

# Year 8 Science knowledge organiser

**Module** – Electromagnetism

**Topic** – Electromagnets and magnetism

**Length of topic** – Approx. 7 lessons

**Method of assessment** – summative assessment

## Links to prior learning

KS2 Year 3 Forces topic

- Describe the effects of simple forces that act at a distance (magnetic forces, including those between like and unlike magnetic poles)

KS2 Year 5 Forces topic

- Describe the effects of simple forces that act at a distance such as gravity and magnetism.

KS3 Year 7 Electromagnetism topic

- Components with resistance reduce the current flowing and shift energy to the surroundings. Current is a movement of electrons and is the same everywhere in a series circuit. Current divides between loops in a parallel circuit, combines when loops meet, lights up bulbs and makes components work.
- Around a charged object, the electric field affects other charged objects, causing them to be attracted or repelled. The field strength decreases with distance.

## Knowledge to be taught.

- An electromagnet uses the principle that a current through a wire causes a magnetic field. Its strength depends on the current, the core and the number of coils in the solenoid.
- Magnetic materials, electromagnets and the Earth create magnetic fields which can be described by drawing field lines to show the strength and direction.
- The stronger the magnet, and the smaller the distance from it, the greater the force a magnetic object in the field experiences.

## Skills to be covered

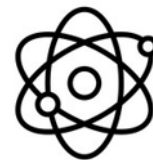
- Discuss limitations in the design of a device using an electromagnet and suggest improvements.
- Predict the pattern of field lines and the force around two magnets placed near each other and how an object made of a magnetic material will behave in or rolled through a magnetic field.

## Working scientifically strands covered

Analyse patterns	✓
Discuss limitations	✓
Draw conclusions	✓
Present data	✓
Communicate ideas	✓
Construct explanations	✓
Critique claims	
Justify opinions	
Collect data	✓
Devise questions	✓
Plan variables	✓
Test hypothesis	✓
Estimate risks	✓
Examine consequences	
Review theories	
Interrogate	

## Assessment

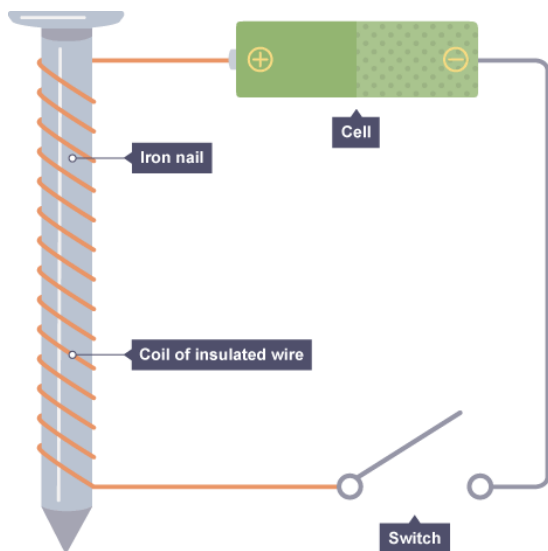
Summative assessment based on knowledge taught through the topic



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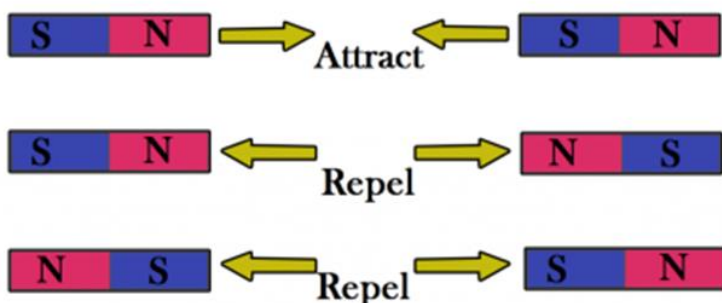
## Facts

When an electric current flows in a wire, it creates a magnetic field around the wire.



The magnetic field of an electromagnet decreases in strength with distance.

Two 'like' magnetic poles repel and two 'unlike' magnetic poles attract.

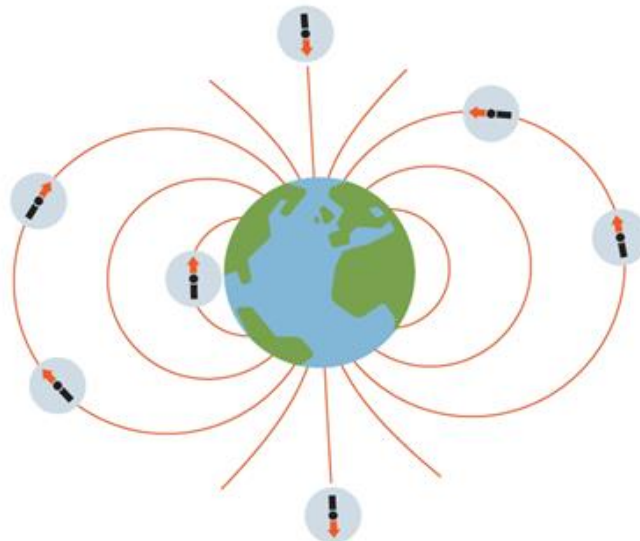


Field lines flow from the north-seeking pole to the south-seeking pole.

These metals are magnetic:

- Iron
- steel
- cobalt
- nickel

The Earth behaves as if it contains a giant magnet.



## Keywords

**Attraction:** When two or more things come together, eg the north pole of a magnet is attracted to the south pole of a magnet.

**Core:** Soft iron metal which the solenoid is wrapped around.

**Electromagnet:** A magnet made by wrapping a coil of wire around an iron bar and passing an electric current through the coil.

**Magnetic:** Able to be magnetised or attracted to a magnet.

**Magnetic field:** Area surrounding a magnet that can exert a force on magnetic materials.

**Non-contact force:** Force exerted between two objects, even when they are not touching, such as the force of gravity.

**North pole:** In a magnet, the end that is attracted to the Earth's magnetic north pole.

**Permanent magnet:** Magnet made from a magnetic material. Its magnetism cannot be turned on or off, unlike an electromagnet.

**Plotting compass:** Small magnetic compass used to detect magnetic fields.

**Repulsion:** When two or more things are forced apart, eg the north pole of a magnet is repelled by the north pole of another magnet.

**Solenoid:** Wire wound into a tight coil, part of an electromagnet.

**South pole:** In a magnet, the end that is attracted to the Earth's magnetic south pole.