

Another FREE SAMPLE LAB from TOPS LEARNING SYSTEMS!

This **TOPS Idea** is taken from an original series of black-and-white line masters, adapted to stand alone as an independent mini-lesson. Please purchase our original book to get the whole in-depth program.

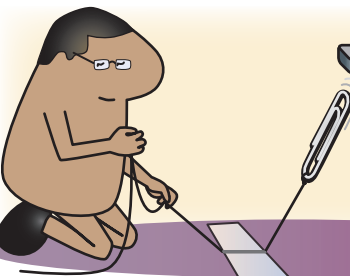
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invisible field

...adapted from **MAGNETISM #33**
by TOPS Learning Systems

1. Tape a magnet, like a diving board, to the bottom of an overturned cup.

2. Tie some thread onto a paper clip, and stick it on the end of the magnet.

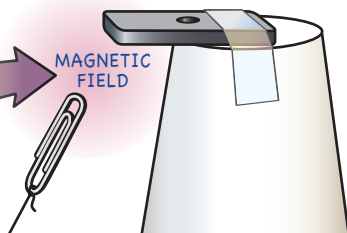


3. Tape the thread to the table, leaving the end free.

4. Pull on the thread so the paper clip floats in the air!

5. Which inserted materials disturb the magnetic field...

- ... index card?
- ... pin?
- ... another paper clip?
- ... aluminum foil?



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- 02 MEASURING LENGTH (gr 6-10)
- 03 GRAPHING (gr 6-10)
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OBJECTIVE

To observe that a magnetic field passes through solid objects if they are not magnetic.

LAB NOTES

Photocopy the activity for each student or lab team.

Step 1. If the magnet makes the cup too top-heavy, tape it to the table.

Step 4. You can also "float" the magnet by sliding the cup slightly away. If the maximum resulting separation is not enough to pass test materials between, add a second magnet to increase the field strength.

Step 5. Magnetic lines of force pass undisturbed through nonmagnetic materials (paper, aluminum, plastic, glass), with no visible effect on the floating clip. The field is altered by magnetic materials like iron or steel. When passing through a magnetic field, steel pins and clips become temporary magnets and interact with the field, causing the floating clip to wobble or fall.

MATERIALS

- Drinking cup (styrofoam, plastic or paper)
- Tape
- Ceramic "refrigerator" magnet
- Thread
- 2 steel paper clips
- Index card, steel straight pin, aluminum foil, other items

ANSWERS

5. Index card: the clip is undisturbed.
Steel pin: the clip wobbles and may fall.
Steel paper clip: the floating clip is pushed to the side, and falls.
Aluminum foil: the paper clip is undisturbed.

EVALUATION

Q. A compass needle is a tiny magnet that lines up with Earth's magnetic field so users can find directions. If you were a compass maker, would you make your compass cases from stainless steel or aluminum? Explain.

A. Make the cases from aluminum. Earth's magnetic field passes through aluminum undisturbed, but steel will alter the field. A steel case would result in an inaccurate compass.



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