



Magnetic Art

Creator Suzanne Konyha

Date Created October 2005

Grade Three

Subject Science

Topic Magnets

Description

This lesson explores the properties of magnetism. Students will explore the concept of induced magnetism and will create small sculptures using magnets and common household items.

Curricular Expectations

Please see the lesson plan preview for the expectations/outcomes for your province.

Materials

- Photocopies of box template
- Round magnets, approx. 3/4" diameter, one magnet per student
- Some stronger magnets such as ceramic magnets
- Roll of magnetic tape
- Coloured paper (can be cut to fit size of box: 2"x 8"), or coloured markers
- Glue sticks
- A variety of magnetic items brought from home or a hardware store. (Students can bring in their own items)

Useful Website: Canada Science and Technology Museum
(<http://www.sciencetech.technomuses.ca/english/index.cfm>)

Note: Remember to place magnets away from computers or where discs are stored!

Space Requirements

Classroom

Getting Ready

- Discuss magnets. What are some of the uses of magnets? Together, make a list of the many uses of magnets?
- What is the composition of a magnet? Does the size of the magnet affect the strength of the magnet? Discuss.



- From a display of common objects, (e.g. glass, marble, small wooden toy, styrofoam cup, paper clip, metal washer, plastic comb. etc.) ask the students to try and identify which are magnetic or non-magnetic. What is it that makes some of these objects magnetic and others not?

Discuss the findings from the exploration. Pose the question: Can an object that is not permanently magnetic become temporarily magnetic? How could we find the answer to this question?

Development

- Ask the students to group together in twos and give each pair a magnet, a nail, and a metal washer. Explore the properties. Are all the items magnetic? Experiment to find a way to attach all three objects.
- Discuss findings. Are some objects always magnetic? Can magnetic properties be temporary? How can magnetic qualities be induced?
- To review the concept of induced magnetism with the whole class, hold the nail against the washer. Is it magnetic? Now attach the washer to the magnet. If the magnet is placed against the washer, will the nail hold against the washer? For how long?
- Observe and discuss the concept of induced magnetism. How does it happen? Where and how might we use induced magnetism?

Application

- After the students have spent time exploring the qualities of magnetic objects, introduce the idea of creating a Magnetic Art piece. They could create their magnetic art individually or in pairs.
- Make sure the students have the collection of objects they brought from home.
- Give each student or group a photocopy of the box template. Remind students that the solid lines are for cutting and the broken lines are for folding. Show them how to score the lines so that the folds will be neat.
- Pass out pieces of (pre-cut) coloured paper or have students decorate boxes before assembling into cubes.
- Hand out magnets and masking tape (2pcs of tape/student) and have students tape magnets into place on underside of top flap.
- Cubes may now be assembled using glue sticks to hold tabs in place.

**Please take a moment to review the
"Building the Base" video**

- Students may then begin building their sculptures.
- Discuss elements of design so that the students can think about creating interesting shapes. Encourage them to look at the shapes and think about where best to place them. Look at the texture of the object. Where would it provide interesting contrast? Discuss the use of negative space. How could negative space be used to create a more interesting structure?
- Small pieces of the magnetic tape (4 per student) may also be passed out to be used within the sculpture (on top) or perhaps on the sides of the cubes to hold additional small objects.

**Please take a moment to review the
"The Magnetic Sculpture video**



Closure

- Display all sculptures and have students discuss or comment on interesting effects that have been created. How far could they build before objects began to fall off? Did objects tend to orient themselves in certain positions? Why?
- At another time you might wish to create a "class sculpture". You will need a larger box and a much stronger magnet. Discuss how the difference in the strength of a magnet affects the size of the sculpture they are able to build.

Glossary

magnetic field: a field of force that exists around a magnet or a current-carrying conductor.

magnetic domains: very small (1 to 0.1 mm) magnetized regions of a ferromagnetic substance. In a strong magnetic field, all the domains are lined up in the same direction as the field.

magnetic: materials that have a uniform arrangement of their domains; the domains point in the same direction and are therefore attracted to magnets. **nonmagnetic:** materials that have a haphazard arrangement of their domains; the domains point in many different directions, and are therefore not attracted to magnets.

magnetic poles: the areas at the ends of a magnet where the magnetic forces are the strongest.

magnetic attraction: a force between a magnet and an object, pulling the object toward the magnet.

magnetic repulsion: the force with which a magnet and another object (or particles) push each other apart.

magnetize: to turn a magnetic material into a magnet

temporary magnet: a magnet that exhibits magnetic powers only when touching or placed near a magnet.

permanent magnet: a magnet that retains its magnetic powers when not around another magnet.

induced magnetism: temporary alignment of the magnetic domains in a magnetic material that is placed near a magnet.

lines of force: lines in a field of force around a magnet, which can be drawn around the magnet to show the direction of the magnetic effect.

Non-permeable: materials that allow a magnetic force field to pass through without any disruptions in the magnetic field.

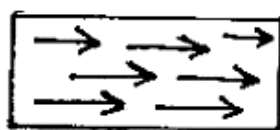
permeable: materials that gather in the magnetic lines of force, thereby disrupting the magnetic field.

Resources

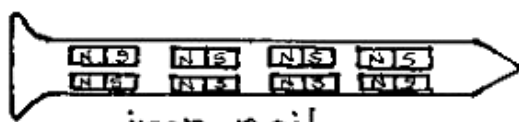
1. Electricity and Magnets by Terry Cash. Warwick Press, 1989.
2. Playing With Magnets by Gary Gibson, Copper Beech Books, 1995.
3. The Magnet Book by Shar Levine and Leslie Johnstone, Sterling Publishing Co., 1998.
4. Magnets by Janice VanCleave. John Wiley and Sons, Inc., 1993.



MAGNETIC

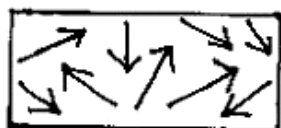


DOMAINS



iron nail

NONMAGNETIC

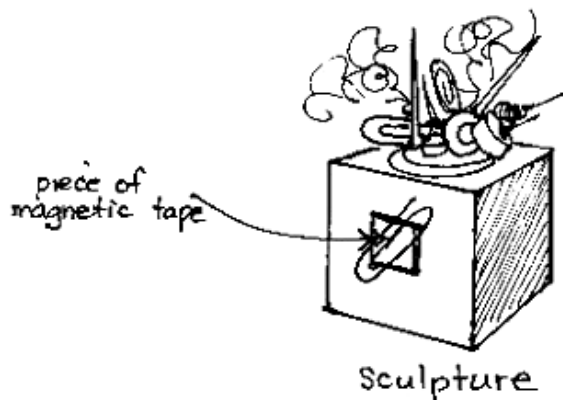
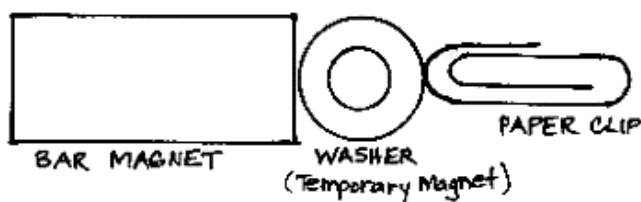


DOMAINS



glass marble

INDUCED MAGNETISM



piece of
magnetic tape

Sculpture

magnetic objects!

- nails
- metal washers
- bobby pins
- paper clips (plastic-coated too)
- nuts, bolts
- fine steel wire



TEMPLATE FOR BOX (OPEN BOTTOM)
ACTIVITY 6!

