

Magnificent Magnets

Grades: Pre K – 3rd

Duration: 30 Minutes

Program Description

This program allows students to observe some ordinary and extraordinary interactions of magnets. While the concept of “opposites attract, likes repel” is stressed, students will also explore the concept of lines of force associated with a magnetic field.

Louisiana GLE:

Science:

Science as Inquiry

Pre-K - 3

2. Pose questions that can be answered by using students’ own observations and scientific knowledge (PK-CS-I1) (SI-E-A1)

Pre-K

5. Express data in a variety of ways by constructing illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate (PK-CS-I5) (SI-E-A5) (SI-E-B4)
6. Use a variety of appropriate formats to describe procedures and to express ideas about demonstrations or experiments (e.g., drawings, journals, reports, presentations, exhibitions, portfolios) (PK-CS-I5) (SI-E-A6)

Kindergarten

3. Predict and anticipate possible outcomes (SI-E-A2)
8. Use a variety of appropriate formats to describe procedures and to express ideas about demonstrations or experiments (e.g., drawings, journals, reports, presentations, exhibitions, portfolios) (SI-E-A6)

Grade 1

3. Predict and anticipate possible outcomes (SI-E-A2)
8. Use a variety of appropriate formats to describe procedures and to express ideas about demonstrations or experiments (e.g., drawings, journals, reports, presentations, exhibitions, portfolios) (SI-E-A6)

Grades 2,3

3. Use observations to design and conduct simple investigations or experiments to answer testable questions (SI-E-A2)
4. Predict and anticipate possible outcomes (SI-E-A2)
9. Express data in a variety of ways by constructing illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate (SI-E-A5) (SI-E-B4)

Physical Science

Pre-K

11. Describe properties of materials by using observations made with the aid of equipment such as magnets, magnifying glasses, pan balances, and mirrors (PK-CS-P4) (PS-E-A2)

Kindergarten

14. Determine whether objects are magnetic or nonmagnetic (PS-E-A1)

Grade 1

23. Identify materials attracted by magnets (PS-E-C5)

24. Determine, through experimentation, which poles of magnets are attracted to each other and which poles repel each other (PS-E-C5)

Grade 2

18. Observe, describe, and record the characteristics of materials that make up different objects (e.g., metal, nonmetal, plastic, rock, wood, paper) (PS-E-A3)

Grade 3

18. Compare and classify objects on properties determined through experimentation (e.g., ability to conduct electricity, tendency to float or sink in water) (PS-E-A1)

32. Give examples of how energy can be used to move or lift objects (PS-E-C6)

Key Terms:

Magnet: An object that has a magnetic field and the property to attract iron or steel

Magnetic Field: The region around a magnet capable of producing a magnetic force; a magnetic field is represented by a series of curved lines

Magnetic Force: A force carried out due to the presence of a magnet or magnetic field

Force: A push or pull

Line of Force: The direction a magnetic force pushes or pulls on an object; in magnetism, a stronger force corresponds to more magnetic lines; a weaker force corresponds to a lesser amount of magnetic field lines

Pole: One of two areas on a magnet that is the source of the magnetic field; the poles are named the North pole or South pole depending upon the direction of the magnetic field

Connections to Permanent Exhibits:

Electric Log: Track the geological profile of the area from the surface. Although at first sight this may look like a piece of art, it holds many scientific gems telling the story of the region over the past several million years.

Voltage Divider: Slide the contact of a rheostat and see the light bulbs wired between the slider and the ends change in intensity; balance the lights; meters show how the voltages are changing.

Polar Power-Electric Wand: Move the bar back and forth through the coil. What happens? Why?

Polar Power-Magnetic Force: Push the button. What happens? Why?

Polar Power-Motors: Push the button. What happens? Why?

Polar Power-Generators: Crank the handle on the right. Crank the handle on the left. How are they different? What do they do? Why?

Plasma Tower: Touch a glowing tube of gas. The glow intensifies and reaches toward your fingers.

Series and Parallel Circuits: Wire up bulbs and other circuit elements in series and parallel circuits and observe the effects.

Bulbs and Batteries: Your students can connect bulbs and batteries to light up the bulbs.

Magnetic Attraction and Repulsion: Push the left button. What happens? Have you ever seen something like this before? Push the center button. Put the compass on top of the coil and observe. Move the compass away from the coil and move the rods back and forth. How is the compass different from before? Why?

What's a Watt?: Pedal a bicycle generator; select a light bulb, hand drill or hair dryer to power by yourself.

Horsepower: Crank the engine. How much horsepower do you generate?

Jumping Ring: When you push a button; electric charge causes an aluminum ring to leap up into the air.

Jacob's Ladder: Send a high voltage charge between two metal rods to see electrical ionization.

The Sci-Port House-A two story structure contain exhibits so children can participate in activities that plumbers, architects, and electricians perform.

Electricity: Construct circuits that contain various lights, switches, and fans using modular components.

Magnetic Cars: See who can get to the finish line first. Does attraction or repulsion work better?

Web Resources:

Electricity and Magnetism Montessori Schools Albany, New York

<http://webhelp.albany.k12.ny.us/suny/em/index.html>

This website has tutorials on electricity, magnetism and electromagnets. In the activities section there are all kinds of cool games and puzzles like Hangman, the Conductor and Insulator Game, Light Up the Doghouse Game, and Who Wants to Be Millionaire (magnets and electromagnets version) just to name a few.

Frankenstein's Lighting Laboratory Miami Science Museum

<http://www.miamisci.org/af/sln/frankenstein/index.html>

This site has a great interactive electrical safety lesson along with lessons about fruity electricity and static electricity.

Lesson Plans IEEE

<http://www.nsc.org/ehc/indoor/iaqview.htm>

IEEE has developed several lesson plans as part of the Teacher In-Service Program for use by engineers and teachers. Each lesson plan is tied to education standards and includes teacher summaries, student worksheets, and activities. Some of the lessons include Everything You Wanted To Know About Electric Motors, Get Connected With Ohm's Law, Insulators and Conductors, Simple Electric Switches, Two Button Buzzer Circuit and much more.

Science for Grades 3-6

Utah Education Network

<http://www.uen.org/3-6interactives/science.shtml>

Under fifth grade on this website there are three really fun interactivities that deal with magnetism and electricity. They include Magnets in My Kitchen, Changing Electric Circuits and Electromagnetic Activity.

ProTeacher Directory: Magnets

ProTeacher

<http://www.proteacher.com/110077.shtml>

This site offers several plans and activities for activities with magnets in various age groups.

Forces and Magnets (resource)

Institute of Physics: Engaging the Public

[http://www.iop.org/activity/outreach/Resources/Physicists and Primary Schools Project/Topics/Forces%20and%20Magnets/page_5860.html](http://www.iop.org/activity/outreach/Resources/Physicists_and_Primary_Schools_Project/Topics/Forces%20and%20Magnets/page_5860.html)

This site offers complete lesson plan and activity with powerpoint presentations, activity sheets, etc.

KidsKonnnect Magnets

<http://www.kidskonnnect.com/content/view/90/27/>

Links to sites that contain experiments, activities, and facts about magnets.

Pre-Visit Activities

Using The **Forces and Magnets** resources from the Institute of Physics, follow the activity as listed in the plans.

Visit **Electricity and Magnetism** from Montessori Schools Albany, New York website. Have students complete games and activities in the website.

Post-Visit Activities

Using the **ProTeacher lesson plans**, select plans that pertain to your age group and complete the activities as listed in the site.

Visit **KidsKonnnect** site. Search Magnets. Have students complete the Magnet Man Cool experiments with magnets.