

Electricity

How can circuits vary?



Lesson 2

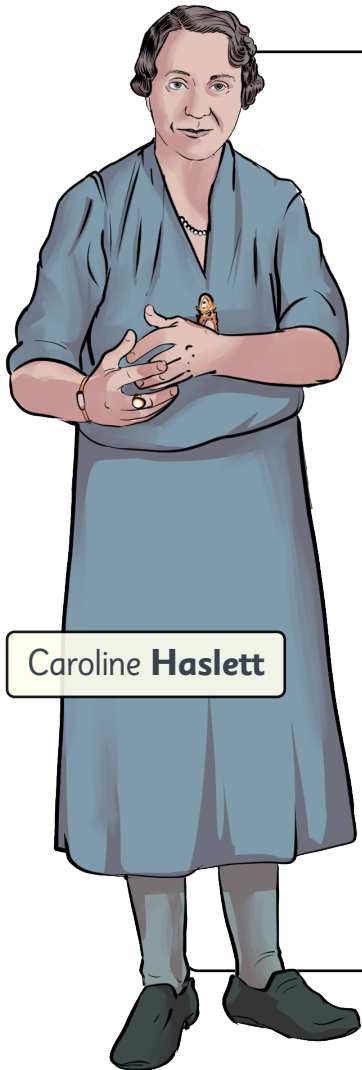
How do we draw circuits using scientific symbols?



www.grammarsaurus.co.uk



Scientific enquiry types and skills



Caroline Haslett

Scientific enquiry types



Testing



Researching



Observing



Pattern seeking



Identifying & classifying



Problem solving ✓

Working scientifically skills



Asking questions



Making predictions



Setting up tests



Observing & measuring



Recording data ✓



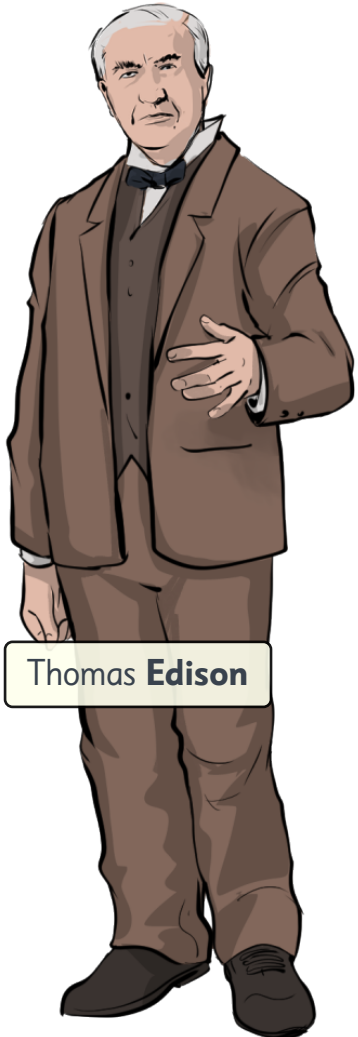
Interpreting & communicating results



Evaluating



How can circuits vary?



Thomas **Edison**

Optional: What is electricity and how do we stay safe?

Lesson 1: How can I get my circuit to work?

Lesson 2: How do we draw circuits using scientific symbols?

Lesson 3: How does changing the voltage affect the circuit?

Lesson 4: What happens when we add components to a circuit?

Lesson 5: Can we design and test our own circuit system?



Nikola **Tesla**

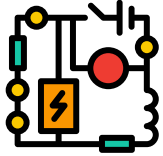


Key vocabulary for this lesson



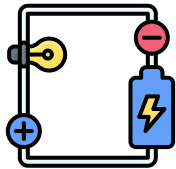
component

– part of an electrical circuit that helps it function e.g. light bulb



circuit

– an electrical **circuit** is a pathway (normally wires) through which electricity flows



