

Circuits 2—Light-up Greetings Cards



Key knowledge

Circuits must be complete in order for current to flow. They must be made from conductors.

Insulators are used to separate conductors. E.g. an air gap in an open switch or coating on wires.

Metals are conductors. Silver, copper and gold are the best conductors.

Most non-metals are insulators. Air and polymers are good insulators.

Resources are valuable and take energy to produce. Components should be recycled where possible to reduce the energy use.

LEDs use less energy than traditional lamps.

Using lower energy components can reduce carbon emissions and can save money on energy bills.

Too much current will damage LEDs, so the circuit may need more resistance.

LEDs and coin cells must be the correct direction in the circuit.

The short connector of the LED is negative. It also has a flat edge. The positive is marked on the coin cell.

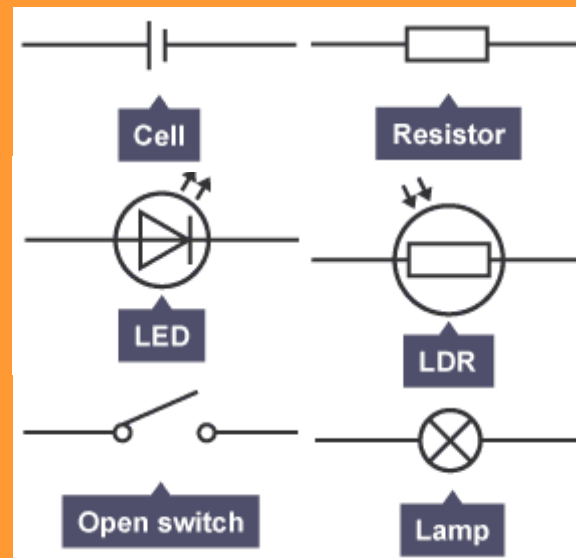
The longer a wire is, the more resistance it has. This can be used to control the amount of current flowing. E.g. in a dimmer switch.

Key Skills

Circuit diagrams are drawn using a pencil and ruler—using correct circuit symbols.

Circuit diagrams must have no gaps between wires and components. Circuits must be a complete loop in order to work.

Circuits must be designed to fulfil the design brief as simply as possible.



Key vocabulary

Insulator—does not allow electrical current to flow

Conductor—does allow electrical current to flow

Current—flow of electrical charge, measured in amperes or amps (A)

Resistance—opposition to the flow of current, measured in ohms (Ω)

Complete circuit—when there are no gaps in the circuit, the switch is closed

Wire—used to connect components in a circuit

Cell—uses chemicals to generate electricity

Battery—2 or more cells in series

Switch—a component that can complete or break a circuit (to control the flow of current)

Diode—a component that allows current to flow in one direction—very high resistance in opposite direction

LED—Light Emitting Diode

Variable Resistor—A component whose resistance can be changed. This can be used to control the flow of current.

Design brief—a brief outline of the problem to be solved

Specification—detailed description of the design and materials needed