



# What are conductors and insulators?

## How to use the worksheet



Ask the children to make a circuit following the diagram on the worksheet.



Ask them to predict whether the bulb will light. If they predict it won't light, ask why not, and what they need to do to make it light. They might join the two crocodile clips. Ask them what would happen if they clip one of the pieces of test material in the gap. They can then test their prediction. Ask them if electricity passed through the material.



Tell them that materials that let electricity pass through them are called conductors and materials that do not are called insulators.



They should continue in the same way, predicting and then testing each material and noting whether the bulb lit and whether the material was therefore a conductor or insulator. Ask what they notice about all the conductors (they are all metals).



Ask the children what they notice about materials that conduct electricity. They could suggest ways in which insulators are useful for safety.



### National Curriculum

This activity supports work in:

## SCIENCE

Sc4 Physical processes, Electricity:

1a) To construct circuits, incorporating a battery or power supply to make electrical devices work.

Also supports work in:

## DESIGN & TECHNOLOGY

Knowledge & understanding of materials and components:

4d) How electrical circuits, including those with simple switches, can be used to achieve results that work.

## Key electricity facts

**1** A simplified explanation, suitable for children at this level, is that an electric circuit needs a complete metal path. A conductor (made of metal) allows electricity to pass through it. An insulator does not.

**2** There are different levels of conductivity. For example, graphite from pencils is a conductor but offers more resistance than metals such as copper. You could let the children investigate graphite as a conductor, using pencils sliced lengthways and varying the length of the graphite in the gap – the longer the piece of graphite, the higher the resistance (in effect, it can be used as a variable resistor for dimming a bulb).



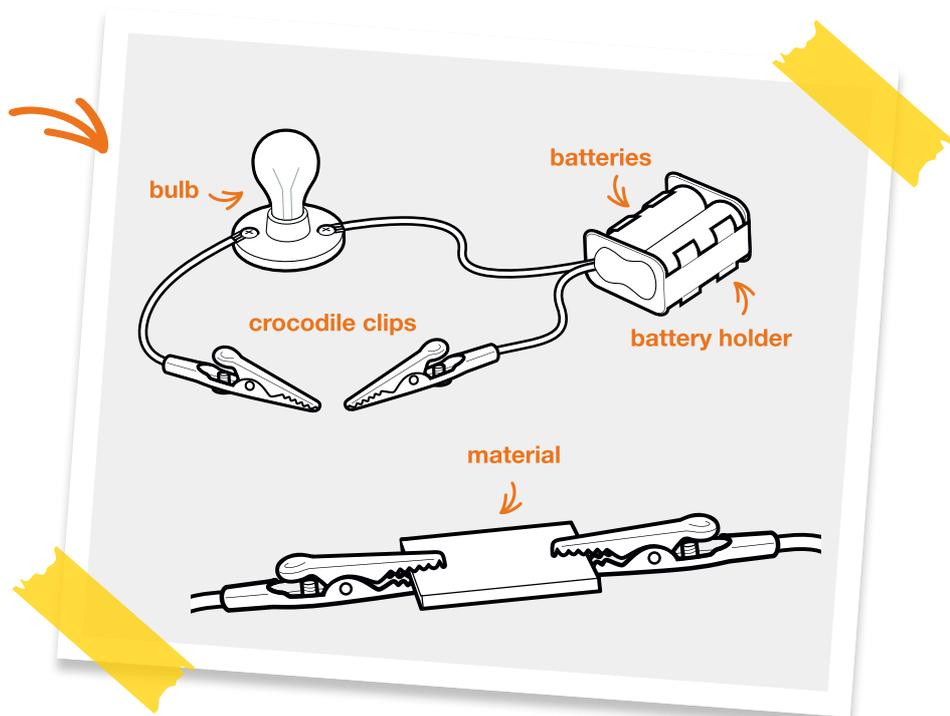


# Conductor or insulator? Put it to the test

 **Materials that let electricity pass through are called conductors. Materials that do not let electricity pass through are called insulators.**

### Get started:

1. Create a circuit with a gap, like this one
2. Clip different materials in the circuit's gap
3. If the material conducts electricity, the bulb will light
4. Record your results on the chart below



### Some materials to test:

- |   |                                  |
|---|----------------------------------|
| <input type="checkbox"/> Aluminium (kitchen foil) | <input type="checkbox"/> Paper   |
| <input type="checkbox"/> Brass                    | <input type="checkbox"/> Plastic |
| <input type="checkbox"/> Charcoal                 | <input type="checkbox"/> Rubber  |
| <input type="checkbox"/> Copper                   | <input type="checkbox"/> Steel   |
| <input type="checkbox"/> Lead                     | <input type="checkbox"/> String  |
| <input type="checkbox"/> Leather                  | <input type="checkbox"/> Wood    |

Material	Did the bulb light?	Conductor or insulator?



- Write a sentence about how conductors are useful in some electrical equipment you use
- Write a sentence about how insulators keep electrical equipment safe