	3.2.4.B1 (SAS)	• Pull • Push • Systems	Construct an explanation using data why an object subjected to multiple pushes and pulls might stay in one place or move.	
Magnets can exert forces on other magnets or on materials, causing energy transfer between them (e.g., leading to changes in motion) even when the objects are not touching.	3-PS2-3 (NG) 3.2.4.B2 (SAS) 3.2.4.B4 (SAS)	• Energy • Force • Magnet • Transfer	Demonstrate the energy transfer between two objects using a magnet and another object.	
			http://ngss.nsta.org/DisplayStandard.aspx?view=topic&id=11	

3.Forces and Interactions

Students who demonstrate understanding can:

- 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.** [Clarification Statement: Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all.] [Assessment Boundary: Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.]
- 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.** [Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.] [Assessment Boundary: Assessment does not include technical terms such as period and frequency.]
- 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.** [Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.] [Assessment Boundary: Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.]
- 3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets.*** [Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.]