

Investigating the current around a circuit

Class experiment

The fact that current is the same all round a series circuit may have been 'discovered' when using ammeters informally. It is so important that this activity may be needed to be reinforce it.

Apparatus and materials

For each student group

Cells, 1.5 V, with holders, 2

Lamps with holders, 2

Ammeter (0-1 amp), DC, preferably moving-coil

Leads, 4 mm, 6

Health & Safety and Technical notes

Modern dry cell construction uses a steel can connected to the positive (raised) contact. The negative connection is the centre of the base with an annular ring of insulator between it and the can. Some cell holders have clips which can bridge the insulator causing a 'short circuit'. This discharges the cell rapidly and can make it explode. The risk is reduced by using 'low power', zinc chloride cells not 'high power', alkaline manganese ones.

[Read our standard health & safety guidance](#)

Procedure

- a** Set up a circuit in which a cell, a lamp and an ammeter are connected in series. Draw a circuit diagram.
- b** Connect the ammeters in different parts of the circuit: between the lamps, between the cells, between the cells and the lamps. Each time note the current at the appropriate point on your circuit diagram.
- c** Draw a conclusion from your observations.

Teaching notes

This result, that the current is the same all round a series circuit, may well be surprising. Even when students have seen it for themselves they find it hard to believe. Many people think that the current is used up as it passes around a circuit.

So what is 'used up'? From an early stage it is helpful to understanding if the idea of the cell being an energy store is discussed. Once the circuit is connected, energy can be transferred by the electrons in the wires to the lamps; the wires are warmed up and energy is carried away from the lamp by the electromagnetic waves (visible and infra red).

This experiment was safety-checked in December 2004

Related guidance

[Working with simple electrical components](#) [2]

[Introducing electric current](#) [3]

[Electric charge and current - a short history](#) [4]

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