

Summer 2 Week 9 Science Lesson 3

Can I identify electrical conductors and insulators?

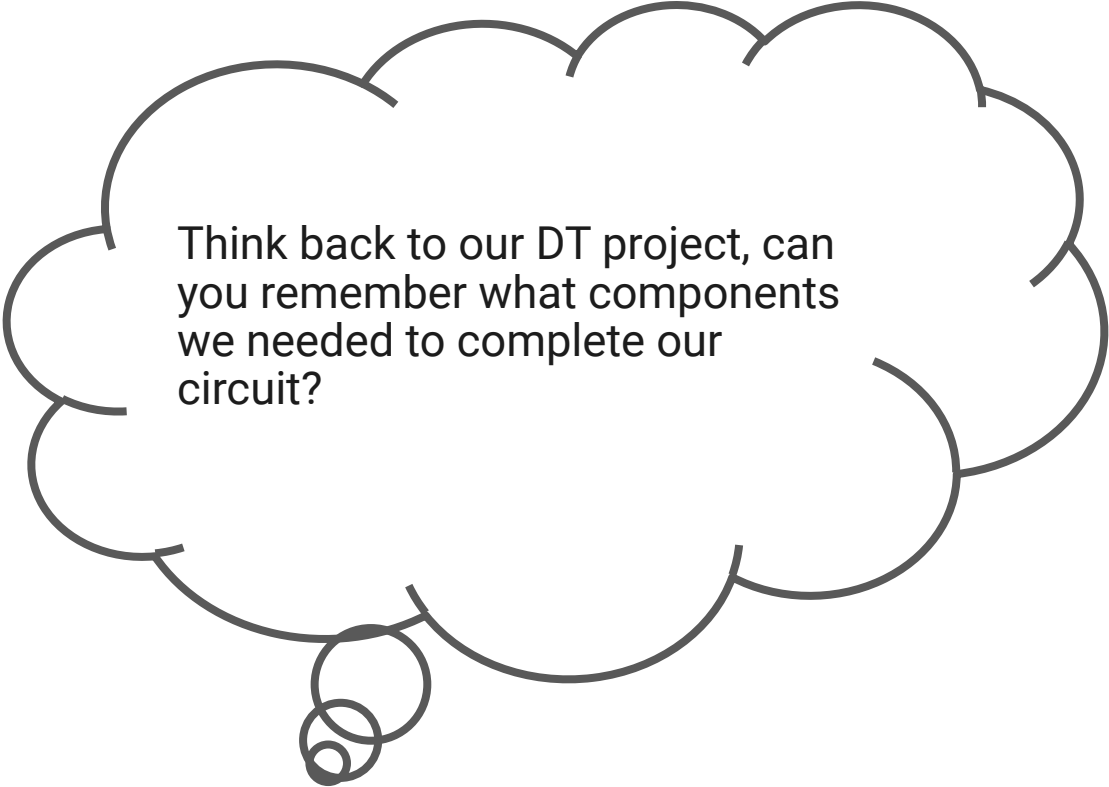
Fast Five - Answers are on the next slide.

- 1) Why might appliances be powered by the mains power supply rather than batteries?
- 2) When might electrical fires happen?
- 3) What two power sources power electrical appliances?
- 4) True or false: Washing machines are powered by the mains power supply.
- 5) True or false: It is safe to have water around electrical sources.

Fast Five - Answers

- 1) Why might appliances be powered by the mains power supply rather than batteries? **Because they require a larger power supply than batteries can provide or because they need to be powered all of the time (such as a fridge).**
- 2) When might electrical fires happen? **If electrical wires are damaged or broken, a fire could start.**
- 3) What two power sources power electrical appliances? **Mains power supply and batteries.**
- 4) True or false: Washing machines are powered by the mains power supply. **True! Washing machines require a lot of power to operate, so we connect them to the mains power supply.**
- 5) True or false: It is safe to have water around electrical sources. **FALSE! It is never safe to have water around electrical sources - electricity and water would result in an electric shock!**

Parts of an electrical circuit



Think back to our DT project, can you remember what components we needed to complete our circuit?

Parts of an electrical circuit

Can you identify these parts of an electrical circuit?



Parts of an electrical circuit

Can you identify these parts of an electrical circuit?



