

Electric circuits

Printable revision sheet — Galaxscia

LEVEL 1

What is electricity?

An electric circuit is a bit like a road that the electric current follows to make devices work. The current has to leave an energy source, travel through the wires and the components, then come back to its starting point.

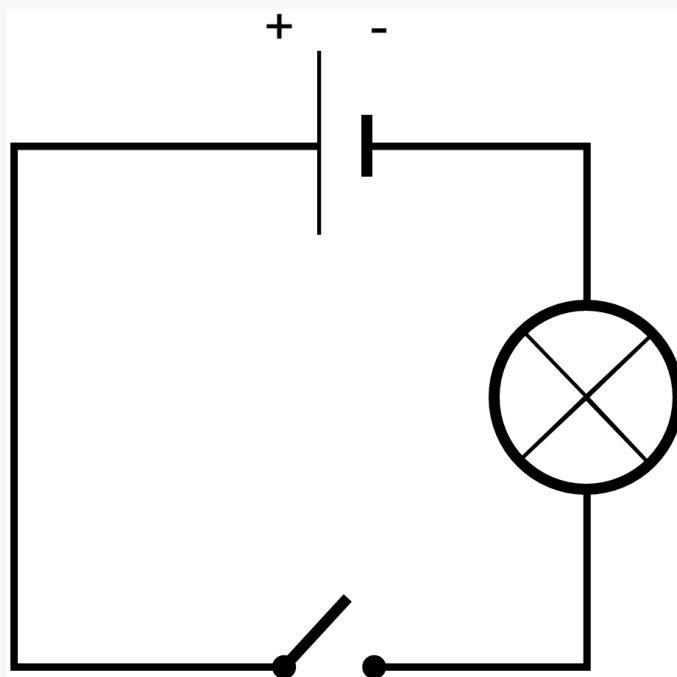
In everyday life we are surrounded by electric circuits: the lighting in your house, your mobile phone, the television, the fridge... All these devices work thanks to circuits that let the current flow.

The 2 rules for a working electric circuit

For the current to flow in a circuit, two essential conditions must be met:

Rule 1: an energy source, such as a battery cell or a generator. This is what supplies the current.

Rule 2: a closed, unbroken path, which lets the current leave the + terminal and return to the – terminal. If there is a break (disconnected wires, an open switch), the current no longer flows.



Two-terminal components: the parts of the circuit

Every electrical device has two terminals: these are two-terminal components.

There are two main families:

Battery	Generator	Lamp	Switch		Diode	Motor	Resistor
			Close	Open			
Generators		Receivers					

Key points — revision questions

- 2 rules for it to work: an energy source + a complete path
- Closed circuit = it works, open circuit = it does not work
- 8 components to know: 2 sources and 6 receivers

LEVEL 2

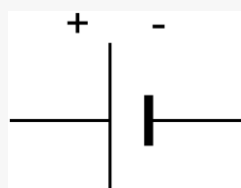
Why use symbols?

So that everyone speaks the same language, scientists created standard symbols. This means an electrician, whatever their country, understands the same diagram.

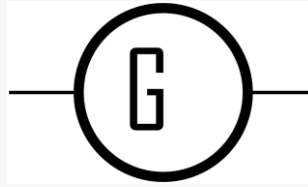
The symbols to know

Here are the main symbols used in an electric circuit:

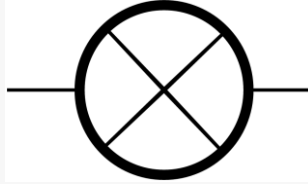
The battery cell



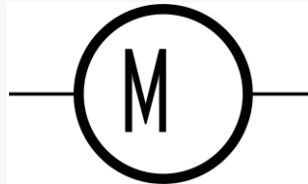
The generator



The lamp



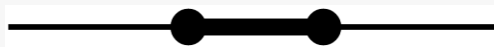
The motor



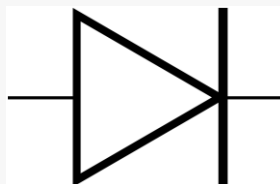
The open switch



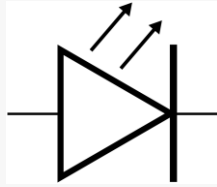
The closed switch



The diode



The LED



The resistor



How do you draw a circuit diagram?

To draw a circuit diagram, always follow these 3 steps:

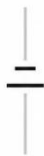
Draw the generator (often on the left).

