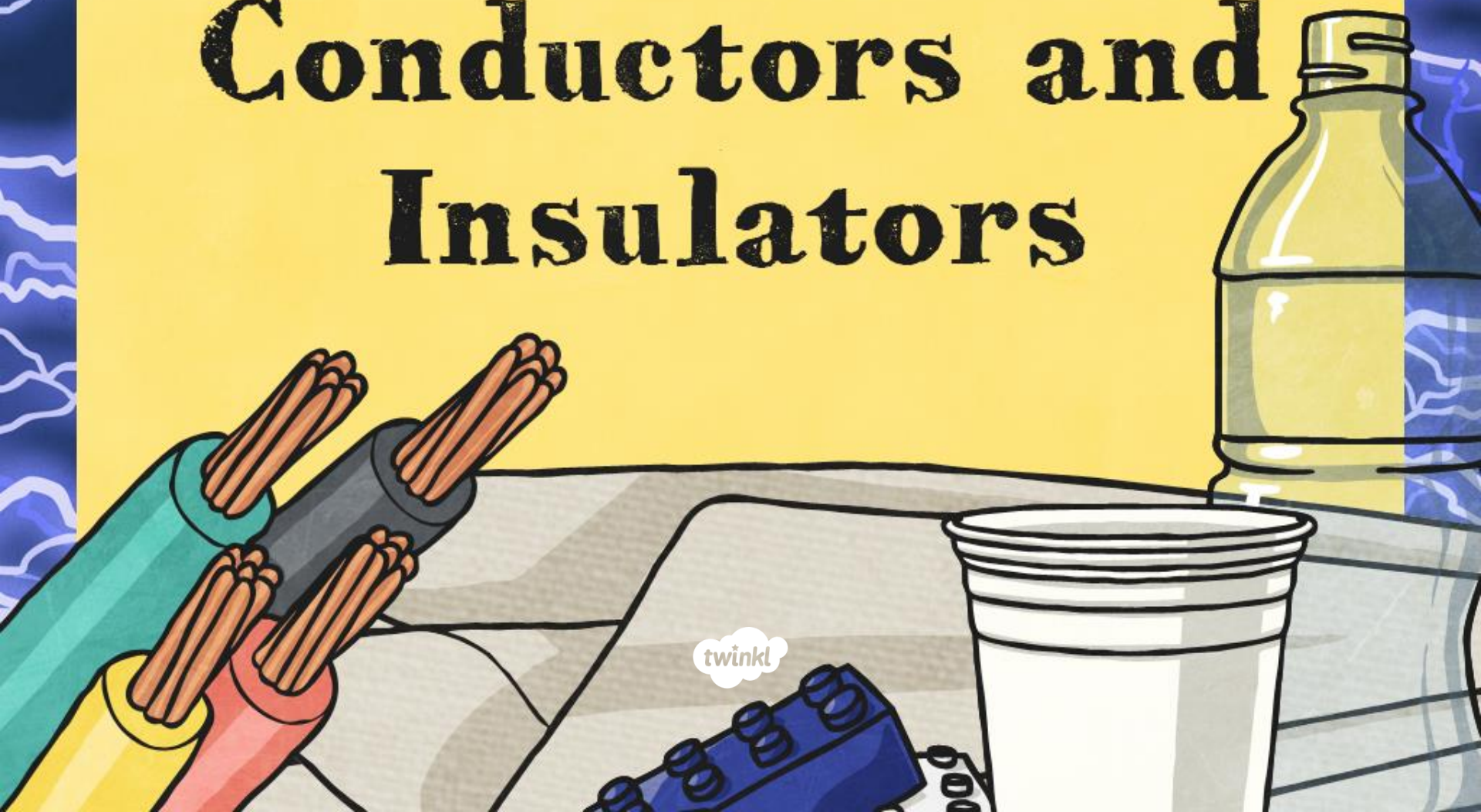
Science

Electricity

Electrical Conductors and Insulators



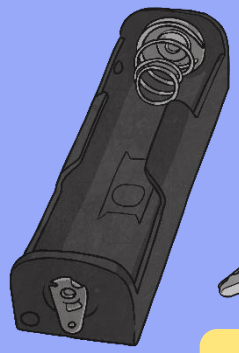
Aim

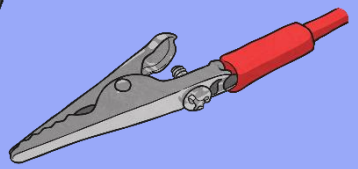
- I can identify and sort materials into electrical conductors or insulators.

