Magnets are Marvelous

An Educational Unit for students K-3

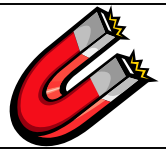
Jeevak Parpia

Cornell Center for Materials Research

Support for Cornell Center for Materials Research is provided through NSF Grant DMR-0079992

How strong is your magnet?

Predict which magnet can pick up the most paper clips. Then try it.

Magnet	Predicted Strength (1^{st}, 2^{nd}, 3^{rd})	# of Paper Clips	Tested Strength (1^{st}, 2^{nd}, 3^{rd})
			
			
			

Questions:

1. Which magnet was the strongest?
2. Which magnet was the weakest?
3. Give a reason for your results.

Make your own magnet

Procedure:

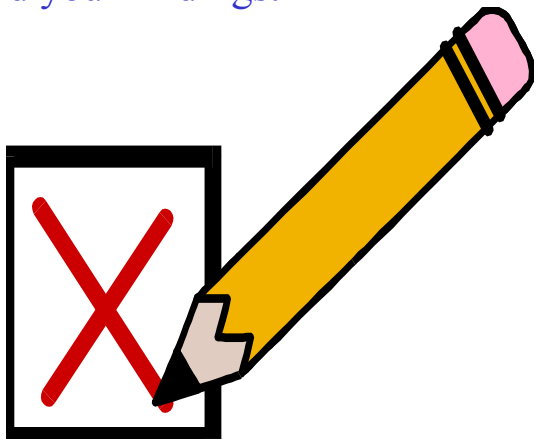
1. Stroke the nail with the magnet 20 times

   (always stroke with the same pole, in the same direction).

2. Test to see how many pins you can pick up.
3. Repeat the steps above, except stroke the nail 40 times.
4. Repeat the steps above, except stroke the nail 60 times.

Complete the chart below in your observation book to record your findings:

Magnet Strength	# of Pins
20	
40	
60	



How does the number of strokes relate to the strength of the magnet?

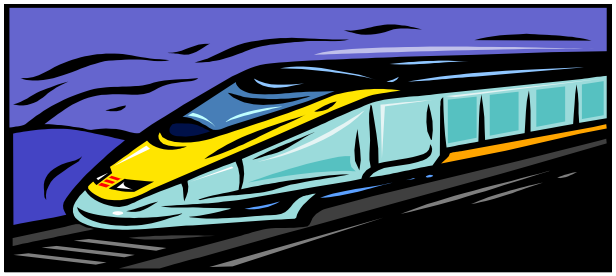
Magnets can harm audio and video devices!

Procedure:

1. Play the audio tape.
2. Drag a magnet over the tape of the audio cassette tape.
3. Now replay the tape.

Questions:

1. What happened to the music on the tape after stroking it with a magnet?
2. What do you think happened?
3. Can you think of other items that we should be careful to keep magnets away from?

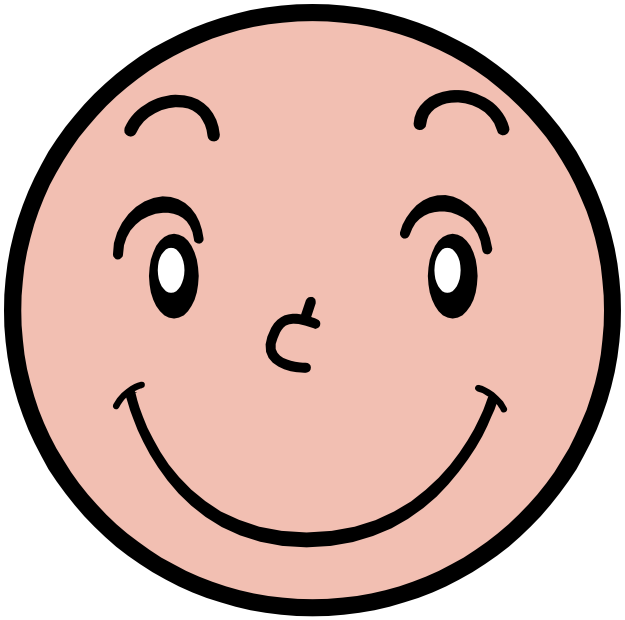


Interesting Fact:

Some trains do not have wheels. They glide along on air. The train is a maglev - short for magnetic levitation, which means floating on magnets. The maglev uses magnetism in the rails to repel it's bottom surface and make it float along.

Magnet Art

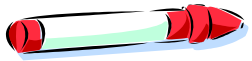
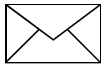
Move the magnet(s) around underneath the face box. You can use the force of the magnet to arrange the iron filings in all sorts of patterns on the man's face. Give him a beard, mustache, different hair styles.



Be Creative!

Magnetism

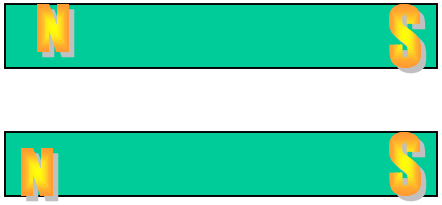
The power to attract material is called **magnetism**. On the table you will see a horseshoe magnet and a variety of other materials. Predict which items on the table will be pulled towards the horseshoe magnet **or** put simply, predict which items will be attracted to the magnet. After you have made your predictions, try it. Complete the chart below in your observation book.

Item	Prediction (attract - yes or no)	Test (attract - yes or no)
		
		
		
		
 		
		
		

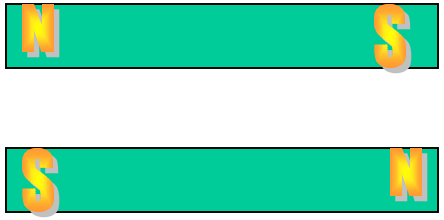
Opposites Attract

Just like the earth, a magnet has a north pole and a south pole. On a bar magnet the poles are at opposite ends. Push the ends of two bar magnets together. Do their poles attract each other? Do they push apart, or repel?

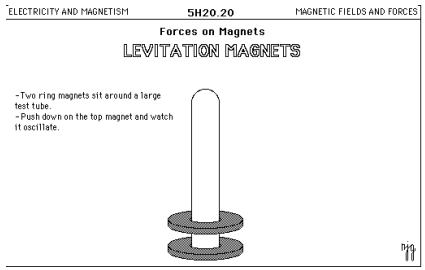
Complete the table below in your observation book:



Attract	Repel



Look at the diagram below. Make a magnet float. Which way do you need to position the magnets to make the top magnet "float"?



Which direction is north?

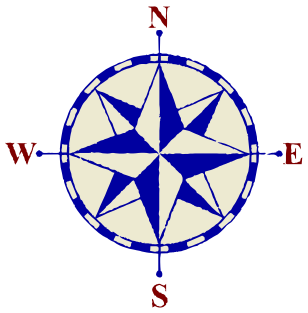
Scientists have found that the earth acts like a huge magnet. One pole, called the magnetic north pole, is found in the far north. The magnetic south pole lies in the far south. The north pole of an ordinary magnet is attracted to the earth's magnetic north pole.

Hikers can use a compass to determine which direction they are hiking. The compass needle is a magnet. It always points north.

You can make your own compass:

Procedure:

1. Stroke a nail50 times with a magnet. (Always stroke in the same direction, with the same pole).
2. Tape the magnetized needle onto the floating cork in the dish of water.
3. Now watch as the needle and cork swing around to point in a certain direction.
4. Use a magnetic compass to check which end of the needle is pointing north.



Questions: Fill in the blanks in your observation books

1. The earth acts like a huge _____.
2. The needle on a compass always points _____.