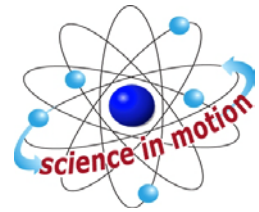


MAGNETS

SECTION 2-MAKING A MAGNET?

From *Hands on Science* by Linda Poore, 2003.



Westminster College

STANDARDS:

Students will conduct multiple trials to test a prediction and draw conclusions about the relationships between predictions and results.

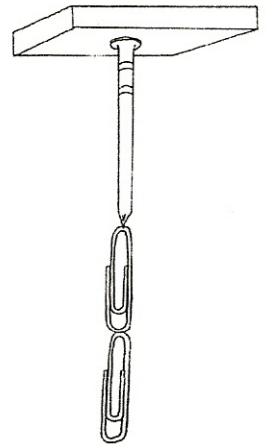
Students will follow a set of written instructions for a scientific investigation.

NOTE:

Steel objects left next to a magnet will become a magnet. Keep nails, staples, and pins separated from all magnets before this activity.

IN ADVANCE:

Have a student use a staples to eject 10 staples into each plastic tray. Do Not put the magnets in the trays. Keep the staples separate from all magnets until ready to experiment. If you do not have staples, use the pins in the kit.



MATERIALS:

For Each Student:

- 5 nails
- 10 staples in a plastic tray
- 1 magnet

EXPLORE:

1. CAN A NAIL BECOME A MAGNET?

[S, instruction] [S, trials/conclusions]

Pass out the student worksheet: *Making a nail a magnet.*

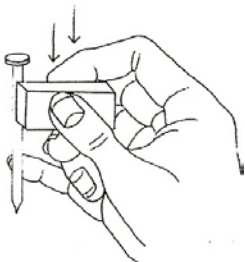
Discuss the work sheet.

Ask the students to make the nail a magnet so it can pick up staples.

Students first place a magnet on top of the nail.

Will the nail pick up staples if you remove the magnet? How many?

(The nail remains a magnet for a few minutes.)



2. The students stroke a nail *in one direction* with a magnet to make the nail a magnet and test the stroked nail to see how many staples it will pick up.

3. HOW DOES THE NUMBER OF STROKES AFFECT THE NAIL'S MAGNETIC FORCE? (Record on the work sheet.)

The students compare nails stroked with the same magnet different amounts of times.

How many staples does each one pick up?

How can you make a stronger 'nail magnet'?

Put 2 stroked nails together to see if they attract or repel.

(Staples left near a magnet will become a magnet.)

4. Make a transparency of the chart, *What Makes a Magnet Work*, Introduce the words atoms and domains and discuss.

MAKING A NAIL A MAGNET

Place the magnet on top of the nail.

How many staples do you pick up? _____

How many nails do you pick up? _____

Place 2 magnets on top of the nail.

How many nails do you pick up? _____

Remove the magnets. Is the nail still a magnet? _____

How many staples will it pick up without the magnet? _____

Rub the magnet on the nail in one direction.

How many staples will it pick up after 30 strokes? _____

Complete the chart below. Use a different nail for each experiment.

Try each experiment 3 times.

Number of Staples Picked Up:

Number of Strokes	1 st try	2 nd try	3 rd try
30			
50			
75			
100			
150			

Describe how to make this nail magnet stronger.

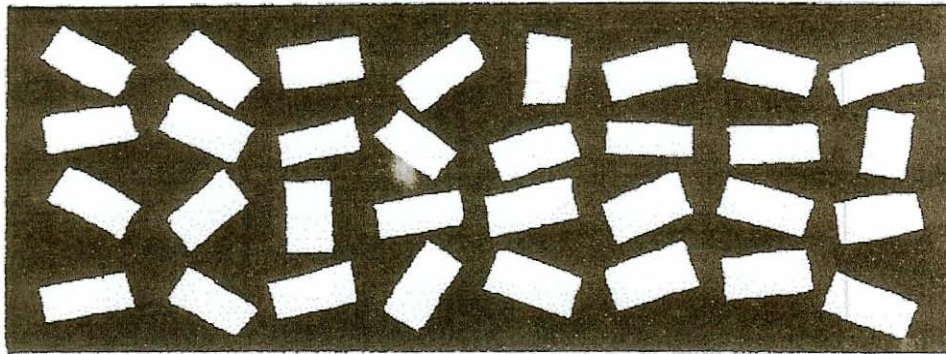
How long will the nail magnet pick up staples? _____

How could you find out? _____

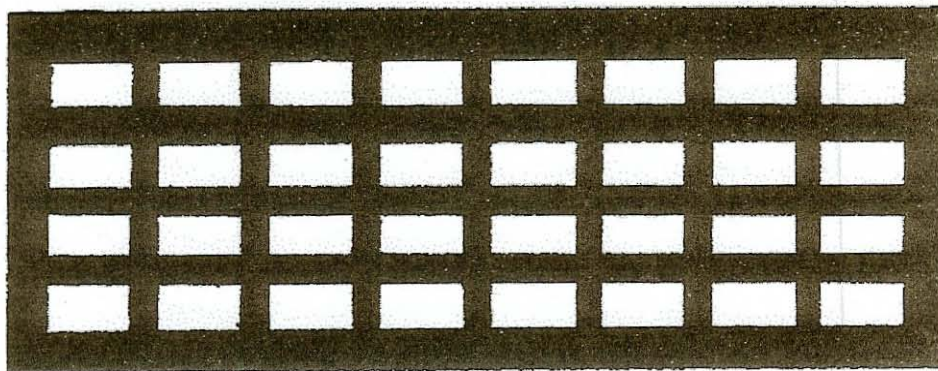
(Make an overhead transparency of the following information.)

What makes a magnet work?

Each atom in a magnetic material (steel, iron, nickel) is a tiny magnet with north and south poles. Atoms are grouped in domains (groups of billions of atoms) which are usually scattered in all directions in magnetic materials. When you stroke a nail with a magnet, the domains line up. The magnetic forces of the domains add together resulting in a magnetic force.



ATOMS IN A NONMAGNETIZED STEEL BAR.



ATOMS IN A MAGNETIZED STEEL BAR.

Atoms in magnets are lined up with most of their 'north poles' generally aligned in the same direction and pulling together.