series circuit

– a circuit where the components are connected in a single path



terminal

– the ends of a cell or battery have a positive + and a negative - terminal

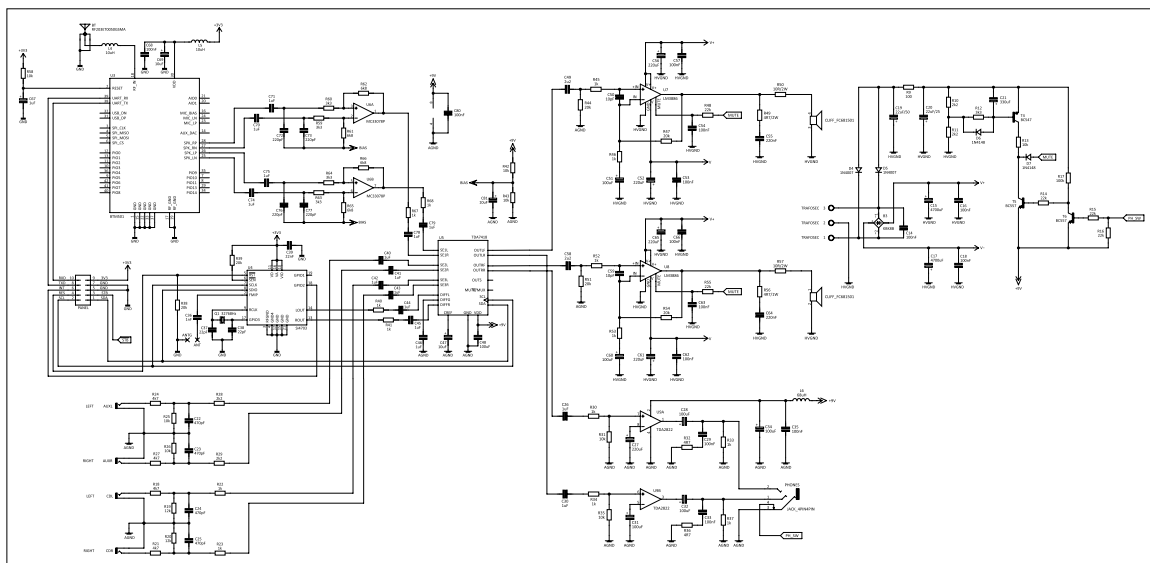




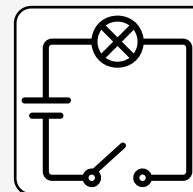
Problem solving



Hello, it's Millie again. Being an electrician means I get to work with wires and **circuits** to ensure that things like lights and machines function properly. I use special drawings called **circuit diagrams** to figure out how **electricity flows** and where **problems** might be. If something isn't working, I look at the diagram, think carefully, and sometimes draw a new one to fix it. I also make sure to keep good records by updating the diagrams with any changes I make, so others know what I did. It's like solving puzzles with pictures, and I really enjoy making things work safely and correctly.



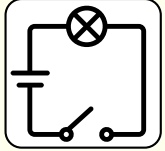
New word alert!



circuit diagram - a simple drawing using special symbols that shows how parts of an electrical circuit are connected

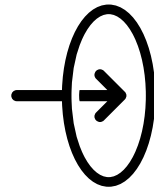


Word detective



circuit diagram - a simple drawing using special symbols that shows how parts of an electrical circuit are connected

The word **diagram** comes from Greek, and it means
'something written or drawn across'.



dia

"through or
between"



gram

"something
recorded or
written"

= diagram

Together, these word parts build a word that means 'something drawn'. This makes sense, because a circuit diagram is a simple drawing that sets out or shows how the parts in the circuit link up.



Build a circuit

Use a cell, three wires, a switch and a bulb.
Make a **circuit** that lights up a bulb when you close the switch.
Then, draw a diagram of your **circuit on** a piece of paper.

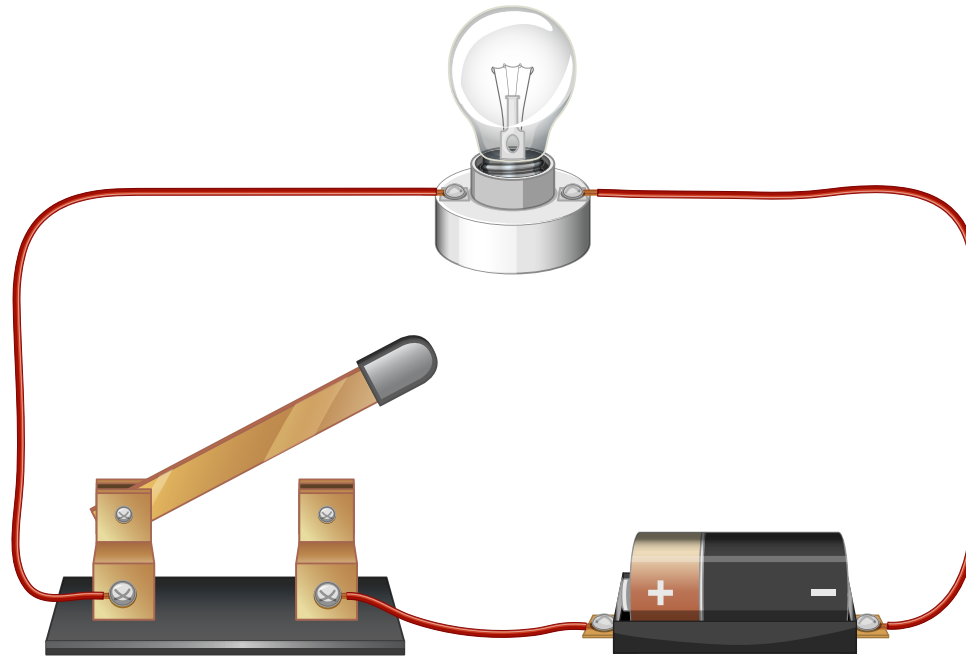


Build a circuit

answers



Did you find it challenging to draw the switch and the bulb?
Let's find out if there is an easier way to represent the **circuit**
in a diagram.



