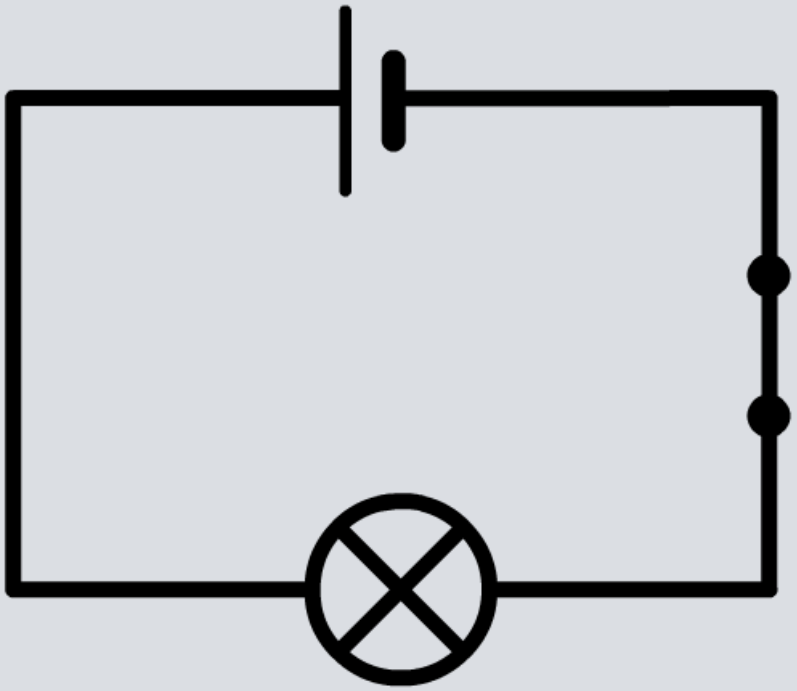
Circuit Diagrams



What is an electric circuit?

An **electric circuit** is a path for electric charge to flow along.

Like all electrical devices, this portable MP3 player contains electric circuits to enable it to play music.

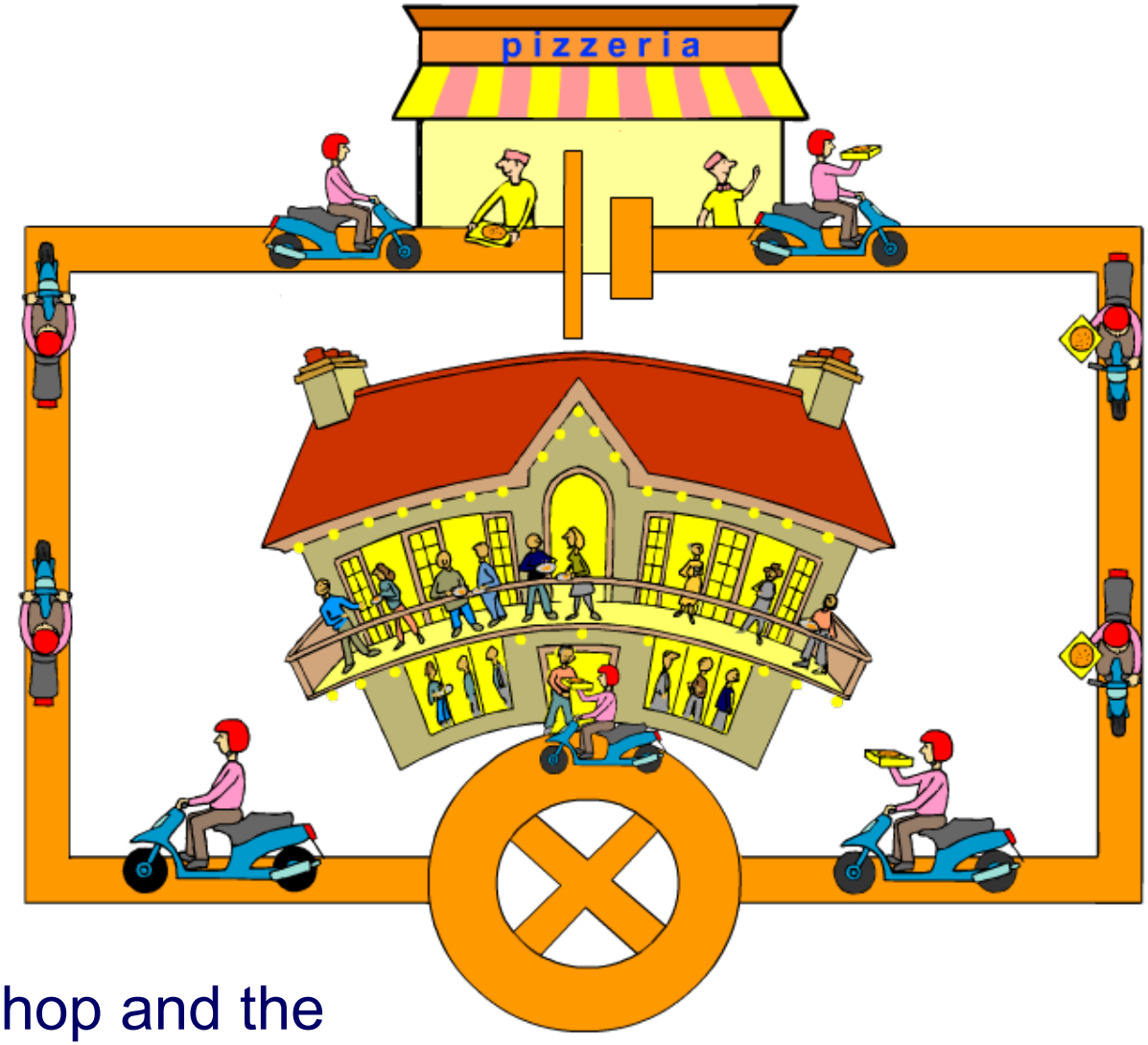
What is needed for an electric circuit to work?