Draw the wires: they form a loop of straight lines (often a rectangle).

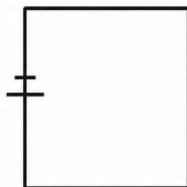
Add the components along the sides, never in the corners.

Building a standard circuit diagram

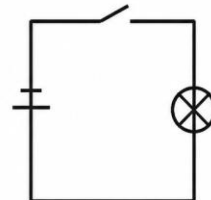
1. Place the power source



2. Draw the loop



3. Add the components



Straight wires • components on the segments • not in the corners

Key points — revision questions

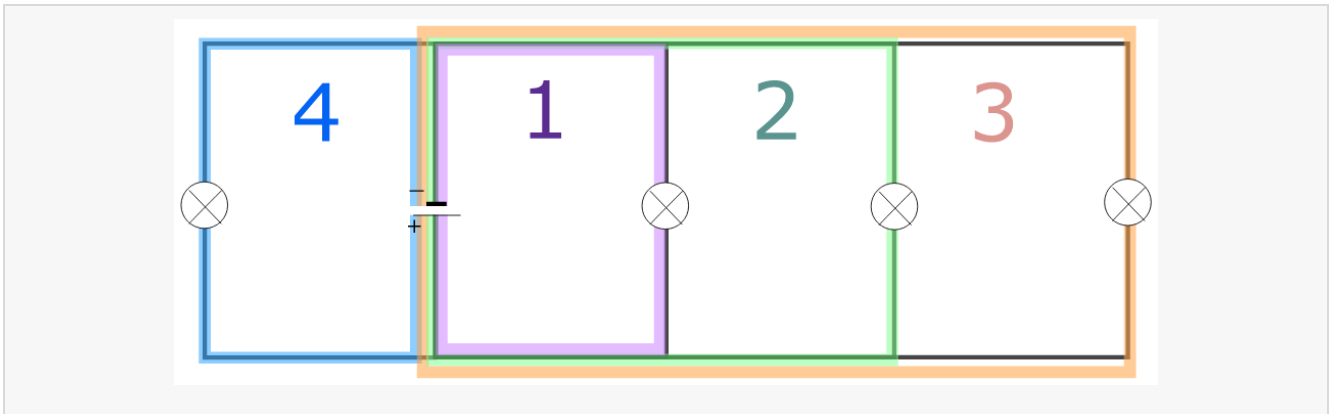
- What are the symbols for all the components?
- How do you draw a standard circuit diagram?
- What must you never do on a standard circuit diagram?

LEVEL 3

Current loops

A loop is a path from the + terminal to the – terminal that the electric current could follow. It is therefore the route of the current, taking the circuit to be closed (even if it is open), travelling from the generator, through the wires and the components, and back to the generator.

If the circuit contains several loops, it means there are several paths, and the current can take several different paths at the same time.