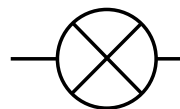
Symbols



When we draw **electrical circuits**, each **component** has a unique **scientific symbol**. The symbols are all displayed on your component symbol worksheet that you can refer back to throughout the lesson.



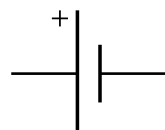
wire



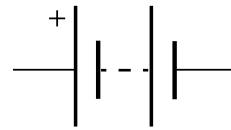
bulb



closed switch



cell



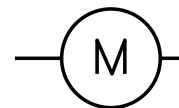
battery



open switch



buzzer



motor

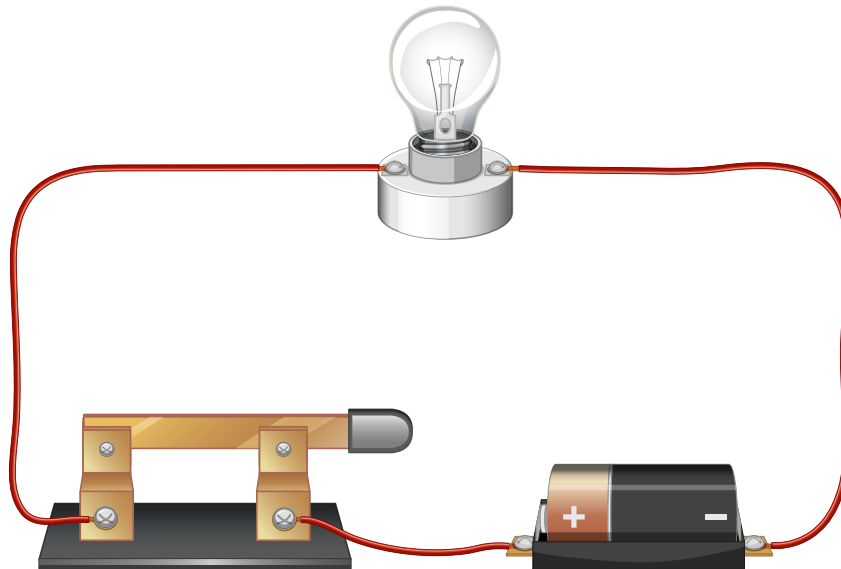
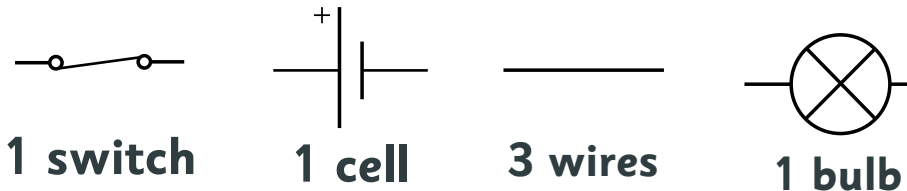
Did you know?

A cell is a single unit that provides electricity.
A battery is made up of two or more cells.



Circuit diagrams

Draw a **circuit diagram** for this simple **series circuit** on another piece of paper using the **component symbols** on your **component symbols worksheet**.