- source of energy
- a component
- a complete loop
- no short circuits

How can we model electric circuits?

A model can help us to understand how current works in an electric circuit.

In this model, the moped riders represent the flow of charge, and the pizzas represent the electrical energy carried around the circuit.



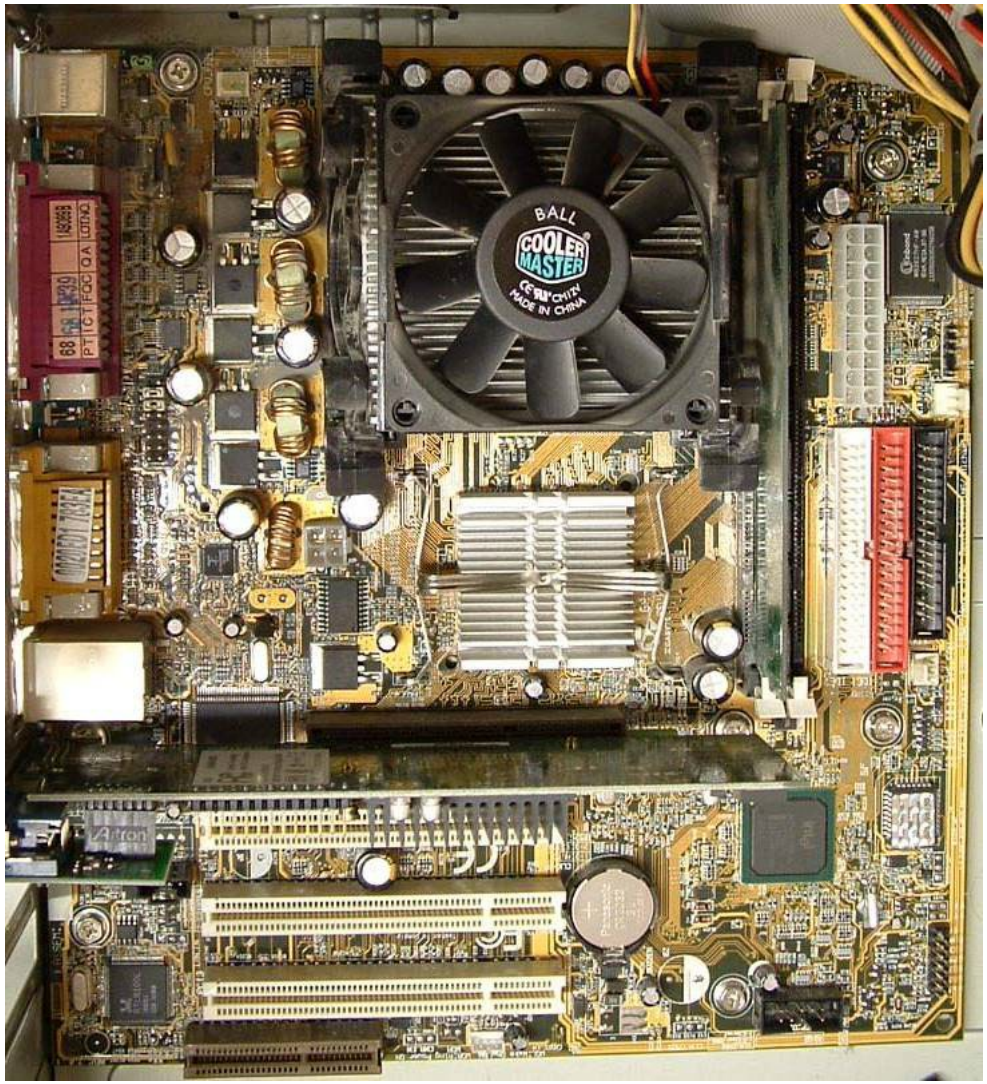
What do the pizza shop and the house of party-goers represent?

