Magnets

Magnets

Most materials are not magnetic. A magnetic material can be magnetised or attracted to a magnet.

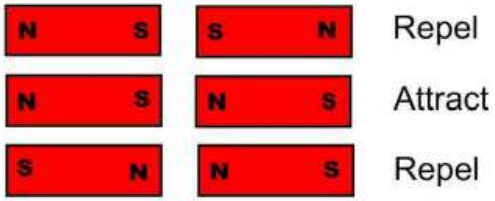
Iron, cobalt and nickel are magnetic elements. **Steel** is an alloy that contains a high percentage of iron so is also magnetic.

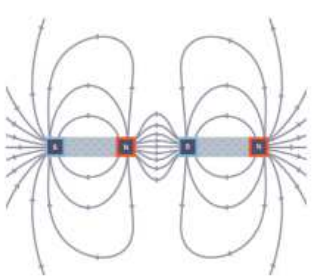
Magnets apply forces. Magnetism is an example of a **non-contact force**

A bar magnet is a permanent magnet. This means that its magnetism is there all the time and it cannot be turned on or off.

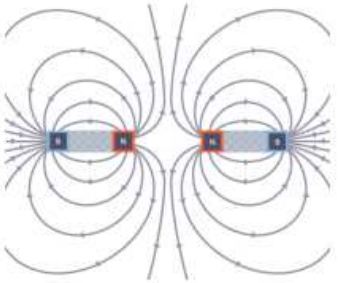
A bar magnet has two magnetic poles:
- North pole
- South pole

Opposite poles **attract**, like poles **repel**





Attraction



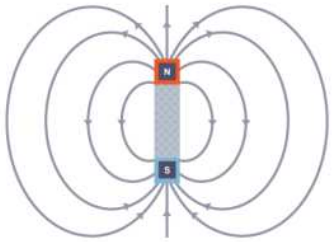
Repulsion

Magnetic fields

A magnet creates a magnetic field around it. A force is exerted on a magnetic material brought into contact with a magnetic field

The **magnetic field is strongest at the poles**

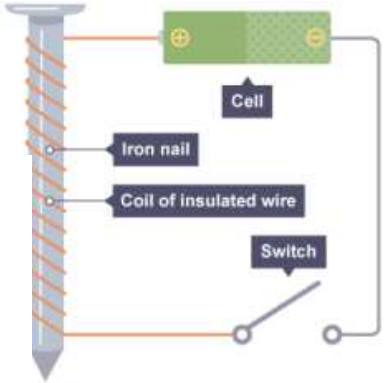
We can show this field by drawing field diagrams:
- Each field has an arrow head
- The field lines come out of the north pole and go into the south pole
- The field lines are most concentrated at the poles
- Lines never cross each other



Electromagnets

A current flowing through a wire causes a magnetic field. This effect can be used to make an electromagnet

A simple electromagnet comprises a length of wire turned into a coil and connected to a battery or power supply.



You can make an electromagnet stronger by:
- Wrapping the coil around \ piece of iron
- Adding more turns to the coil
- Increasing the current through the coil

Plotting a magnetic field around a bar magnet

Using a plotting compass:
1. Place the plotting compass near the magnet on a piece of paper
2. Mark the direction the compass needle points. The needle of a plotting compass always points to the south pole of a magnet.
3. Move the plotting compass to many different positions in the magnetic field, marking the needle direction each time
4. Join the points to show the field line.