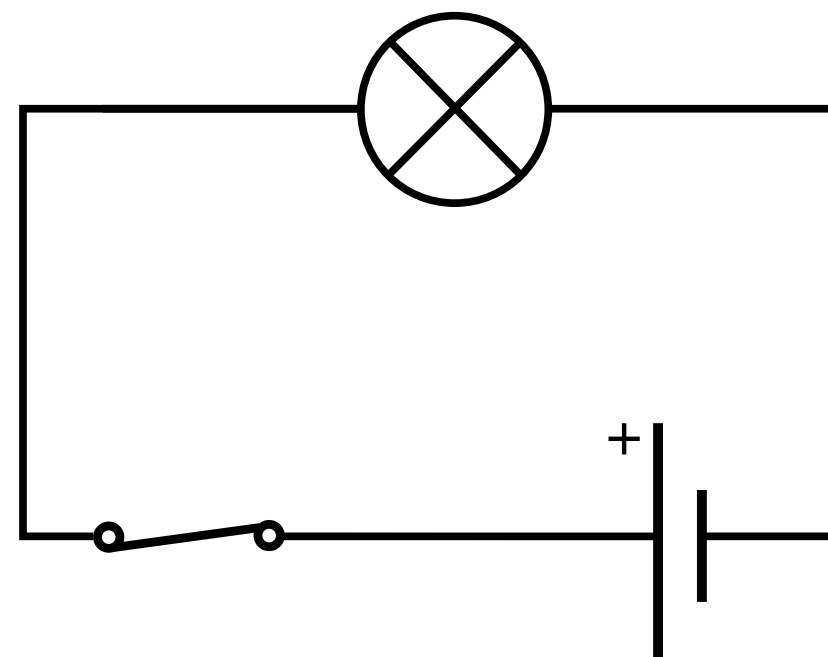
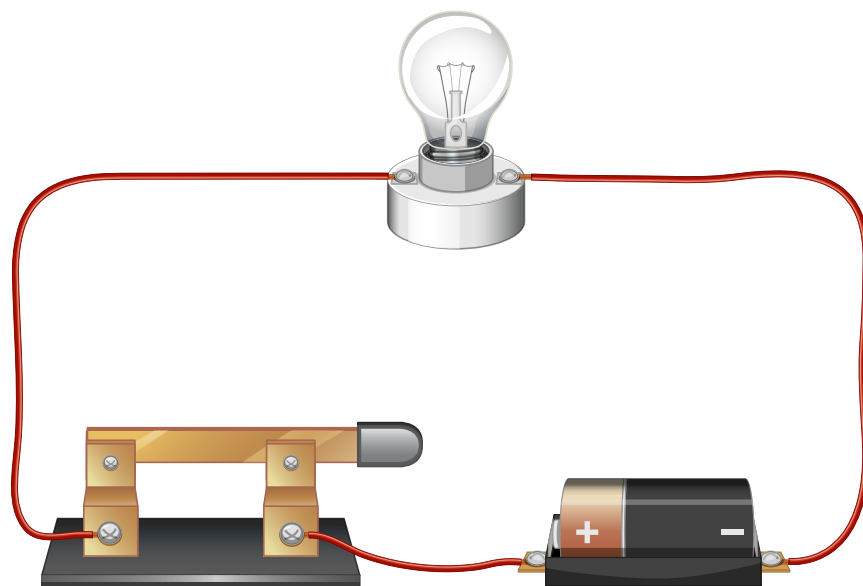
Remember!

Use **straight lines** to draw a **circuit diagram**. The wires **connect** the **components**. There must be **no gaps** in the circuit.



Circuit diagrams

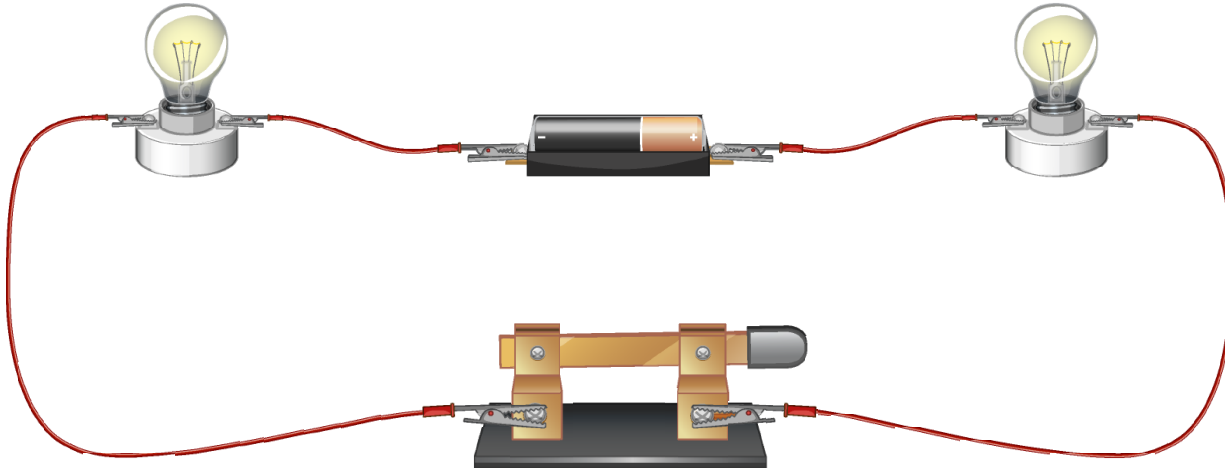
answers



Circuit diagrams

Now look at the circuit below.

First, decide which **component** symbols you need to use, then draw your **circuit** on a piece of paper using the **circuit symbols on your component symbols worksheet**. Remember to use straight lines for the wires!