Why use circuit diagrams?

Electronic circuits are usually very complex.

It is important to have a clear way of showing how different components are connected together.

A standard set of symbols is used to represent different devices and to draw schematic diagrams of circuits, which show how the components are connected.



How are wires shown in circuit diagrams?

Wires or leads are used to carry the current around a circuit between the components.

This copper lead is made from thin wires twisted together to make the lead more flexible.

Copper is used as it is a very good conductor of electricity.

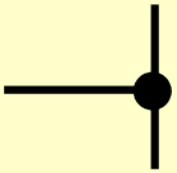
The lead is covered with a plastic sleeve, which prevents a short circuit if the lead touches other bare wires.

Circuit symbol for a wire ——

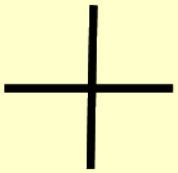
Are the wires connected?

Circuit diagrams can be complex, and it is important to be able to distinguish between wires that are joined together and those that cross without being joined.

Circuit symbol for two wires that are connected



Circuit symbol for two wires that cross (i.e. not connected)



What is the source of energy in a circuit?

Household electricity is often used to power electric circuits.

When household electricity is unsuitable, cells or batteries can be used as the source of electrical energy.

This remote control uses batteries.

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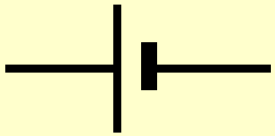
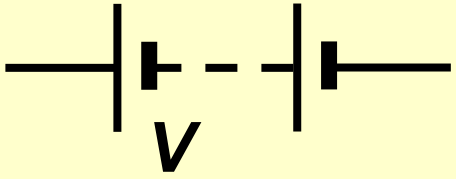
Circuit symbol for a cell



Circuit symbol for a battery



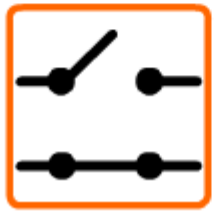
Circuit components

What components can be used in a circuit?

To make it easier to construct electric circuits, symbols are used to represent the electrical components.

What components do the symbols below stand for?

Click on each symbol to find out more about that component.

