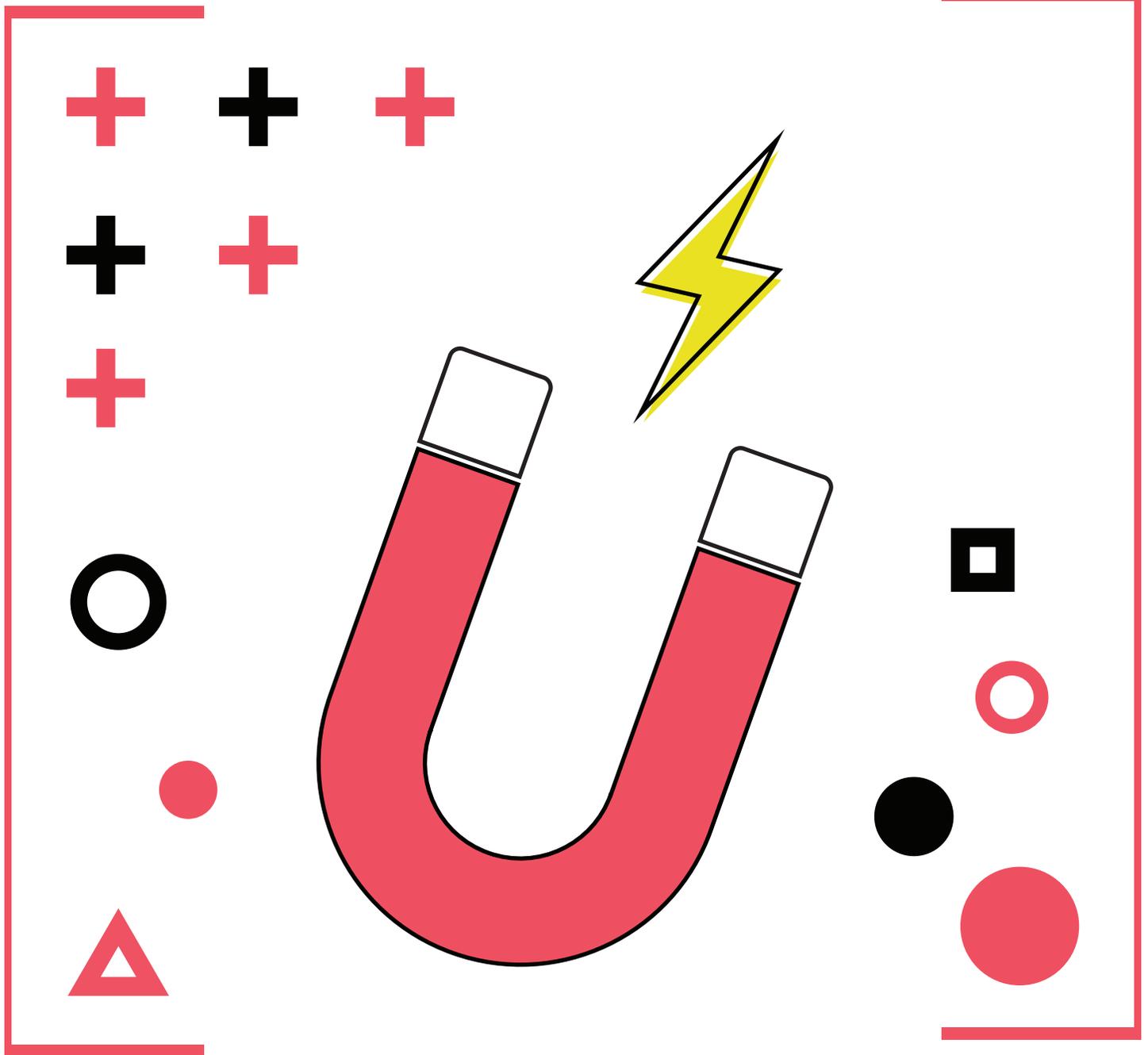


MAGNET

SCAVENGER HUNT!



WITH
BROOKHAVEN
NATIONAL LABORATORY

SO YOU WANT TO KNOW ABOUT MAGNETS?

Lucky for you here at Brookhaven National Laboratory we love magnets! We use them in some of our coolest experiments.

Here are some questions you might have about magnets:

What does it mean when something is magnetic?

What does it mean when something is non-magnetic?

Are all metals magnetic?

What happens when you put magnets together?

VOCABULARY

Write down what each word means

Hypothesis

Magnetic

Non-magnetic

Magnetic Force

Cobalt

Iron

Nickel

Steel

Attract

Repel

Hint: Use a dictionary or the internet to help you

YOU WILL NEED

- A Magnet
- Permission from a grown-up
- A place to experiment
(desk, kitchen table, living room, etc.)

SCAVENGER CHALLENGE

Try to find one of each item. Feel free to gather items not on the list that you are curious about

- | | |
|--|---|
| <input type="checkbox"/> A coin | <input type="checkbox"/> A Key |
| <input type="checkbox"/> Pipe cleaner | <input type="checkbox"/> Something Wooden |
| <input type="checkbox"/> Washer / Screw | <input type="checkbox"/> Steel Wool |
| <input type="checkbox"/> Paperclip | <input type="checkbox"/> Pencil |
| <input type="checkbox"/> Cardboard | <input type="checkbox"/> Sock |
| <input type="checkbox"/> Something Plastic | <input type="checkbox"/> Aluminum Foil |

WARNING: Magnets can damage certain electronics like TV and computer screens, tablets, etc.
Ask A grown-up BEFORE you start testing

EXPERIMENT ONE

Hint: If you don't know some of the words used, go back to the word bank you filled out.