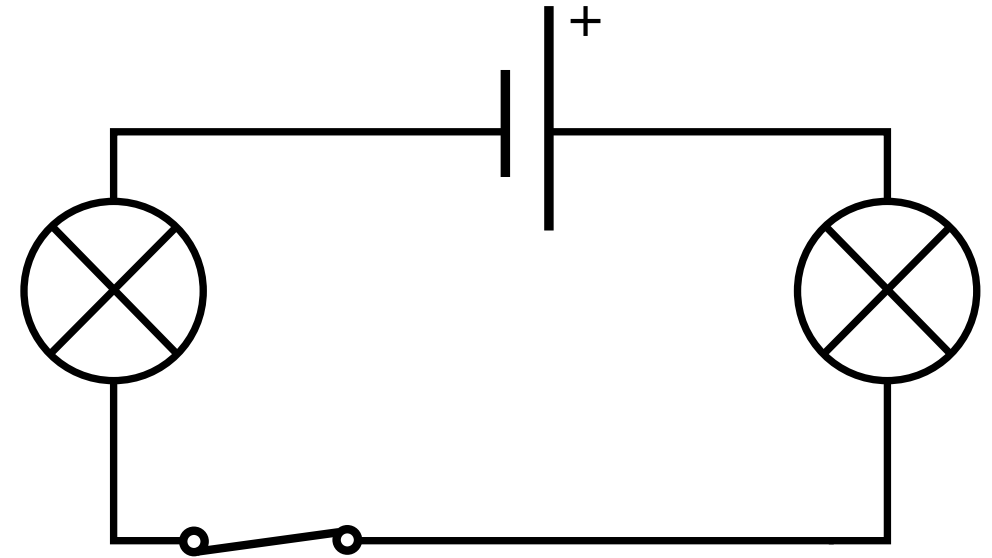
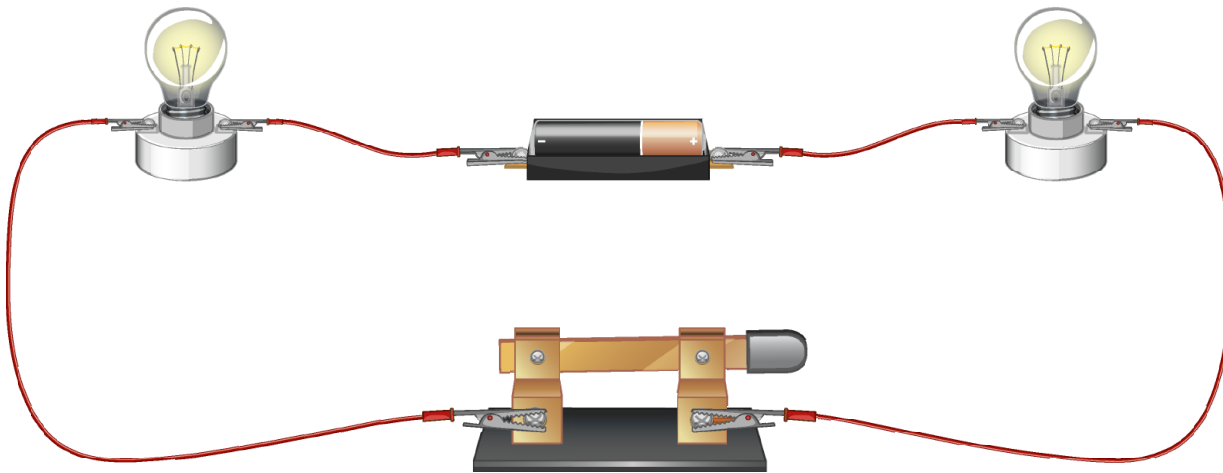
Hint!



Look very carefully at the **cell**. Do you notice where the **positive (+) terminal** is?



Circuit diagrams

answers

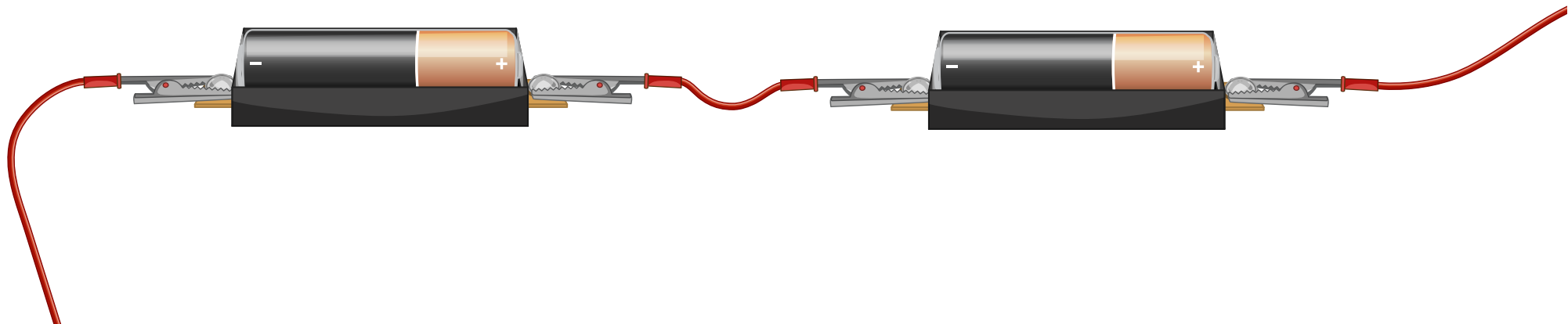


The position of the positive terminal  on the cell is very important when using certain other components .

Cells and batteries



How do you think we represent **two cells** in a circuit diagram?
Discuss this question with your learning partner. Be ready to share your feedback with the class before the answers are revealed.



