



Fourth Grade Curriculum Pacing Guide

Crosscutting Concepts: Energy and Matter; Cause and Effect

Balanced and Unbalanced Forces, Unseen Forces, Simple Machines

Estimated time: 7 weeks

Anchoring Phenomenon	Standard	Instructional Segments	Core Ideas	Practices	Instructional Notes
Small Rube Goldberg Machines Dream of a world without machines activity	S4P3 a, b, c	Life in Motion	From A Framework for K-12 Science Education : <i>By the end of grade 5</i> PS2.A FORCES AND MOTION <ul style="list-style-type: none"> Each force acts on one particular object and has both a strength and a direction. An object at rest typically has multiple forces acting on it, but they counterbalance one another. Forces that are not counterbalanced can cause changes in the object’s speed or direction of motion. The patterns of an object’s motion in various situations can be observed; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.) PS2.B: TYPES OF INTERACTIONS <ul style="list-style-type: none"> Objects in contact exert forces on each other (friction, elastic pushes and pulls). 	<ul style="list-style-type: none"> Planning and carrying out investigations Asking questions and defining problems Engaging in argument from evidence 	Background: (includes safety alerts) No standing on furniture. No throwing objects at anyone. Throwing to someone who is prepared to catch is permitted. By the end of this unit, students are using the following language in their speaking and writing during EXPLAIN or ELABORATE. <ul style="list-style-type: none"> Energy transfer Direction Speed Motion Balanced force Unbalanced force Gravity Friction Simple machine names: wedge, pulley, lever, inclined plane, screw, wheel and axle

			<ul style="list-style-type: none"> • The sizes of the forces in each situation depend on the properties of the objects and their distances apart. • The gravitational force of Earth acting on an object near Earth’s surface pulls that object toward the planet’s center. <p>PS2.C: STABILITY AND INSTABILITY IN PHYSICAL SYSTEMS</p> <ul style="list-style-type: none"> • A system can change as its processes move in one direction (e.g., a ball rolling down a hill), shift back and forth (e.g., a swinging pendulum), or go through cyclical patterns (e.g., day and night). Examining how a system’s internal forces change as it moves can help explain the system’s patterns of change. • The faster a given object is moving, the more energy it possesses. Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (Boundary: At this grade level, no attempt is made to give a precise or complete definition of energy.) <p>PS3.C RELATIONSHIP BETWEEN ENERGY AND FORCES</p> <ul style="list-style-type: none"> • When objects collide, the contact forces transfer energy so as to change the objects’ motions. 		
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