

Magnets

National curriculum objectives (year 3):

- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.

Science in the news today

There is a lot of plastic in the ocean. One of the big plastic polluters is microplastic, tiny, almost invisible plastics that are extremely harmful to fish and other nearby creatures.

For a long time scientists have been trying to find ways to remove this plastic from the ocean and now they have come up with a new idea - magnets! These tiny magnetic coils cause a reaction in the water which breaks down the miniscule plastics into material which isn't harmful anymore. Then, because they are magnets, they are attracted to one another; this makes them very easy to remove from the water once they have done their job!

These magnetic plastic killing coils are still being developed, but could be a promising tactic for cleaning our oceans!

Here is a picture of tiny plastics in the ocean.



Very small pieces of plastic are harmful for ocean life.

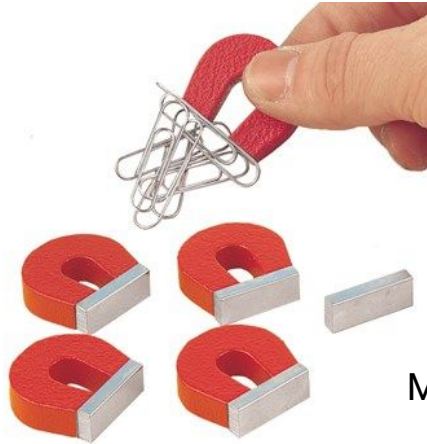
Photo credit: Tunatura/Getty

What is a magnet?

Magnets are types of metals that experience a **magnetic force**. This means they attract or repel other objects. You probably have some sort of magnets around your home.



Fridge magnets

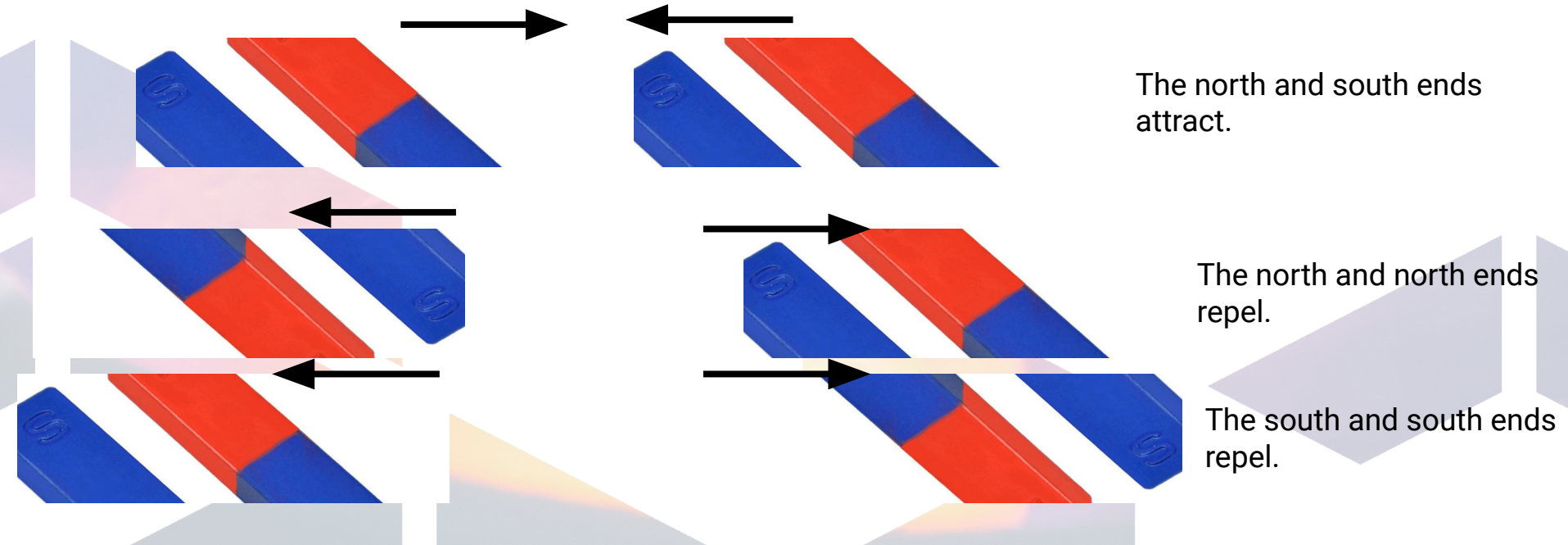


Magnetic toys



How do magnets work?