Cells and batteries

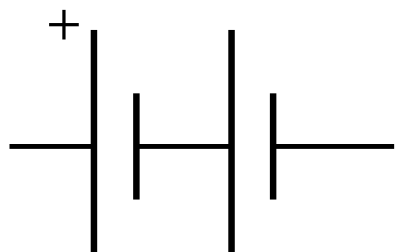
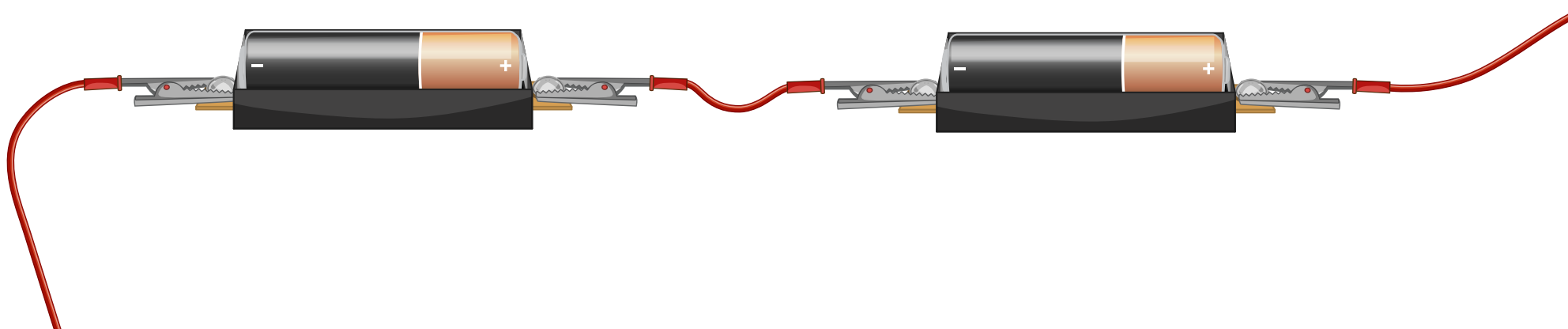
answers



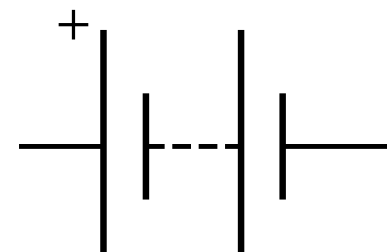
Problem
solving



Recording
data



We can join **two cell** symbols together.

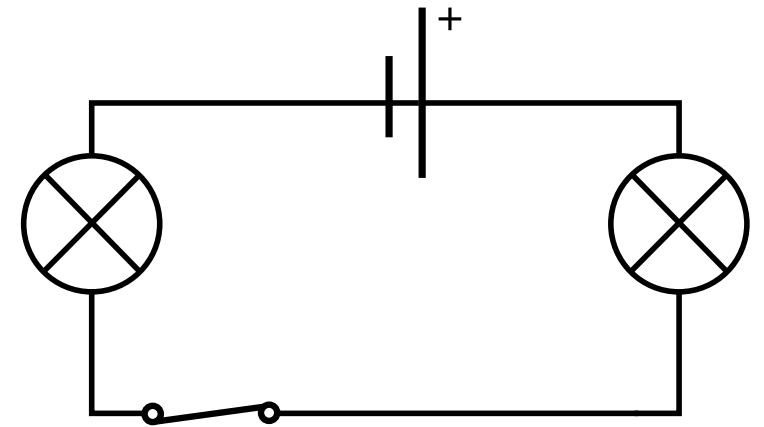
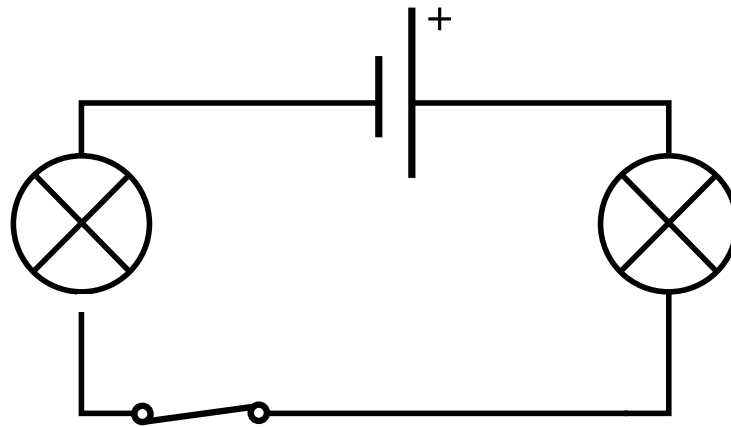
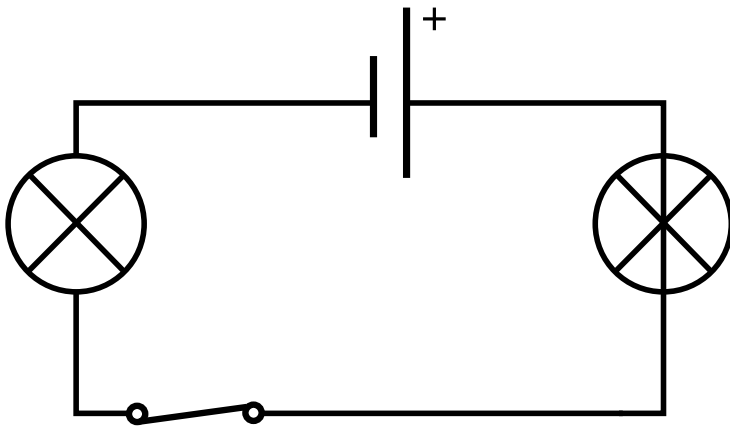