Success Criteria

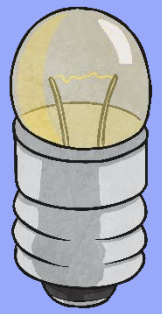
- I can explain why some materials conduct electrical currents and why others don't.
- I can test materials to check if they are conductors or insulators of electrical current.

Parts of a Circuit



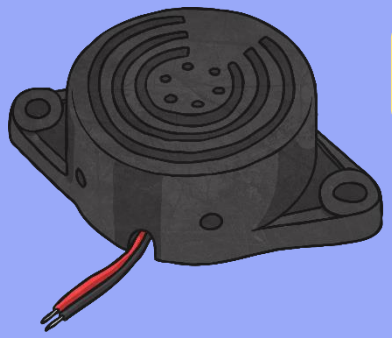


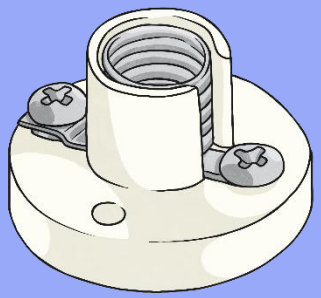
motor

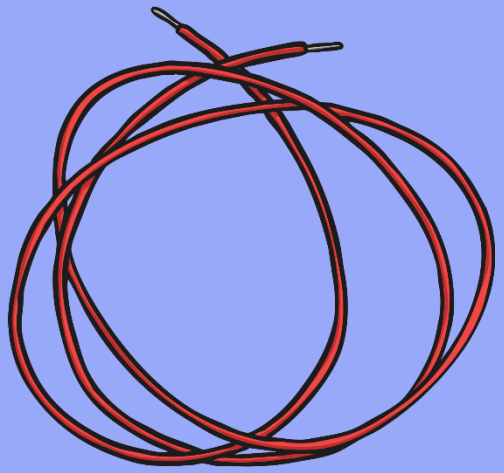


wires

bulb

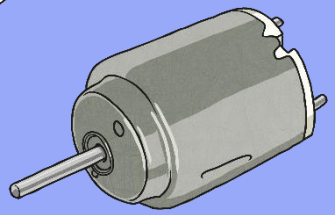






battery (cell)

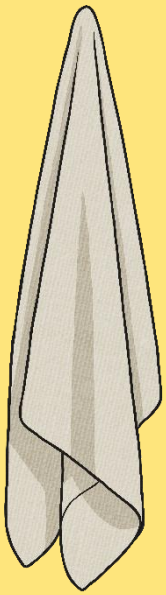
crocodile clip



Materials

In your groups – look at the materials you have been given and label them.

What materials did you have?