Magnets have *two poles*, one end is the North end and one is the South end. If both ends are the same they will repel each other. If one is North and one is South they will attract.



How do magnets work?

The magnetic force that magnets have is invisible and only attracts certain other objects.



Magnets can either attract or repel other magnets. But, there are other materials that *aren't* magnets themselves that are still attracted to magnets.

A good example of this is a paperclip.

What do magnets attract?

A fridge is attracted to magnets.



A magnet will attract paper clips but the paper clips aren't magnets. (Paper clips don't attract other paper clips!)






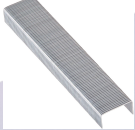


What do magnets attract?

What other materials are attracted to magnets? Think about these objects below (if you have a magnet at home, test them out!):

Wooden table		Knives and forks	
Plastic bag		Clay plant pot	
Tweezers		Staples	
Kitchen foil		Copper ring	

What do magnets attract?

Did you get them right?

<p>Wooden table Wood doesn't attract magnets.</p>		<p>Knives and forks Yep, they are often made of stainless steel, which does attract magnets.</p>	
<p>Plastic bag Nope, plastic isn't attracted to magnets.</p>		<p>Clay plant pot Clay isn't attracted to magnets.</p>	
<p>Tweezers Yes! Tweezers are attracted to magnets.</p>		<p>Staples Yes! Again, they're made of steel.</p>	
<p>Kitchen foil No, magnets don't attract kitchen foil.</p>		<p>Copper ring Copper doesn't attract magnets, so this one is a no!</p>	

What do magnets attract?

Now we can group some items together based on whether they are magnets, attract magnets, or neither!

Magnets



Attracted to magnets



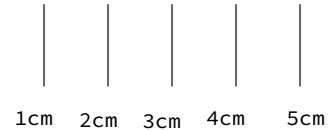
Magnets have no effect



What are magnets attracted to?

What do you need?

- A magnet
- Plenty of household items such as: coins, tweezers, blue tac, kitchen foil, candles, metal forks, plastic toys, metal toys, wooden spoons, anything you like!
- Paper and a pen
- A ruler



Instructions:

1. First, go through each item you have gathered and make a prediction. Decide whether you think it will be attracted by the magnet or not. You could create a table to record this.
2. Next, make a list of the items in order, starting with the one you think will be most *strongly* attracted to the magnet.
3. Then, draw a small cross on the far left side of your paper. Measure 1cm and make another mark. Keep measuring 1cm away and marking the paper. It would be useful to label the marks (see image above).
4. After that, take one of your objects and put it on the cross. Hold the magnet right next to it. If it is not attracted to the magnet at all, make a note of that, but if it is, continue....
5. Pull the object away from the magnet by 1cm and let go. Do the object and the magnet attract? If they do, move the magnet away by 2cm. Repeat this until they no longer attract together. Make a note of the final distance.
6. Repeat with each object. Remember to write down whether it was attracted to the magnet or not, and if so, the distance.
7. After you have repeated this you will have a complete list of what was attracted to the magnet and what wasn't, as well as which one was attracted the most strongly!
Top tip - the stronger the attraction, the further away the object can be from the magnet.

Paint with magnets!

What do you need?

- A magnet
- A paperclip (or two!)
- Paper
- Paints
- Shoebox

Instructions:

1. First, place the piece of paper at the bottom of the shoebox.
 2. Next, drop a few drops of paint on the paper, and place the paper clip on top of the paper too
 3. Then, place the magnet underneath the shoebox and move the paperclip using the magnet.
 4. See what patterns you can make with the paint and the magnets!
 5. You can use other magnetic objects that aren't paperclips to paint with, and different colors and patterns of paint.
- We would love to see the ones you've made, so please take a photo and send it to outreach@sciencecreates.co.uk.



Magnetic mazes!

What do you need?

- A printer, or you can draw your own maze
- Two small magnets

Instructions:

1. Print out the mazes we have made available here (on the following slides).
2. Place a magnet at the start of the maze and then another attached to it but on the other side of the paper. Use the magnet at the back to drag the front magnet through the maze!
3. If you don't have a printer, you can design your own maze and do the same!