Or we use the **battery symbol**. A battery is the term we use for two or more cells joined together.



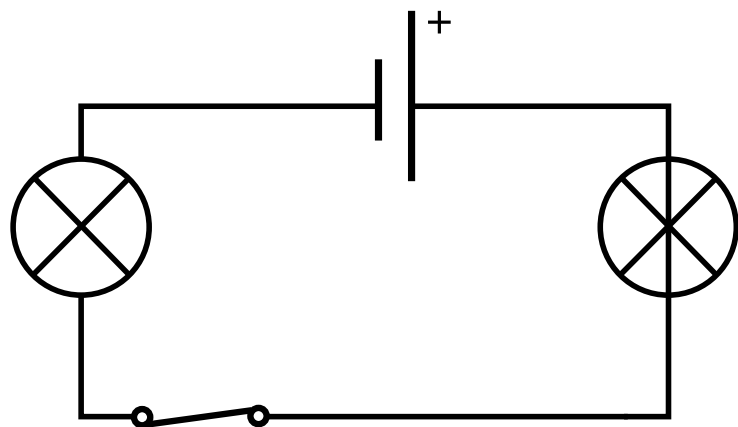
Spot the error

Can you **spot the mistakes** in these circuit diagrams?
Discuss this with your **learning partner**. Be ready to **share your feedback** with the class before the answers are revealed.

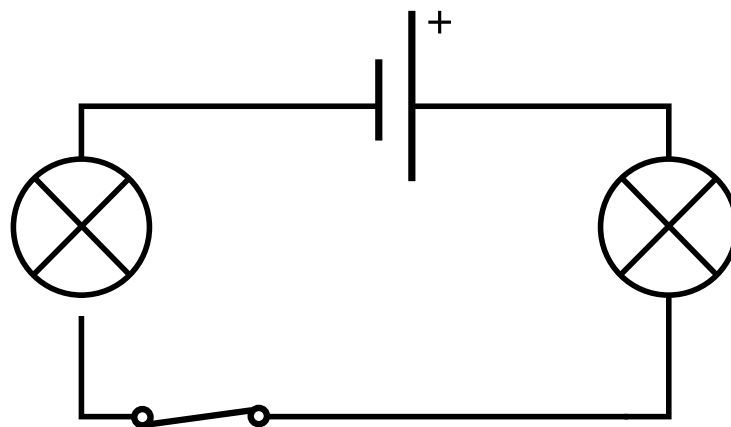



Spot the error

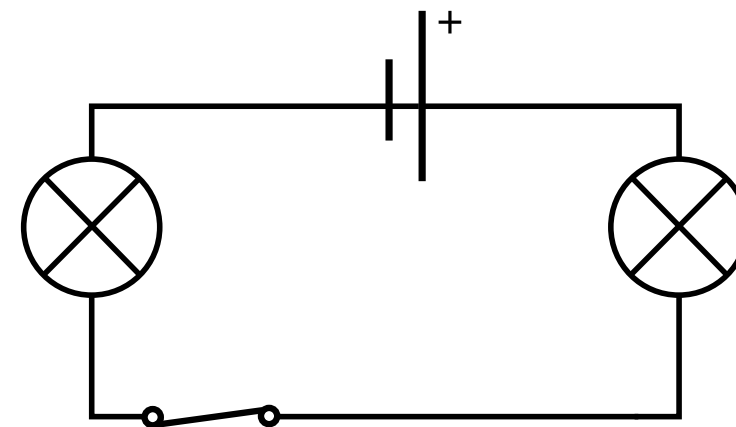
answers




A **line has been drawn through the bulb**. This bulb would not work.



There is a **gap in the circuit** . The electricity would not flow around the circuit.



There is a line joining the two terminals  of the cell. This would mean the circuit would not work. It would be a **short circuit**.



Activity



Problem
solving



Recording
data



Use the **electrical components** on your **table** to make the circuits listed on your **activity worksheet**. **Draw accurate circuit diagrams** using the correct symbols.

Check that there are **no gaps in the circuits** and **keep your lines straight**.