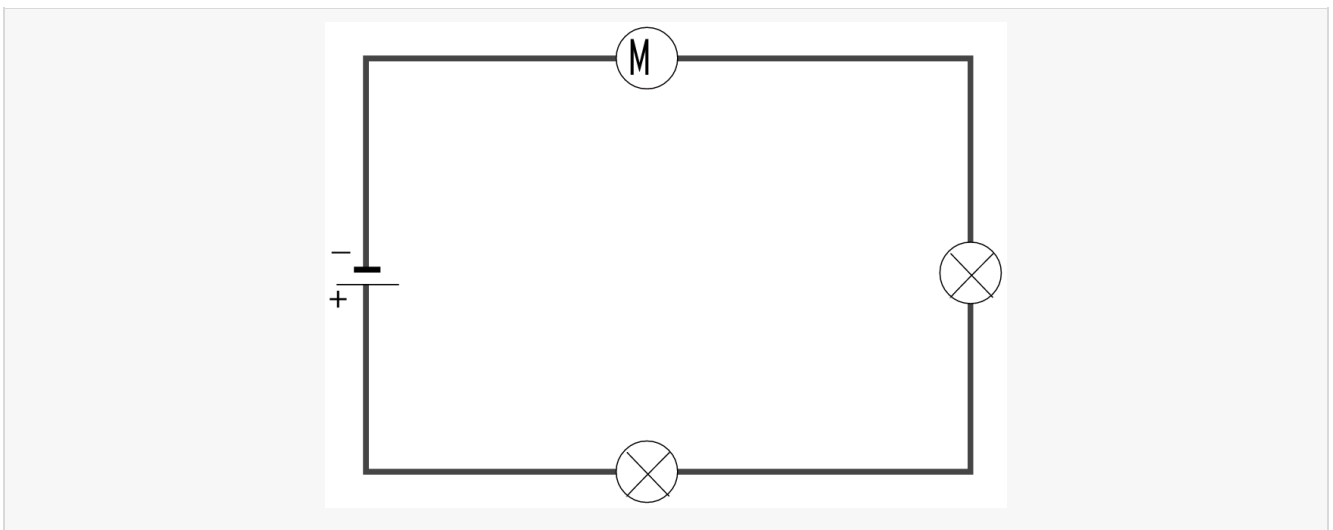


Connected in series or in parallel?

In series

In a series connection, all the components are placed one after another, on a single loop. The current goes through each component in turn. If a component is removed or blows, the whole loop goes out.

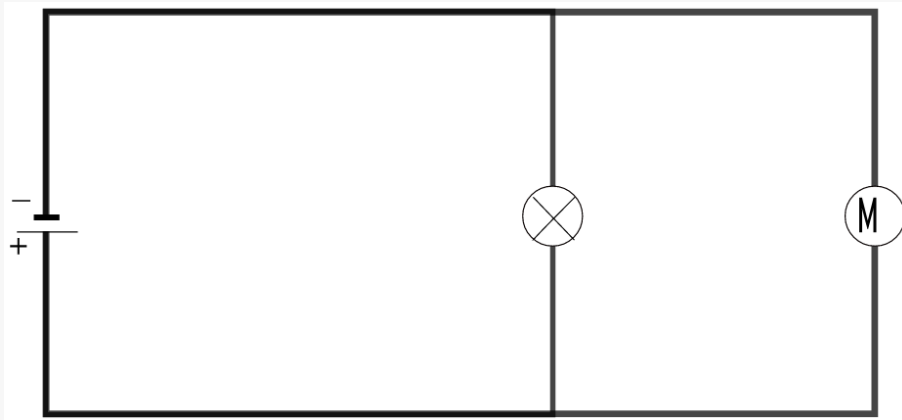
Example: an old string of Christmas lights. If one bulb blows, everything goes out.



In parallel

In a parallel connection, several independent paths exist. Each component can be on a different loop. If one component stops working, the others carry on working.

Example: the lighting in a house. If the living-room bulb blows, the ones in the other rooms still work.



Key points — revision questions

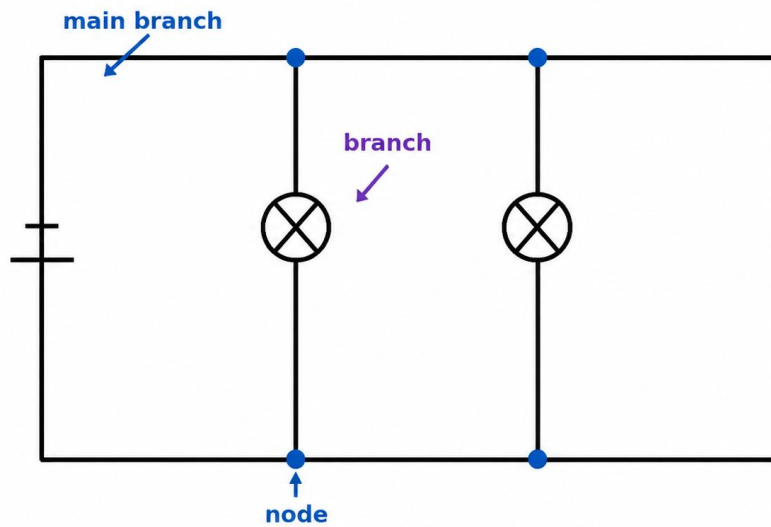
- A loop = a complete path for the current
- Series = the same loop → if one stops, everything stops
- Parallel = different loops → each one works independently

LEVEL 4

Junctions and branches

In a circuit, a junction is a point where three or more wires meet. It is like a crossroads: the current can split there or join up again.

Nodes and branches in a parallel circuit



Key points — revision questions

- Junction = a meeting point of 3 or more wires
- Branch = the section between two junctions containing at least one component
- Main branch = the one containing the generator
- Side branches = all the others