

## Knowledge organiser

### Magnetism

Magnetism is a **non-contact force**. Magnetic materials can be magnetised or will be attracted to a magnet. There are three magnetic metals: **iron, nickel and cobalt**. Steel is also magnetic because it contains iron.

A bar magnet is a permanent magnet. It has a **north pole** and a **south pole**.

Like poles **repel**. This means that the two poles push each other away.



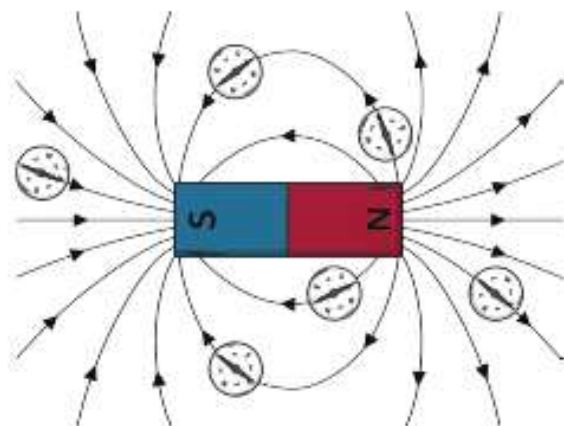
Opposite poles **attract**. This means that the invisible magnetic force between the magnets pulls the poles towards each other.



### Magnetic Field Lines

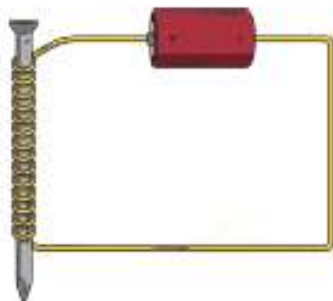
The magnetic field around a magnet can be shown as a series of lines around the magnet. The magnetic field lines can be plotted using a plotting compass.

The compass will always point towards to the south pole, wherever the compass is placed near the magnet. The arrows show the direction of the magnetic field.



### Electromagnets

When electrical charge flows in a wire, a magnetic field is created around the wire. The larger the current, the stronger the electromagnet. The strength of the magnetic field can be increased by wrapping the wire around a magnetic material, such as iron.



The strength of an electromagnet can be changed by changing the number of coils of wire around the iron core. This can be measured by counting the number of paperclips that become attracted to the electromagnet.

**Independent variable** – number of coils of wire

**Dependent variable** – number of paperclips picked up

**Control variables** – current supplied to the circuit, core material, width of wire, length of wire, potential difference of the battery or power pack

The **greater the number of coils**, the **stronger the electromagnet** and the more paperclips it will pick up.

Electromagnets are useful because they can be switched on and off. This makes them suitable for sorting scrap metal at a recycling centre.

