



Magnificent Magnets!

Supplies:

- Magnets (One Marked with N and S Poles, one unmarked)
- Pencil
- Items for Magnetic Test (paper clip, paper, brass brad, penny, rubberband, other)
- Paper

Age or Grade: All Ages

Time: 30 Minutes



Background:

Here are some cool facts about magnets and magnetic fields (the area of attraction):

- Magnetism is a naturally occurring force that can be felt but not seen. Magnets radiate a force field that we call a magnetic field. The earth has a magnetic field around it.
- A magnetic field surrounds all magnets;
- A magnetic field surrounds the earth;
- A magnetic field is strongest at the poles and weaker as the distance from the poles increases;
- A magnet field is invisible, but we can see the effect a magnetic field has on metal objects;
- A magnetic field will pass through materials such as glass, plastic, wood, etc.
- The poles of a magnet are classified as North and South;
- Like poles repel and opposite poles attract each other.
- Magnets will attract metal objects that contain iron or nickel, but have no effect on other objects. NOTE: A nickel (five cent piece) does not contain the metal nickel and is not attracted by a magnet.

Project Goal: Investigate and understand characteristics of magnetism and magnetic fields.

What to Do:

1. Take the two bar magnets with the marked poles and bring them close together. A marked bar magnet will either be stamped with a N on one end and a S on the other, or one end will be painted and the other will not. Usually, the painted end is the north pole.
2. Watch what happens when the magnets come close together. Write down the answers to these two questions:
 - What happens if you put two N poles together?
 - What happens if you put a N and a S pole together?
3. Using what you learned in number 1, figure out which side of the unmarked magnet is N and which S.
4. Take the pencil and mark the poles of the unmarked magnet N and S.



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- Next, make a hypothesis (an educated guess) on which items will attract and which will not.
- Using the table below, test each of your items and mark the correct column.

Material	Will Attract Magnet	Will not Attract Magnet
Wood (pencil)		
Paper clip		
Brass brad		
Penny		
Rubber band		
Aluminum can		
Plastic toy		
Other:		

- Next determine where the magnetic field is the strongest. To do this, hold the magnet by one end and use the other end to pick up paper clips. Write down the number picked up here: _____
- Hold the magnet by placing your fingers over both ends and see how many paper clips it can pick up in the middle of the bar. Write down the number picked up here: _____
- Lastly, we are going to test what materials the magnetic field goes through. Place paper clips on the top of a piece of paper and put the magnet under the paper. Write down what happens.
- Place the paper clips in the water in the bowl. Hold the magnet above the paper clips. Write down if the magnet can attract through the water.

Reflect:

- Will the magnetic field pass through air? How can you test to find out?
- What other materials can you test to see if a magnetic field will pass through?
- Does it matter how thick the material is? (Example: a magnetic field will pass through one piece of paper, but will it pass through 25 pieces? 50 pieces?)

Apply:

- Can you think of magnetic fields that are used in everyday life?
- What kind of jobs can you think of that use magnets?

Going Further:

Attach one magnet to a toy car using glue or tape. Using the other magnet, move the car. Draw a track or maze for your car on a piece of paper. Now try to navigate your car using only the magnets. Can you think of some practical uses for magnets in your everyday life?



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Notes for
Parents or
Helpers:



Please keep small objects that could be choking hazards out of the reach of children under five years of age, as well as pets!



Keep Magnets away from electronic devices, (telephones, television screens computers, tablets, pacemakers, etc) as well as credit cards, video tapes or anything with magnetic data!

Adapted from the Virginia 4-H In-School and School Enrichment Curriculum-Electricity
<https://www.sites.ext.vt.edu/resources/4h/4hpubs/pdfs/388-800.pdf>



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