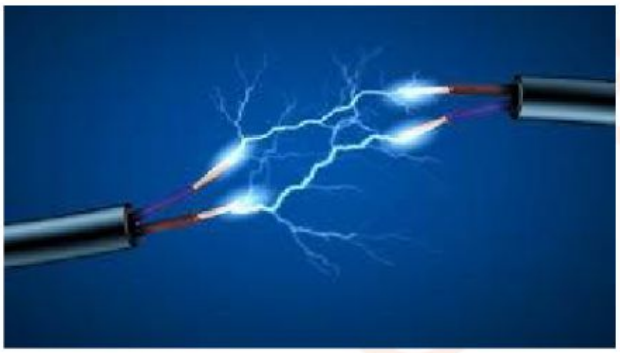
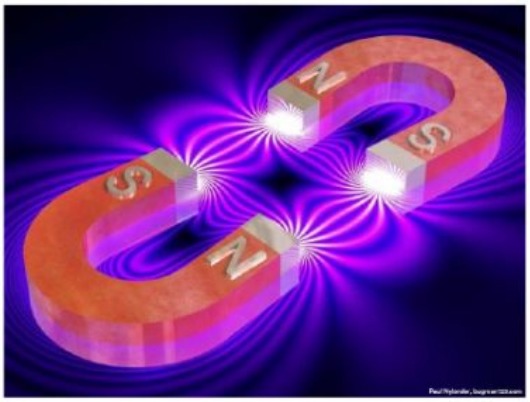
ELECTRICITY
&
MAGNETISM



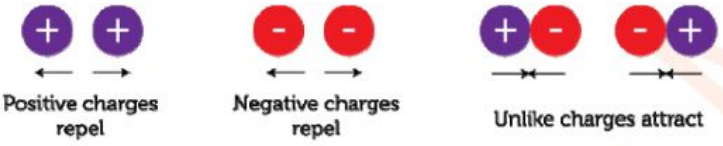


1 Electrical charges

There are two types of **electrical charge**: **positive** and **negative**. Negative charges can move from one place or object to another.

- If an object has more positive than negative charges, it is **positively** charged.
- If an object has more negative than positive charges, it is **negatively** charged.
- If an object has the same number of positive and negative charges, it is **neutral**.

Objects with **opposite** charges **attract** each other, and objects with the **same** charges **repel**

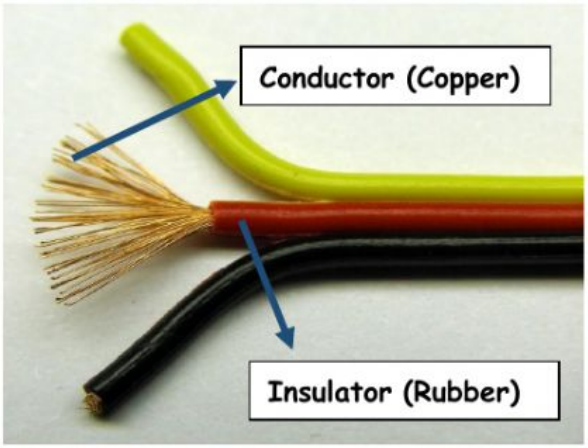


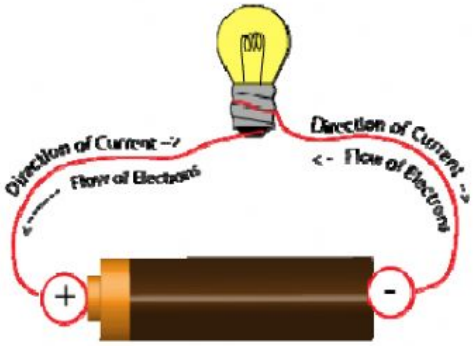
2. Electrical current

Electrical current is the flow of electrical charges. It transmits energy called **electricity**.

Electrical current flows differently, depending on the type of material through which it flows.

- **Conductors**: electrical current flows easily through conductors. Most metals are conductors.
- **Insulators**: electrical current does not flow easily through insulators, such as air, glass, plastic, wood and rubber





3 The effects of electrical current

When electrical currents circulate through a conductor, they can produce:

Heat. When electrical current circulates through a wire, it can heat up. This is what happens in a toaster or electric grill.
Light. Electrical current can produce light as we can see in the light bulb on the right.
Sound. Electrical current can be transformed into sound in loudspeakers on a radio.
Magnetism. When electrical current circulates through wire, the wire behaves like a magnet. Electromagnets use this effect.
Movement. In electric motors, the electrical current produces a turning movement. These motors have a magnet and a conductor wrapped around an axis, like fans or drills.

4. Magnetism

Magnetism is the property some substances have to **attract metal**. like iron. These substances area called magnets.
There are natural and artificial **magnets.** Magnets can be **natural**, such as the mineral magnetite, or **artificial**, such as magnets manufactured from metal.

An electromagnet behaves like a magnet when it is connected. What will happen to the paper clips when the battery is disconnected?

