

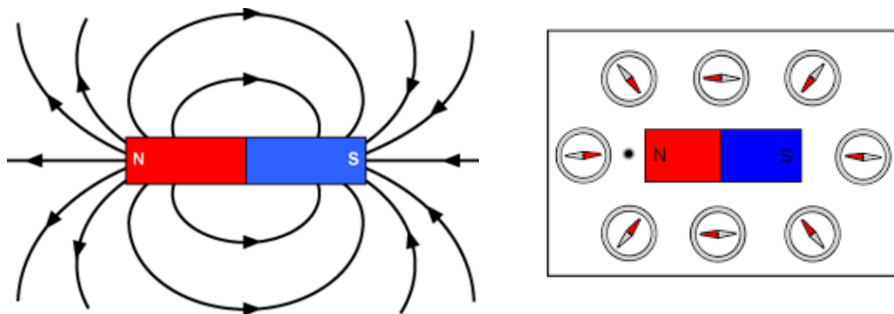
Magnetism Knowledge Organiser

Magnetic field

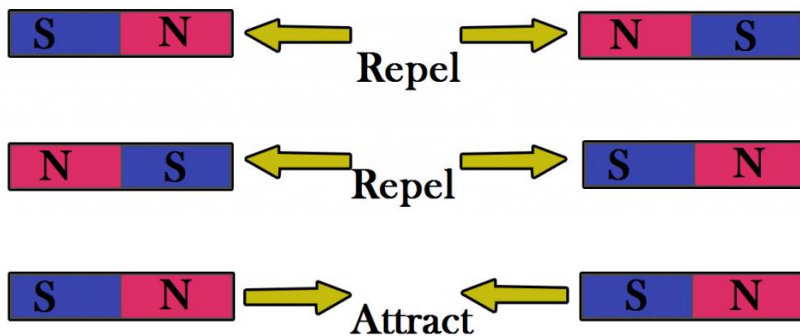
Magnets have a magnetic field around them. Magnets can attract objects made of magnetic materials. The magnetic materials are iron, nickel and cobalt.

The direction of a field is the direction of the force on a north pole placed in that field. It always points from the north pole to the south pole.

The magnetic field is strongest close to the poles.

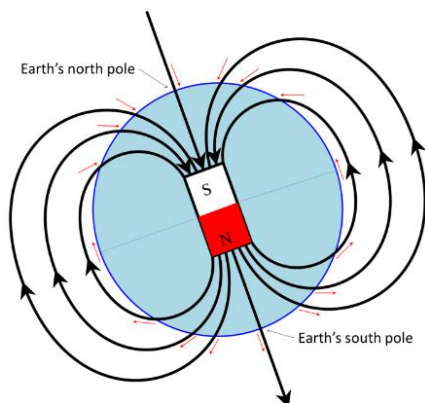


A north pole will attract a south pole, but two north poles or two south poles will repel each other.



Earth's magnetic Field

The Earth's magnetic field causes the north side of a compass needle to point to 'magnetic north' (it is 'north seeking')



Permanent and Induced Magnets

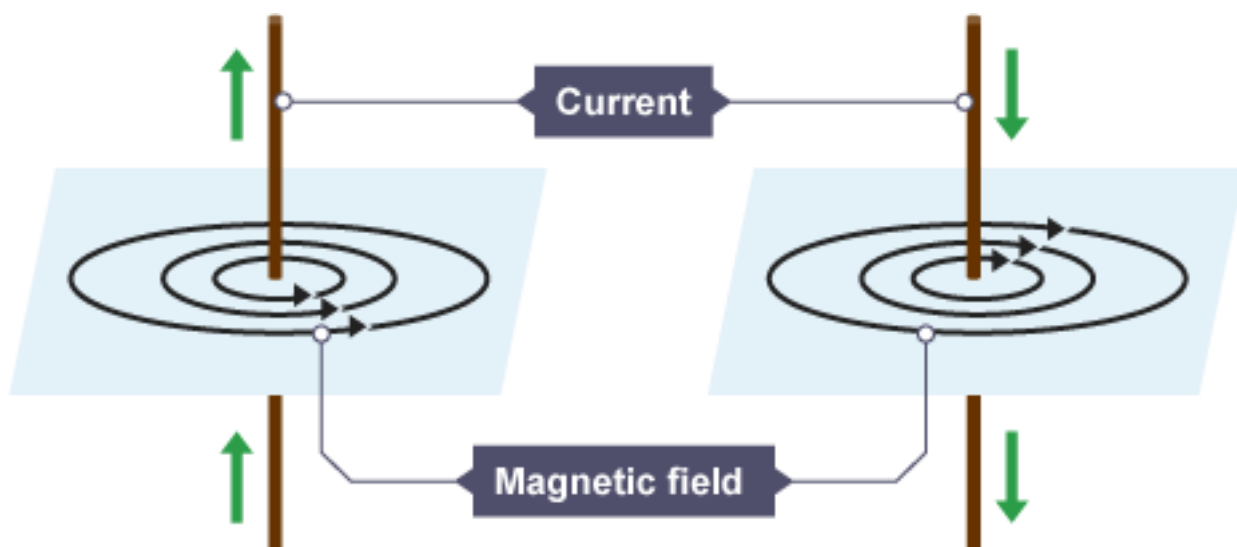
A Permanent magnet produces its own magnetic field. Example – bar magnet.

An induced magnet is a material that becomes a magnet when it is placed in a magnetic field. Example – Paperclips become induced magnets when they are attached to a magnet.