1. Search for items on the scavenger hunt list. You don't need to find all of them, and feel free to test things not on the list!
2. After you have your items sit down where you can do your experiment.
3. Make a **hypothesis** for each item, whether you think it is **magnetic**, or **non-magnetic**.
4. As you make your **hypothesis**, sort the items you think are **magnetic** in one area and the items you think are **non-magnetic** in another area. You should have two piles at the end of this step.
5. After you have two piles ask a grown-up for a magnet (hint: you may have one on your refrigerator).
6. Use the magnet to test each item **one at a time!**
Science Question: Why would a scientist test one at a time? Write a guess and then turn the paper upside-down to see the answer.

7. Were there any items that surprised you? Write or doodle them here:



"I have no special talents. I am only passionately **curious**."

- **Albert Einstein**
Physicist

Scientists test things one at a time so they get correct results. If you test too many things at once you might get confused! Imagine the cardboard got sandwiched between the paperclip and the magnet. You would be able to lift the cardboard this way! But that cardboard is non-magnetic. Try this out with your materials after you are done with your experiment.

SCIENCE FACT!

THERE ARE ONLY 4 MAGNETIC METALS



COBALT

Cobalt is found in blue paint, stained glass, and even meteorites



IRON

Iron is found in beach sand, blood, and cast iron



NICKEL

Nickel is found in Canadian nickles, but not US nickels.
Nickel is also found in some batteries



STEEL

Steel is found in many places from as small as paper clips to as big as skyscrapers

Hint: you can remember these four with the acronym Co.I.N.S.
If you take the letters "Co" from cobalt, "I" from iron, "N" from nickel, and "S" from steel, you spell "coins"

EXPERIMENT TWO

1. Get another magnet.
2. Experiment putting the two magnets next to each other. What happens?
Can you feel a **magnetic force**?

CHALLENGE TIME

Can you make the magnets **attract**?

Draw arrows to show which way the magnets are pulling.



Can you make the magnets **repel**?

Draw arrows to show which way the magnets are pushing.



Science Question: What letters do you see on the magnets in the picture? Write down what you think they stand for. When you're ready for the answer turn to the next page.

"All sorts of things can happen when you're open to new ideas and playing around with things."

- **Stephanie Kwolek**
Chemist & Inventor

SCIENCE FACT!

MAGNETS HAVE TWO POLES

Every magnet has a north and south pole. The magnets you use do too, even if your magnet isn't labeled or looks different from the ones shown in this packet.

LIKE POLES

Like poles repel. This means if you put a south pole of one magnet next to the south pole of another magnet you will feel a magnetic force pushing the magnets apart. This will also happen if you put a north pole next to the north pole of another magnet.

OPPOSITE POLES

Opposite poles attract. This means if you put a south pole of one magnet next to the north pole of another magnet you will feel a magnetic force pulling the magnets together. So in science "opposites attract" is correct.

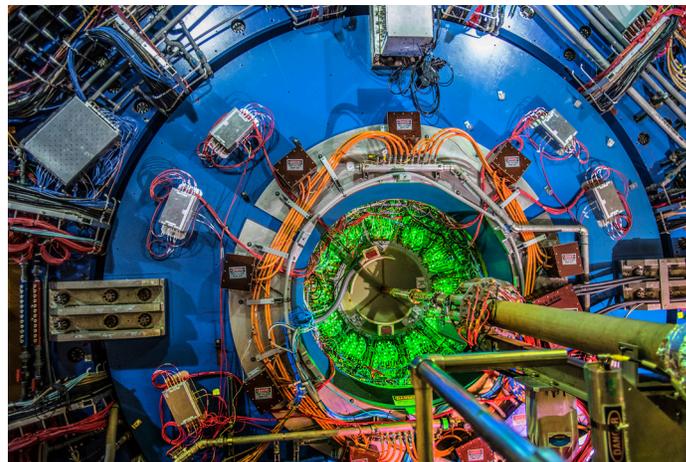
SCIENCE FACT!

THE EARTH IS ONE BIG MAGNET



The middle of the earth has a lot of iron and nickel, which are magnetic. This makes Earth a huge magnet! This is why compasses always point north.

MAGNETS AT BROOKHAVEN NATIONAL LABORATORY



Scientists use magnets in their experiments at Brookhaven National Laboratory! The picture on the left is Brookhaven National Laboratory, the big circle at the top of the picture is a machine called the Relativistic Heavy Ion Collider (RHIC). It uses magnets to see tiny explosions! The picture on the right shows the inside of RHIC. You might not see them but there are powerful magnets in this picture!

RESOURCES

View Virtual Magnets:

<https://micro.magnet.fsu.edu/electromag/java/magneticlines2/index.html>

More information about magnets:

<https://www.magcraft.com/magnet-university>

More about Magnetism:

<https://school-for-champions.com/science/magnetism.htm#.XoTaC4hKiUk>

Videos about magnets:

<https://www.bbc.co.uk/bitesize/topics/zyttyrd/resources/1>

Three National Laboratories Achieve Record Magnetic Field for Accelerator Focusing Magnet:

<https://www.bnl.gov/newsroom/news.php?a=217097>

Branley, Franklyn. *What Makes a Magnet?* Harper Collins, 1996.

Fowler, Alan. *What Magnets Can Do.* Children's Press, 1995.

Hewitt, Sally. *Forces Around Us.* Bt Bound, 2001.