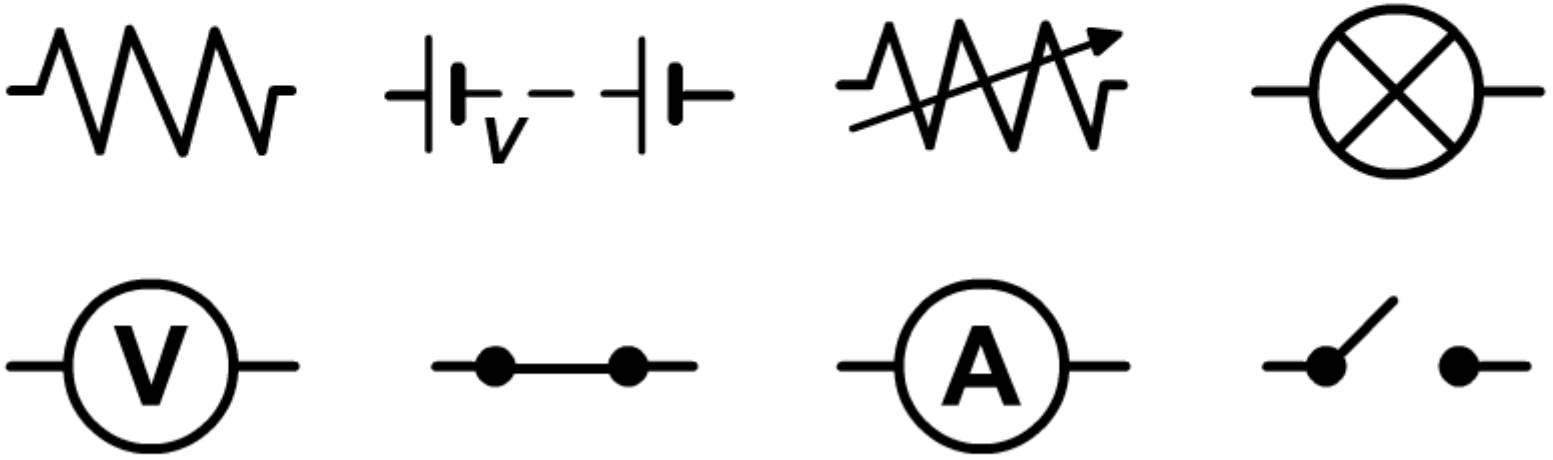




Circuit symbols

Which symbol represents each component?

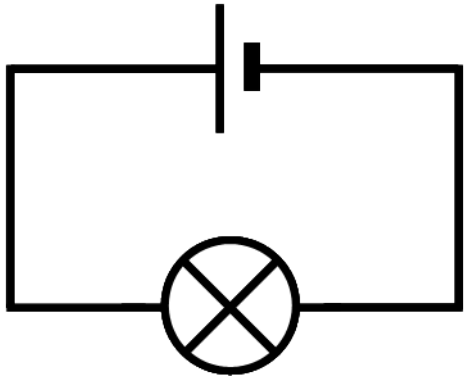
battery



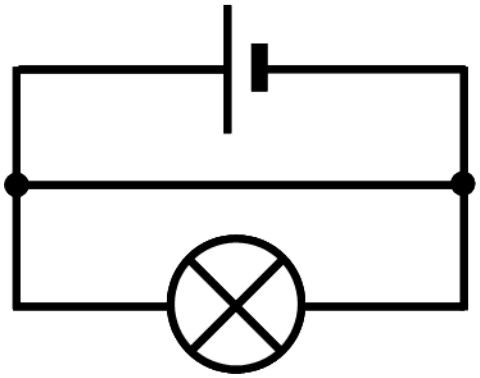
What is a short circuit?

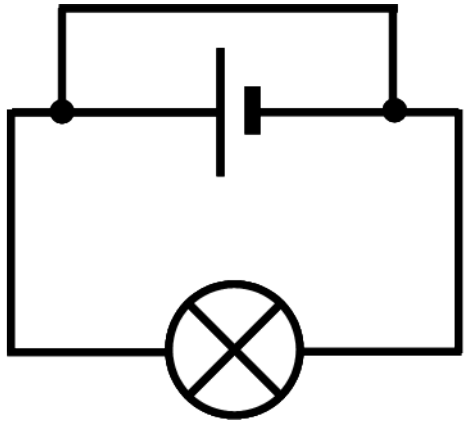
Current will always pass along the path of least resistance. The resistance of the wires in a circuit is low compared to the resistance of components, such as bulbs.

If current can flow along a path without passing through the components, this part of the circuit is called a **short circuit**.



The current can only pass through the bulb.





These circuits both contain a short circuit, so the bulb will not be lit up.

Which circuit diagram?

Which is the correct circuit diagram?