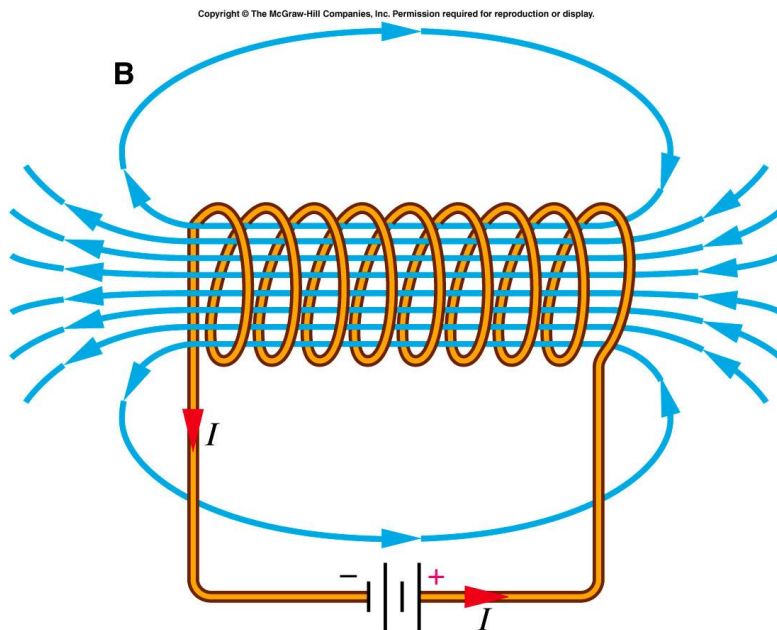


Electromagnets

A wire with an electric current flowing through it has a magnetic field around it. The strength of the field increases if the current increases. The direction of the field changes if the direction of the current changes.



When a wire is wrapped into a coil, the magnetic field is in a similar shape to the magnetic field of a bar magnet.



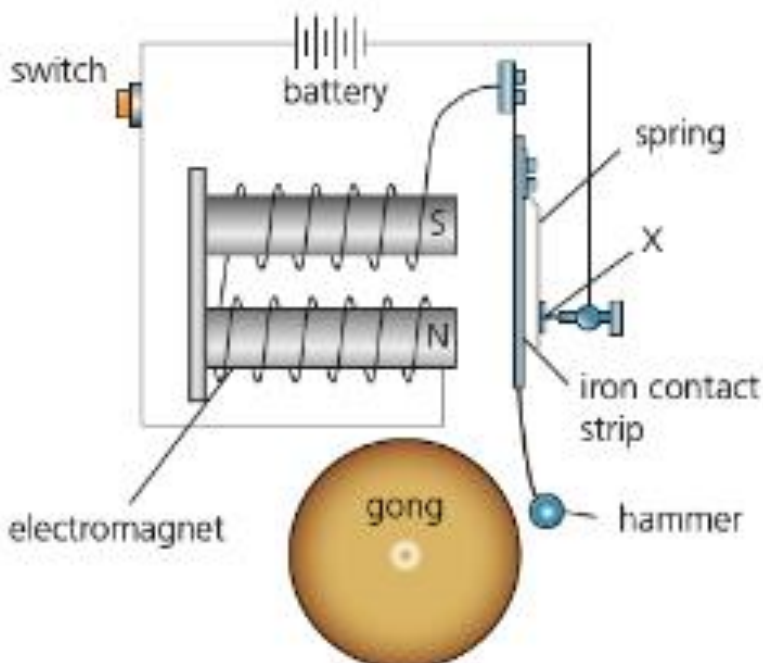
You can increase the strength of an electromagnet by:

- increasing the number of coils of wire,
- increasing the current in the wire,
- using a magnetic material as a core inside the coil of wire

Uses of electromagnets

Relay switches use a small current to switch on a circuit that carries a much larger current. This is much safer as people do not have to touch any part of the circuit carrying the large current.

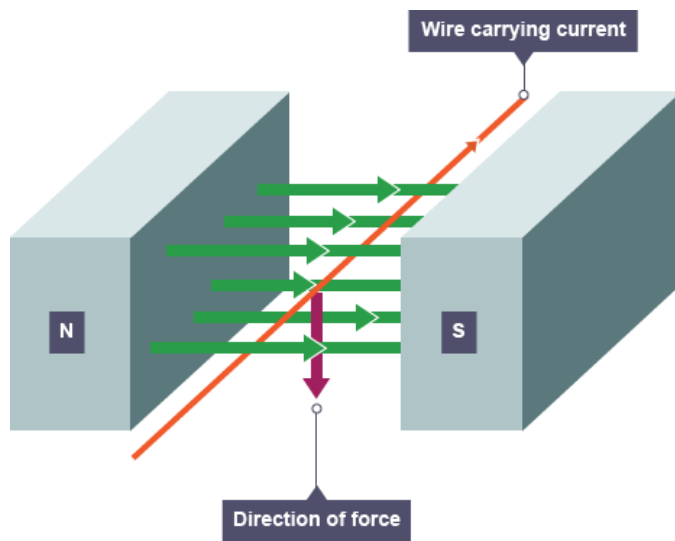
Door bells use electromagnets to attract and repel a hammer to hit the bell.



Electric motors

The motor effect – if a wire carrying a current is placed in a magnetic field it experiences a force.

The direction of the force depends on the direction of the current and magnetic field.



An electric motor consists of a coil of wire in a magnetic field. When a current flows through the coil of wire, the combination of the magnetic field from the magnet and coil of wire makes the coil spin.

