

366852

Experiencing Forces Lab Activity

Aligned with All Published National Standards

ward's
science+

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framework for K-12 science education © 2012

* The Dimension I practices listed below are called out as **bold** words throughout the activity.

DIMENSION 1 Science and Engineering Practices	X	Asking questions (for science) and defining problems (for engineering)		Use mathematics and computational thinking
	X	Developing and using models	X	Constructing explanations (for science) and designing solutions (for engineering)
	X	Planning and carrying out investigations	X	Engaging in argument from evidence
	X	Analyzing and interpreting data	X	Obtaining, evaluating, and communicating information
DIMENSION 2 Cross Cutting Concepts	X	Patterns	X	Energy and matter: Flows, cycles, and conservation
	X	Cause and effect: Mechanism and explanation	X	Structure and function
	X	Scale, proportion, and quantity	X	Stability and change
	X	Systems and system models		
DIMENSION 3 Core Concepts	Discipline		Core Idea Focus	
	Physical Science		PS2: Motion and Stability: Forces and Interactions	

X Indicates standards covered in activity

NGSS STANDARDS © 2013	Middle School Standards Covered	High School Standards Covered
	MS-PS2-2: Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	HS-PS2-3: Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.
	MS-PS2-3: Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.	HS-PS2-4: Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.
	MS-PS2-4: Construct and present arguments using evidence to support the claims that gravitational interactions are attractive and depend on the masses of interacting objects.	HS-PS2-5: Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.
	MS-PS2-5: Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.	

standards/learning objectives

national science education standards © 1996

Content Standards (K-12)			
×	Systems, order, and organization		Evolution and equilibrium
×	Evidence, models, and explanation	×	Form and Function
×	Constancy, change, and measurement		
Physical Science Standards Middle School		Physical Science Standards High School	
×	Motions and Forces	×	Motions and Forces

× Indicates standards covered in activity

benchmarks for science literacy (AAAS, © 1993)

1. The Nature of Science	1B: Scientific Inquiry
4. The Physical Setting	4F: Motion
	4G: Forces of Nature
11. Common Themes	11A: Systems
	11B: Models
	11C: Constancy and Change
	11D: Scale

activity objectives:

- Explore and classify different types of forces.
- Analyze forces at work in various test situations.

time requirement:

This activity can be completed in two or three 45 minute class periods.