5. Electrical circuits

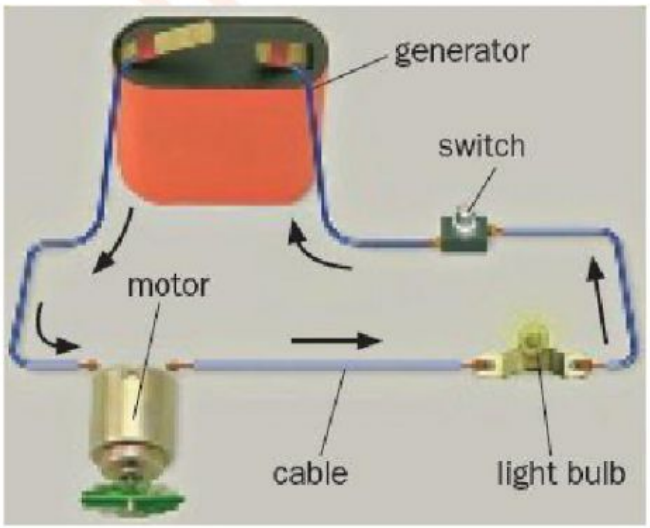
As you can see in the diagram, an electrical circuit is formed by various elements connected in a way that allows the circulation of an electrical current.

A generator, for example, a battery, produces the electrical current. A generator has two poles or terminals. Electrical charges exit through one terminal and enter through the other. In this way, an electrical current is created.

Cables transmit the electrical current from the generator to the other components of the circuit. Generally, electric cables are made of copper wires and are covered with plastic.

Light bulbs, electric motors and other components convert the electrical current into light, movement, heat and sound. Look at the second diagram.

Switches make it possible to control the current in the circuit. They make current flow and stop flowing.
For current to flow, a circuit must be closed. This means that all components are connected, and the switch is closed.



ACTIVITIES

1. Look at the photo. Complete the text. Use the words.

repel | negative | attract | positively

When two objects are rubbed together, one becomes_____and the other becomes positive

Here, the girl is combing her hair. Her comb is negatively charged, but her hair is charged. For this reason, the comb and the hair_____each other. Individual hairs each other because they have the same charge

2. Look at the picture and answer the questions.

a. What happens when two of the same poles are put together?

_____

b. What happens when two opposite poles are put together?

_____

c. Name three objects which use magnets

_____

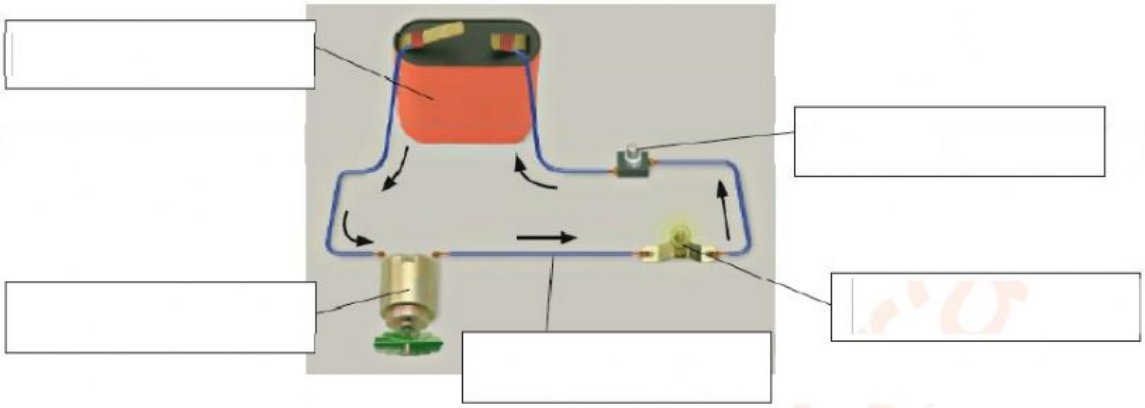
3. Complete.

If an object has more positive than negative charges, it is_____charged

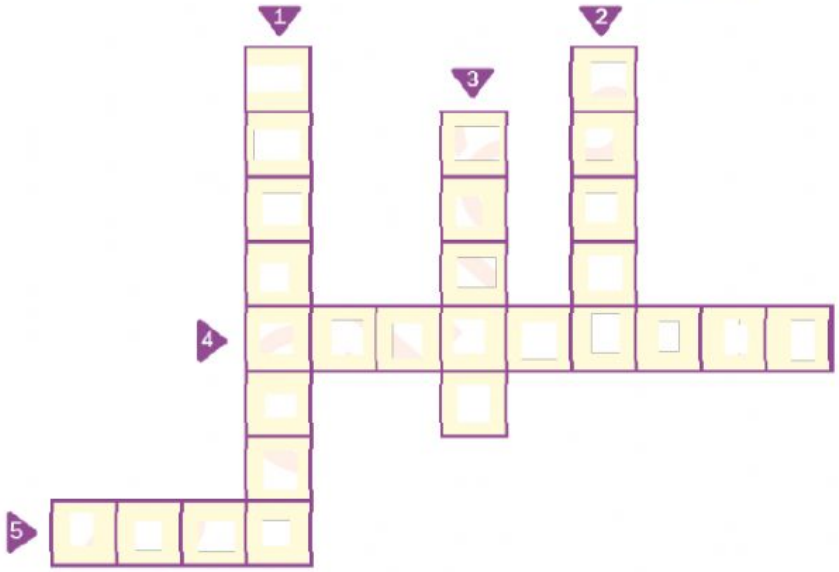
If an object has more negative than positive charges, it is_____charged

If an object has the same number of negative and positive charges, it is_____.

4. Look at this diagram of an electrical circuit. Label the components.



5. Complete the crossword to name the effects of electrical currents.



Down

1. The turning of a drill is produced by this effect.
2. Electricity produces this effect in a light bulb.
3. Your MP3 uses this effect

Across

4. An electromagnet produces this effect as the electrical current circulates.
5. This effect is produced in an electric toaster