

Magnets

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EQ: What are the properties of a magnet?

- How do magnetic poles interact?
What is the shape of a magnetic field?

Quick write: Explain in a paragraph how magnets work.

Vocabulary

- magnet: any material that attracts iron and materials that contain iron
- magnetic pole: the ends of a magnetic object where the magnetic force is strongest

- magnetic force: A force produced when magnetic poles interact
- magnetic field: a region around a magnet where the magnetic force is exerted
- magnetic field lines: invisible lines that map out the magnetic field around a magnet

- The earliest magnets were natural magnets called lodestones. They were rocks that had magnetic qualities. Ancient Chinese and Greeks studied them. They believed that lodestones had medicinal uses. They even discovered that a lodestone mounted on a cork would float in water and act as a compass.

Today there are many kinds of magnets. Some are made of iron or steel. Some are made from ceramics mixed with iron filings. The best magnets are made of an alloy called alnico. This name tells you that these powerful magnets contain aluminum, nickel and cobalt.

How are magnets useful? Talk to a partner and write two ideas you discussed about how magnets are useful. 4 minutes.

- What types of objects are magnetic
- Kind of material
- Attracted by a magnet
- Not attracted by a magnet

Look over your data table.

- What types of materials are attracted by magnets?
- What types of materials are not attracted by magnets?
- If you spilled thumbtacks in sand. What would be the easiest way to separate the tacks and sand?

Lab: Magnetic Lines of Force

1. Obtain a bar magnet and iron filings. You can use small thumbtacks instead of iron filings, but filings work better.
2. Obtain a manila file folder or any 8 ½ “ x 11” (22 x 28 cm) piece of cardboard or plastic.
3. Place the folder on the table. Place the bar magnet in the center of the folder and sprinkle iron filings all around the magnet.
4. Tap the folder gently with your finger to get the best view of the lines of force.
5. Draw a diagram of what you discover.

Magnetism

Magnets

Any material that attracts iron and materials that contain iron.

Attract or repel other magnets

One part of a magnet will always point north when allowed to swing freely.

Has two poles, one at each end

Magnetic poles that are opposite attract

Magnetic poles that are alike repel each other

Force

The attraction or repulsion between magnetic poles

Maglev train

B. Magnetic Field

- a. The area of magnetic force around a magnet
- b. Magnetic field lines spread out from one pole and curve around the magnet and return to the other pole
- c. Single
- d. Combined

C. Magnetic Earth

a. Has two poles

i. North Pole located in Northern Canada about 1,250 km from geographic north pole

ii. South Pole

iii. Magnetic rock in core

iv. Comes to surface through **cracks in the ocean floor.**

1. Scientist study Earth's crust and know the magnetic fields have **changed over time.**

D. Magnetosphere

- The region of Earth's magnetic field shaped by the **solar wind**
 - Solar wind is a stream of electrically charged **particles** flowing at high speeds from the sun.
 - Aurora
 - lights given off when high-speed charged particles get close to Earth's surface and interact with **the atoms** in the atmosphere.
 - The atoms **give off light**
 - Occurs in the Northern Hemisphere called **Aurora Borealis**
 - Occurs in Southern Hemisphere called **Southern Lights** or Aurora Australis.