Battery holder



Bulb holder

Battery



Bulb



Wires



Crocodile clip

Parts of an electrical circuit

All of the parts of an electrical circuit are made of different types of material:

Some materials conduct electricity which means it allows electricity to flow through it. These are called electrical **conductors**.

Some materials do not conduct electricity. They do not allow electricity to flow through the material. These are called **insulators**.

Electrical insulators

If electricity cannot flow through the materials, no **electrical current** can be produced.

These materials are called **electrical insulators**.
Examples of electrical insulators are plastic, wood, glass and rubber.

If you create a circuit which includes an **electrical insulator**, it will be **incomplete**.

Electrical conductors

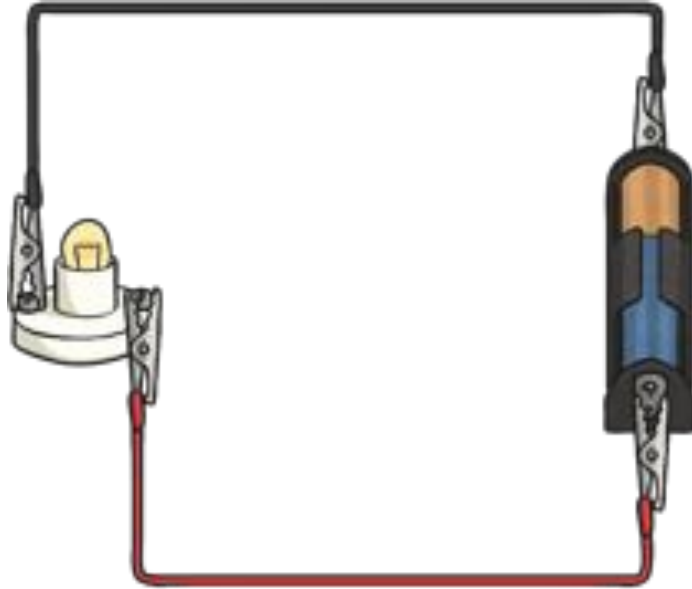
If electricity can flow through the materials, an **electrical current** can be produced.

These materials are called **electrical conductors**. Many **metals**, such as copper, iron and steel, are good **electrical conductors**.

If you create a circuit which connects electrical conductors, it will be **complete**.

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.

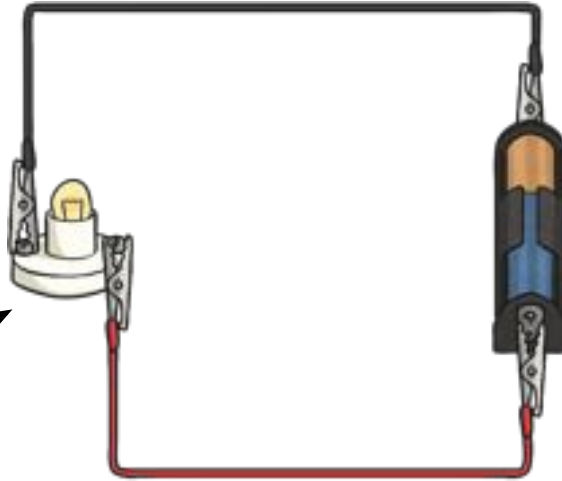
What materials can you identify on this complete circuit?



What materials can you identify on this complete circuit?

Crocodile clips - metal. Metal is a conductor so does conduct electricity. To complete the electrical current, the metal crocodile clips connect to the metal screws of the bulb holder.

Battery - Metal conducts electricity.



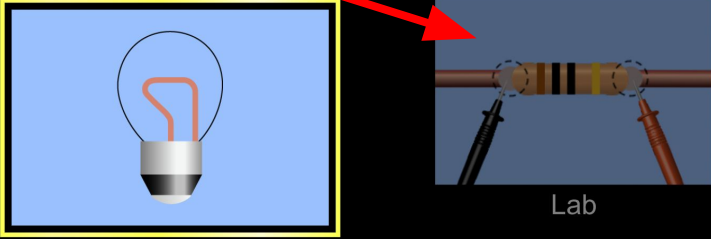
Bulb holder - plastic. Plastic is an insulator so does not conduct electricity.