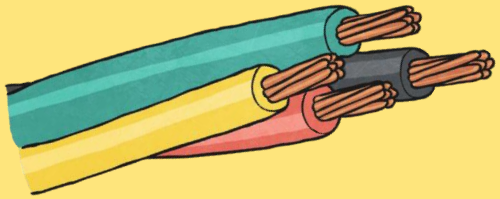
linen

plastic

cupronickel

wood

wool

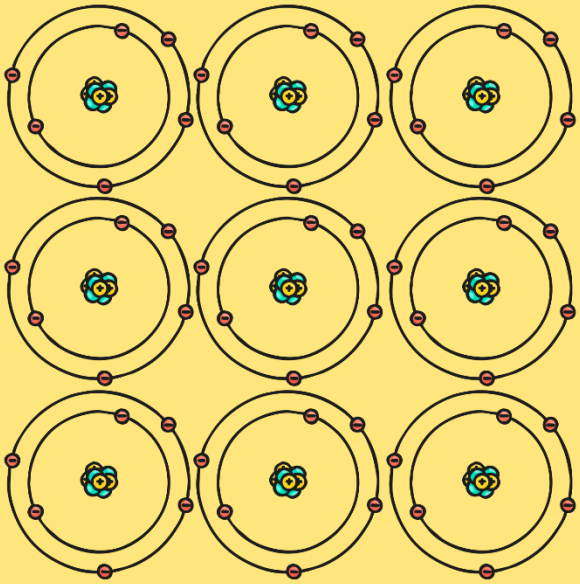


copper

Are there any materials you were unsure about? Which ones?

Insulators and Conductors

In most materials, the atoms look like this:



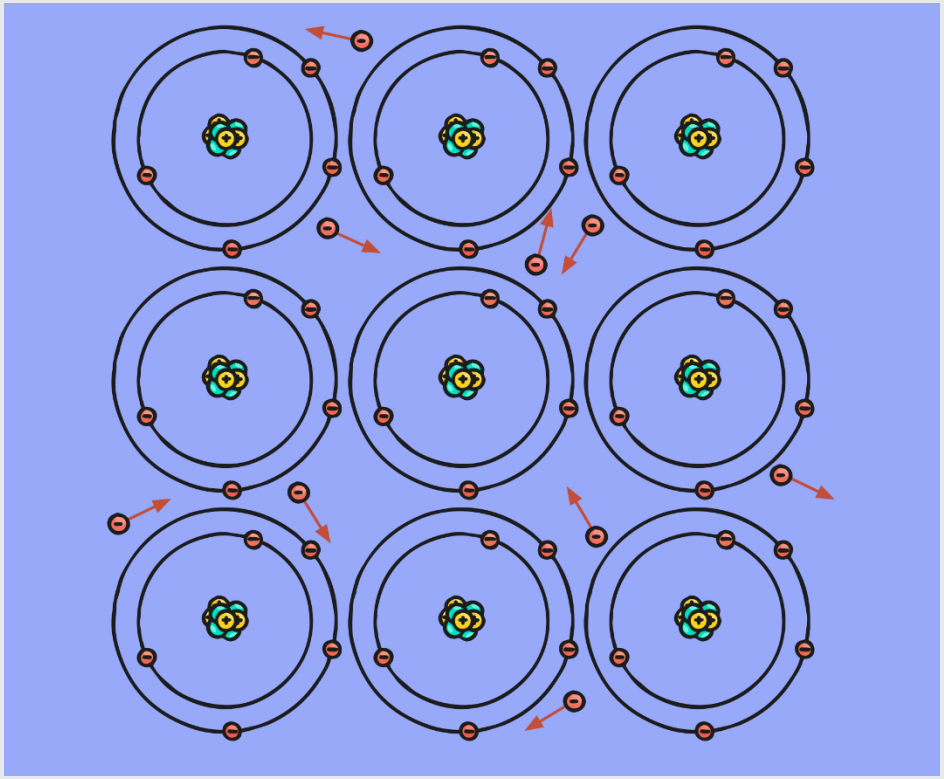
- The **protons** and **neutrons** are attracted to each other as a result of the **strong nuclear force**, and they form the nucleus.
- The **electrons** are attracted to **protons**, but this attraction is not as strong as the **strong nuclear force** which makes the **protons** and **neutrons** stick together.
- Instead, the attraction means that the **electrons** orbit the **protons** in the nucleus.
- The **electrons** **cannot move freely** in these materials and therefore no **electric current** can be produced.

These materials are called **electrical insulators.**

If you create a circuit which includes an **electrical insulator**, it will be **incomplete** (even if it looks complete!) as no **electrons** will flow through the material.

Insulators and Conductors

- In some materials, some of the **electrons** are **free electrons** and can move.
- If you create a circuit with these materials, the **free electrons** can be made to move in one direction, creating an electric current.
- These materials are called **electrical conductors.**



N.B. If the circuit has not been set up correctly, then the electric current cannot flow, even through a conductor. Ensure that you check that you have connected all parts of the circuit together.