Mission Assignment: Demonstrate the shape of a magnetic field

KS3-23-04

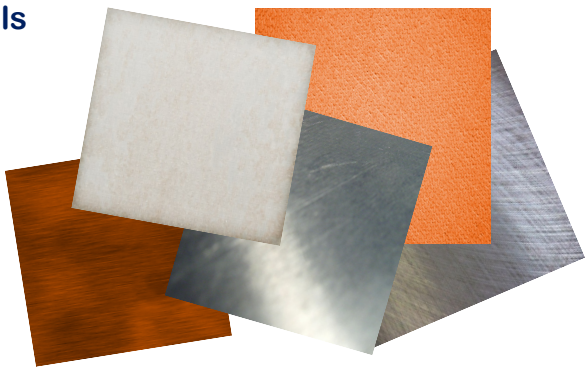
Magnetic shielding

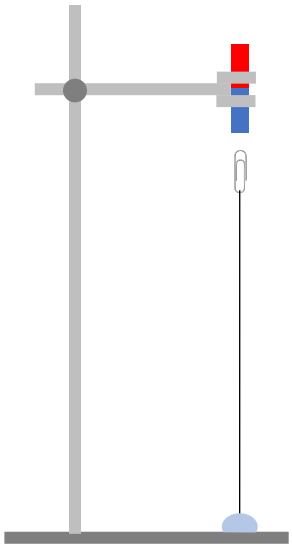
You are going to investigate which materials will disrupt a magnetic field.

Equipment
- Thin thread
- Bar magnet
- Small metal paper clip
- Sticky tack/ tape
- Clamp, boss, and stand
- Thin material samples – steel, iron, nickel, copper, paper, cloth, tin, aluminium, plastic

Method
1. Tie the thread to the paperclip and fix it to the base of the stand.
2. Clamp the magnet so that the paper clip is suspended underneath it, while keeping a gap between paperclip and the magnet.
3. Raise the magnet to the highest point possible while still suspending the paperclip.
4. Slide different materials through the gap, without touching the paperclip.
5. Record if the paperclip stays in place or drops.

You may find some materials are attracted to the magnet. It doesn't matter if the magnetic materials stick to the magnet.

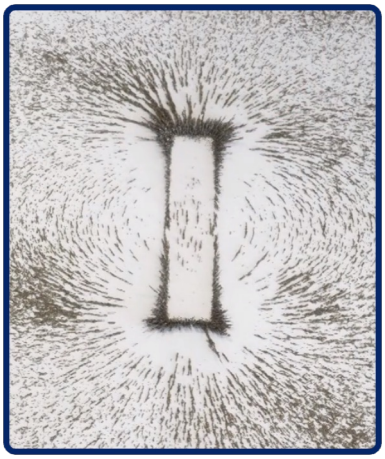




Material	Paperclip drop (✓/✗)
Steel	
Iron	
Nickel	
Copper	
Paper	
Cloth	
Tin	
Aluminium	
Plastic	

What do the materials that cause the paper clip to drop have in common?

Plotting magnetic fields

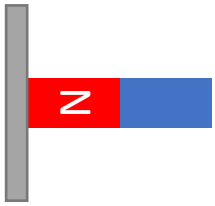


You are going to draw magnetic field lines for the following setups.

Method:

1. Arrange the magnets as shown in the illustrations below.
2. Place a piece of paper over the top, and sprinkle iron filings on the paper (you could also use plotting compasses).
3. Draw the lines that appear on the diagrams below.
4. Add the directional arrows to the field lines.

Single magnet with magnetic material attached.



Two magnets attracting (with a wooden block separating them).

Two magnets repelling.