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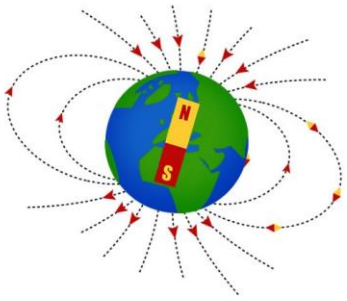
MAGNETS

Do you have any magnets in your house? Maybe there are magnets on your refrigerator holding up your beautiful artwork! Perhaps you have seen some in your parents' toolbox, or you may even have some in your toy box. You might be surprised to learn that magnets are found in many other objects in your house including microwave ovens, telephones, computers, and refrigerator doors.

Did you know that you are living on a big magnet? Yes, the Earth is like a giant magnet! The center of our planet generates its own magnetic field that we can measure at the surface.



All magnets have two **poles** (areas of a magnet that have magnetic strength), a north pole and a south pole, just like the Earth does. When you have more than one magnet, like (or same) poles **repel**, or push, each other apart. Opposite poles **attract**, or pull, each other together.

Magnetism was discovered in ancient China and Greece. These early civilizations noticed that stones called **lodestones** attracted iron or steel. A lodestone is actually a naturally magnetized piece of a mineral called **magnetite**.

Magnetite

Electricity and **magnetism** are strongly related. Scientists call this **electromagnetism**, which is the physical interaction that occurs between electrically charged particles

Electromagnetism is a branch of **physics,** the scientific study of matter, force, and energy.

Physicists study physics and work in many different areas, including nuclear research, space exploration and astronomy, biomedical engineering, and energy. **Geophysicists** study the physical characteristics of the earth and other planets. They measure gravity, magnetic fields, seismic waves, and natural electric current.

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Magnets create a force that you can't see. A magnet creates its own **magnetic force**, which is called a **magnetic field**. Objects in that magnetic field can be drawn to the magnet. Even though you cannot see the force, you can see how the force of a magnet affects things around it.

Magnets attract certain **metals** like **iron, nickel** and **cobalt**. Metals have a shiny appearance, are good conductors of electricity and heat, and usually can be made into a wire or hammered into a thin sheet.

A **compass** is a tool that people use to help find direction. A compass contains a magnetic needle that always points north, towards the Earth's magnetic pole. It is possible to determine other directions relative to the north position on a compass.

Here are some activities that will help you to explore magnetism:

With two magnets, try placing the ends of each magnet near each other. You will notice that the two opposite ends will attract each other. (The north and south poles will attract.) If you place both north ends or both south ends together, you will see that they repel.

If you rub a magnet over a piece of magnetic material, like an iron nail or metal paper clip, you can temporarily change the object into a magnet. This is called **magnetization.**

Try testing different objects to see if they are attracted to a magnet. Test things made of wood, plastic, glass, silver, and gold. Also try keys, paper clips, spoons, a dollar bill, coins, iron enriched breakfast cereal, and anything else you can find that might be interesting. *Were you surprised to discover that the dollar bill is attracted by the magnet?* Even though it looks like paper, a dollar bill can be attracted to a magnet because the ink in the bill has iron particles in it.

Place a piece of paper in the bottom of a shoe box. Place a few dots of different color paint and a paper clip in the box. Move the magnet around on the bottom of the box and "paint" with the magnet.

If you hang a bar magnet by a string, the magnet will align itself to the north pole, like a compass.

Try this fun magnetic art activity using an assortment of everyday objects that you can find at home:

- Assorted magnets
- Metal jar lids or a magnetized tray
- Metal objects such as nuts, bolts, washers, screws, paper clips.

1. Begin by placing a strong magnet under a metal jar lid, or substitute a magnetized tray if you have one.
2. If using the jar lid, turn it over. This will give you a magnetic base.
3. Add an assortment of nuts and bolts, then begin to build.
4. As the force of the magnet weakens, add another magnet and continue to build.
5. How far can you go before you need another magnet?
6. See how high and wide you can go.
7. Take it apart and try different designs!

What did you discover about the strength of your magnets?

What would you do if you had more magnets? Bigger magnets? Stronger magnets?

ADDITIONAL RESOURCES

Websites

https://www.nationalgeographic.org/encyclopedia/magnetism/

https://www.exploratorium.edu/snacks/subject/electricity-and-magnetism

https://www.daviddarling.info/childrens_encyclopedia/Magnetism_For_Kids.html

Videos

SciShow Kids, Fun with Magnets https://www.youtube.com/watch?v=s236Q1nuWXg

Bill Nye the Science guy on Magnetism https://www.youtube.com/watch?v=Viml1smEBks

Magnets and Magnetism https://www.youtube.com/watch?v=-aNpmCSZHbk

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The Science Behind Magnets https://www.youtube.com/watch?v=MZtTVsIOA9c

How does a compass work? https://www.youtube.com/watch?v=LroX6ThIDpw

Books available from the Washoe County Library System

Magnets: Sticking Together! by Wendy Sadler
Magnets: Pulling Together, Pushing Apart by Natalie M. Rosinsky, Sheree Boyd
Magnets Push, Magnets Pull by David. A. Adler, Anna Raff
Magnets in the Real World by Chris Eboch