

Electrical Conductors and Insulators

Conductor

A **conductor** of electricity is a material that will allow electricity to flow through it. Metals are good **conductors** of electricity.



Insulator

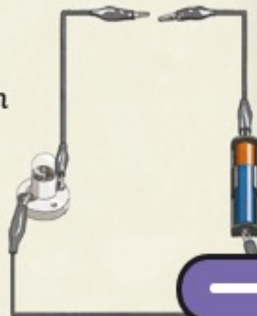
Materials that are electrical **insulators** do not allow electricity to flow through them. Wood, plastic and glass are good **insulators**.



To test if a material is an electrical **conductor** or **insulator**, it could be attached between the empty crocodile clips in the circuit shown.

If the bulb lights up, then electricity has been able to flow through the circuit and the material can be classed as a **conductor** of electricity.

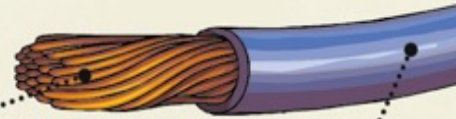
However, if the bulb fails to light up when the material has been correctly attached, then the item would be classed as an electrical **insulator**.



Inside a Wire

Knowing about electrical **conductors** and **insulators** helps us to understand why electrical wires are made of different parts. The different materials have been chosen to conduct electricity, yet also to keep us safe.

The inside of the wire is made from copper. This is a type of metal and is a good **conductor**.



The copper metal is covered with plastic. Plastic is an electrical **insulator** and stops us from getting an electrical shock from the copper wires that have electricity flowing through them.

The same idea works for the plug; the pins that go into the wall are metal to allow electricity to be **conducted** but the plastic casing is an **insulator** which helps to keep us safe.

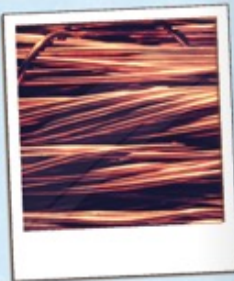




Fascinating Conductors

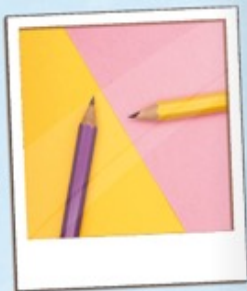
Copper

Copper is a very commonly used **conductor**, especially for electrical wiring. It is the second-best metal **conductor** after silver (which is too expensive to be widely used). Copper is more affordable and can also be easily formed into wires which can bend - if you think about how we use wires in appliances, that's exactly what they need to do.



Graphite

Conductors are usually metals. However, graphite is an example of a non-metal that can **conduct** electricity. It is a form of something called carbon. It's also used in pencils because of the marks that it leaves.



Water

We know electricity and water really don't mix! Water acts as a **conductor** of electricity (it's actually due to the substances **dissolved** in it) so it's important to keep it away from electrical items.



Gold

Gold (a metal) is a good **conductor** of electricity. Although very expensive, it is used in small amounts in some electric circuits. One of the reasons it is a good choice is because it doesn't easily **tarnish**. When a metal **tarnishes**, it can actually act as an **insulator** instead!



I'm a scientist working with semiconductors. These are essential in many of the electronic devices that we rely on every day, such as mobile phones. Semiconductors are a type of material that can be described as being in between an **insulator** and **conductor**. For example, they may act as an **insulator** or a **conductor** depending on the temperature. Silicon is a common example of a material that is a semiconductor.