Wires - the outside coating of wires is made out of plastic which is an insulator and does not conduct electricity. Inside the wire is metal which completes the circuit. The plastic coating of the wire protects us from the electrical current when we touch it.

Try creating your own circuit!

Use the link below to try creating your own circuit. Once you have clicked on the link press lab.

Circuit Construction Kit: DC



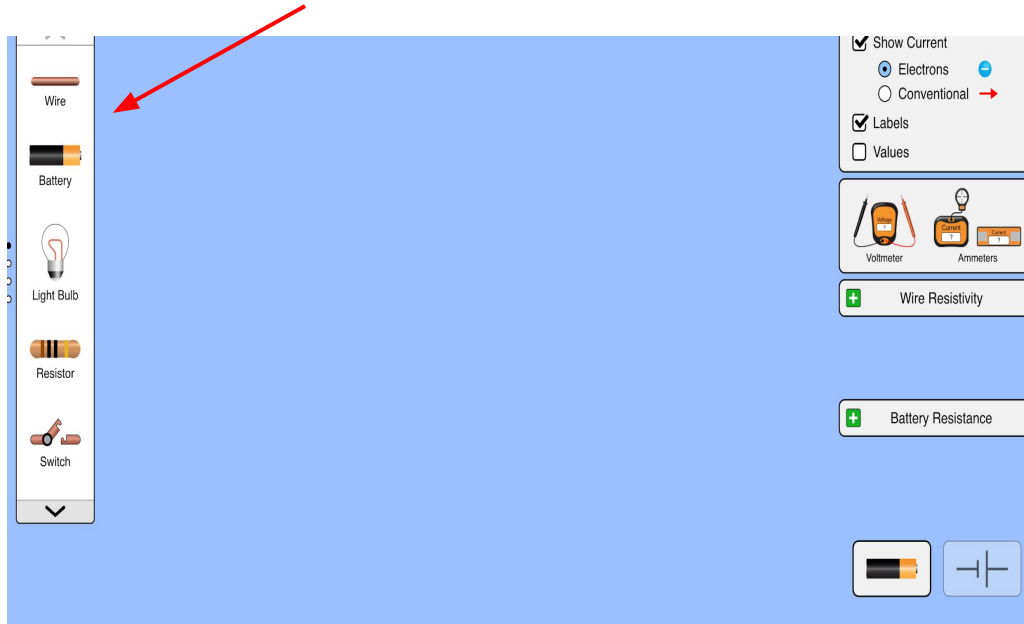
Intro

Lab

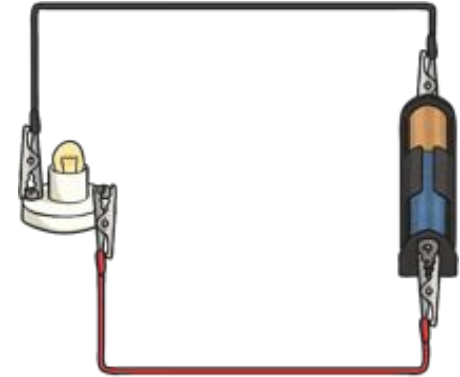
https://phet.colorado.edu/sims/html/circuit-construction-kit-dc/latest/circuit-construction-kit-dc_en.html

Try creating your own circuit!

Once you have clicked 'lab', you will have the screen below. Using the toolbar along the left hand side, create your circuit.



Remember, your complete circuit should look like this one:



Try testing different materials to see if they are conductors or insulators!

Test the following materials in your circuit to see if they conduct electricity or not. If they are conductors, the light bulb will glow! If they are insulators, the circuit will not be complete so the light bulb will not glow!



Paper Clip



Pencil



Coin



Eraser



Dollar Bill

Activity: Test these different materials to see if they are conductors or insulators.

Red - Test the following materials and write a sentence explaining if the material is a conductor or an insulator.

Yellow - Write a paragraph explaining which materials you tested were conductors and insulators, and explain how you know this.

Green - Write a paragraph explaining what a conductor and an insulator is with example materials for both. Continue to explain what you learnt when testing the materials in this lesson.



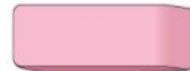
Paper Clip



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Dollar Bill