STEM Sims™

Magnets

Magnets

Do you need an idea for a scientific study?
Try out one of our ideas or make one of your own.

They attract, they repel, they're magnets. Take the following brief quiz to see how much you already know about magnets. See the bottom of page 4 to check your answers.

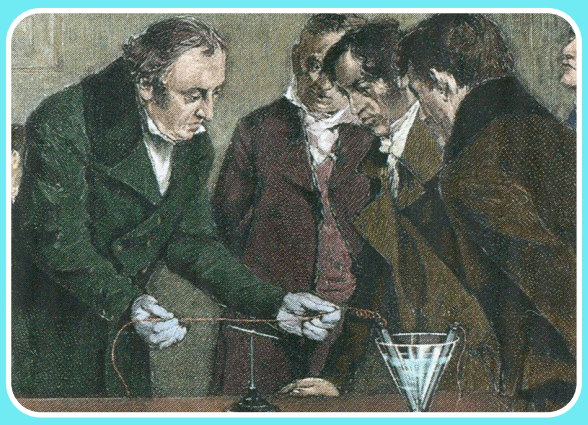
1. The earliest known magnets were:
   a. human-made bars of iron.
   b. lodestones, naturally occurring magnetic rocks.
   c. electromagnets created by ancient civilizations.
   d. pieces of metal struck by lightning.

2. In ancient Greece, which philosopher is credited with some of the earliest writings about magnets?
   a. Socrates
   b. Plato
   c. Aristotle
   d. Thales of Miletus

3. What legendary story is associated with the discovery of magnets?
   a. A shepherd named Magnes found his iron staff sticking to a rock.
   b. A Chinese emperor used a compass to navigate his army.
   c. Benjamin Franklin flew a kite in a thunderstorm.
   d. Isaac Newton discovered gravity by watching an apple fall.

4. Who was the first person to systematically study magnets and publish a book about them in 1600?
   a. Isaac Newton
   b. Galileo Galilei
   c. William Gilbert
   d. Benjamin Franklin

5. Which of these animals uses the Earth's magnetic field for navigation?
   a. dogs
   b. cats
   c. squirrels
   d. pigeons



Exploring Magnetism

Magnets are all around us, from the fridge to our phones! But how do they work? In this lab, you'll become a magnet detective, exploring the invisible forces of attraction and repulsion. You'll experiment with different materials, map a magnetic field, and uncover the secrets of these amazing objects. Get ready to be amazed by the power of magnets!

Safety First!

- Magnets can damage electronic devices. Keep magnets away from computers, phones, and TVs.
- Small magnets can be a choking hazard. Keep them away from young children

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Materials

- Two bar magnets
- Various small objects (e.g., paper clips, coins, aluminum foil, plastic buttons, wooden blocks, iron nails)
- A piece of string or thread
- A compass

Procedure

Part 1: Magnetic Attraction and Repulsion

1. Bring one of your bar magnets close to each of the small objects. Record which objects are attracted to the magnet and which are not.
2. Bring the north pole of one magnet close to the south pole of the other magnet. Observe what happens. Then, bring the north poles of both magnets together. Observe what happens. Repeat with the south poles. Record your observations.
3. Tie the string around the center of one magnet and hang it from a stable object (like a doorknob or a chair back). Allow the magnet to turn freely. Observe what direction it settles in. Compare this direction with your compass.

Part 2: Mapping a Magnetic Field

4. Place one of the bar magnets in the center of the sheet of paper.
5. Slowly move the compass around the magnet. Observe how the compass needle changes direction as you move it. At various points around the magnet, draw an arrow on the paper to indicate the direction the compass needle points.

Questions

1. Based on your observations in Part 1, what can you conclude about the types of materials that are attracted to magnets?

2. What did you observe about the interaction between the north and south poles of the magnets? What about the interaction between two north poles or two south poles?

3. Why did the hanging magnet align itself in a particular direction?

4. Describe the pattern you observed in the compass needle directions or the iron filings in Part 2. What does this tell you about the magnetic field around a magnet?

Magnets

Water Watcher!

Imagine a magnet so strong it could lift a tank! That's the kind of power we're talking about at the National High Magnetic Field Laboratory, or MagLab, in Tallahassee, Florida. This place houses the world's strongest magnet, a real-life superpower that attracts scientists from all corners of the globe.

This incredible magnet isn't just strong, it's massive! It weighs as much as a Boeing 737 airplane and stands two stories tall. Its magnetic field is a whopping 45 teslas. To put that in perspective, that's about a million times stronger than the Earth's magnetic field! It's so powerful that it needs its own special building and a massive amount of electricity to keep it running.

But why do scientists need such a gigantic, powerful magnet? Think of it like a super-powered microscope. This magnet allows scientists to zoom in on tiny particles and observe them in ways never before possible. They can study how atoms behave, explore the secrets of new materials, and even unlock clues about the mysteries of the universe.

This amazing magnet needs to be kept incredibly cold to work its magic. We're talking about temperatures colder than outer space! It's all part of what makes the MagLab a truly unique and fascinating place, right here in Florida. So next time you use a magnet, remember the colossal one in Tallahassee pushing the boundaries of science and helping us understand the world around us!

Please visit our site for more helpful information:
STEMsims.com

Answers: Page 2 Answers: 1) b, 2) d, 3) d, 4) c, 5) d. **Page 3 Answers: Exploring Magnetism** 1) Most metals are attracted to magnets, most non-metals are not. 2) Like poles repel, opposite poles attract. 3) Earth's magnetic field. 4) Magnets create a magnetic field around the magnet.