Magnet Lab

Mid-Valley
STEM-CTE HUB

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Magnet Lab

The Magnet Lab introduces students to the fascinating world of magnetism through hands-on exploration and scientific inquiry. Using a variety of magnets, compasses, and magnetic materials, students investigate magnetic forces, attraction and repulsion, magnetic fields, and the properties of magnetic and nonmagnetic materials. Through guided investigations and engineering challenges, students develop observation, prediction, and problem-solving skills while exploring the principles of physical science. Designed for students in grades 2–6, this kit supports inquiry-based learning across science, engineering, and mathematics.

Grade Level

2nd - 6th

Group Size

1-3 per group

Time Duration

15 - 60 minutes

Content of Kits

Components

- 25 Magnet Wands
- 25 Plastic-Encased Button Magnets
- 25 Plastic-Encased Block Magnets
- 25 Plastic-Encased N/S Bar Magnets
- 25 Horseshoe Magnets
- 75 Magnet Rings
- 5 Alnico Magnets
- 25 Compasses
- 15 Tubes of Polished Steel Shapes
- 25 Pencils
- 1 Teacher's Guide by the Manufacturer

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Usage

Getting Started

1. **Inventory and Organize the Materials**
Begin by unpacking the kit and confirming that all magnet types, compasses, steel shapes, pencils, and the teacher's guide are present and in good condition. Organize materials by type so student teams can easily locate the items needed for each investigation.

2. **Review Safe Magnet Use**
Before beginning, discuss how magnets should be handled carefully. Remind students not to throw magnets, strike them together, or place them near electronic devices or magnetic storage media.

3. **Explore the Different Magnet Types**
Allow students to examine each type of magnet and make observations about their shapes, sizes, and predictions for how they might behave. Encourage students to compare the different magnets before beginning formal investigations.

4. **Prepare for Scientific Investigations**
Provide students with science journals or data collection sheets to record predictions, observations, measurements, and conclusions. Encourage them to explain their thinking using evidence gathered during investigations.

Storage

- **Sort Materials by Type**

Return each type of magnet, compass, and steel shape to its designated storage location after use. Keeping materials organized will simplify inventory and future classroom setup.

- **Protect Magnets and Compasses**

Store magnets away from excessive heat, moisture, and electronic devices. Keep compasses separated from strong magnets during storage to help preserve their accuracy.

Troubleshooting

- **Magnets Do Not Behave as Expected**

If magnets do not attract one another, rotate one magnet and try again. Students may be observing magnetic repulsion rather than attraction, providing an opportunity to discuss magnetic poles.

- **Compass Needle Does Not Point Correctly**

If the compass needle appears stuck or inaccurate, move away from nearby magnets or large metal objects before testing again. Strong magnetic fields can temporarily affect compass readings.

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Activity Guide

Beginner

Magnetic or Not?
Students investigate which classroom objects are magnetic by making predictions, testing materials, and classifying objects based on their observations.

Oregon Science Standards Alignment
3-PS2-3

Procedure
1. Predict which objects will be attracted to magnets.
2. Test each object using a magnet wand.
3. Sort objects into magnetic and nonmagnetic groups.
4. Record observations.
5. Discuss patterns in the materials that were attracted to magnets.

Intermediate

Exploring Magnetic Fields
Students use bar magnets, horseshoe magnets, ring magnets, and compasses to investigate magnetic fields and observe how magnetic forces act at a distance.

Oregon Science Standards Alignment
3-PS2-3

Procedure
1. Place magnets on a table.
2. Position compasses around the magnets.
3. Observe how the compass needles change direction.
4. Compare magnetic field patterns produced by different magnets.
5. Record observations and create simple diagrams.

Advanced

Engineering a Magnetic Solution
Student teams design and build a simple device or game that uses magnetic forces to solve a problem or complete a challenge.

Oregon Science Standards Alignment
3-5-ETS1-1, 3-5-ETS1-2, & 3-5-ETS1-3

Procedure
1. Identify a simple challenge or problem.
2. Plan a magnetic solution.
3. Build and test the design.
4. Improve the design through multiple trials.
5. Present the finished solution to the class.

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Learning Extensions

STEAM Connections: Science - Engineering

Learning Objectives:

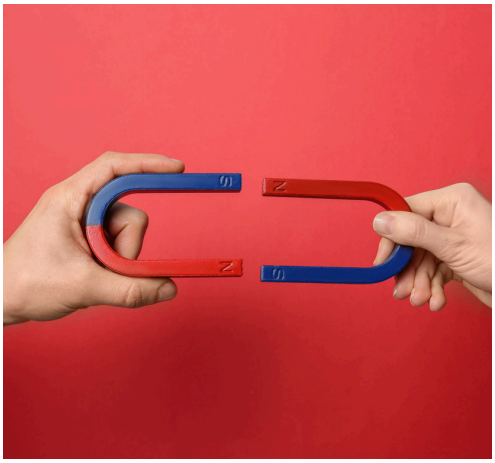
- Investigate the properties and behavior of magnets through hands-on exploration.
- Explain how magnetic forces cause attraction and repulsion between objects.
- Distinguish between magnetic and nonmagnetic materials using evidence from investigations.
- Observe and describe magnetic fields using compasses and different types of magnets.
- Apply the engineering design process to solve problems using magnetic forces.
- Collect, record, and communicate scientific observations using appropriate scientific vocabulary.

Career Connections:

- **Electrical Engineer –** Designs electrical systems, motors, and devices that use magnets and electromagnetism.
- **Mechanical Engineer –** Develops machines and mechanical systems that rely on magnetic components.
- **Medical Imaging Technologist –** Operates imaging equipment such as MRI machines that use powerful magnets.
- **Materials Scientist –** Studies magnetic materials to develop new technologies and products.
- **Electronics Technician –** Builds, tests, and repairs electronic equipment containing magnetic components.
- **Product Designer –** Develops products and toys that incorporate magnets into their design.

Essential Employability Skills:

- Critical Thinking
- Problem Solving
- Collaboration
- Communication
- Observation and Attention to Detail
- Curiosity and Initiative
- Responsibility



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Resources and Accessibility

Safety Guidelines

- **Handle Magnets Carefully**

Avoid snapping magnets together or dropping them, as they may chip or break. Keep magnets away from electronic devices and magnetic storage media.

- **Use Materials Responsibly**

Keep small magnets and steel pieces contained within the work area and return all materials to the kit after use. Adult supervision is recommended during investigations.

Accessibility

- **Provide Multiple Ways to Participate**

Students can test magnets, make predictions, record observations, create diagrams, organize materials, or explain findings. Offering a variety of roles allows all learners to participate meaningfully.

- **Support Learning Through Visual and Hands-On Exploration**

Use demonstrations, diagrams, picture vocabulary, and guided investigations alongside tactile exploration. Encourage students to communicate understanding through speaking, writing, drawing, or building models to support diverse learning needs.

Library Catalog

Library Resources

Feedback

QR to feedback survey