Activity



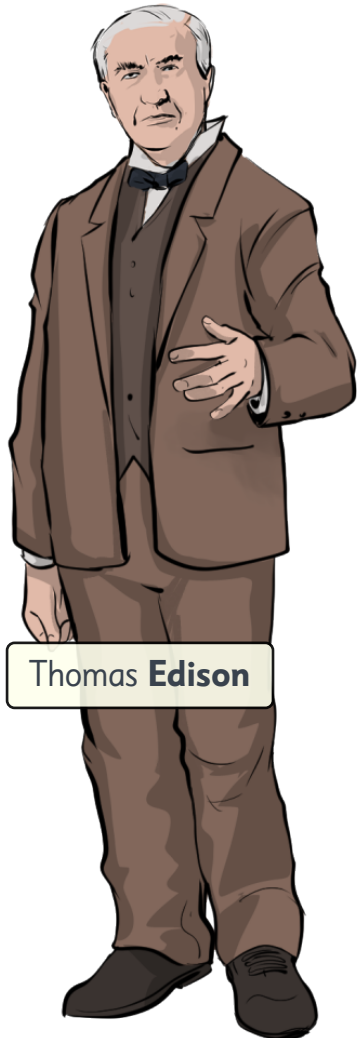
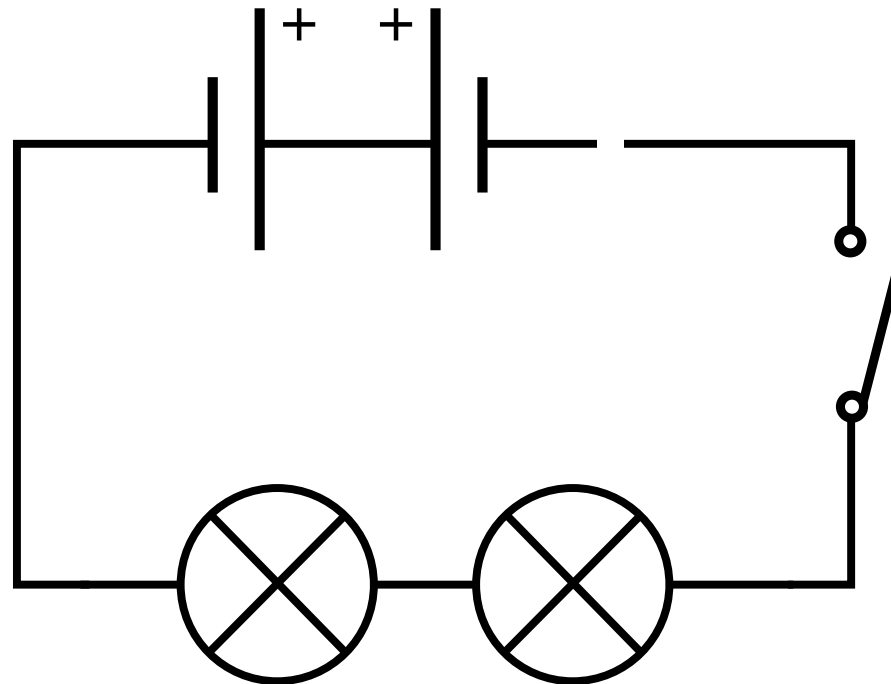
Challenge	Draw a diagram using scientific symbols
1. Make a circuit that will make a buzzer buzz.	
2. Make a circuit that includes a motor and a switch.	
3. Make a circuit that makes a bulb light up and a buzzer buzz at the same time.	
4. Make a circuit that makes two bulbs light up.	



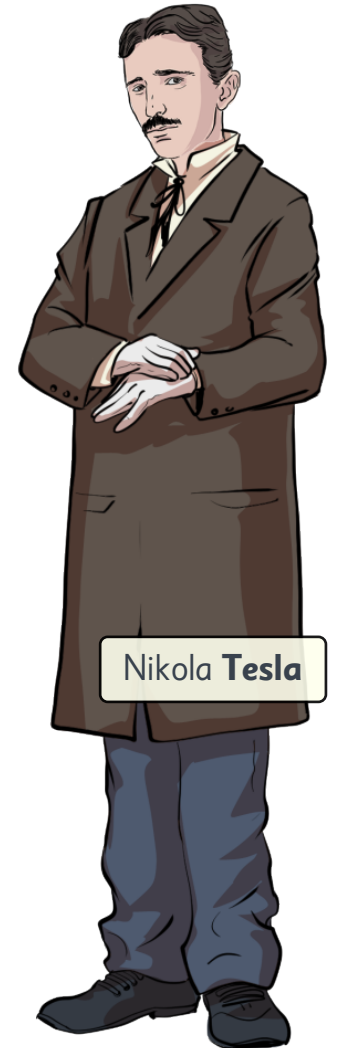
Challenge

Look at the circuit diagram below.

Will one, two or no bulbs light up when the switch is closed?
Discuss this question with your learning partner.



Thomas Edison

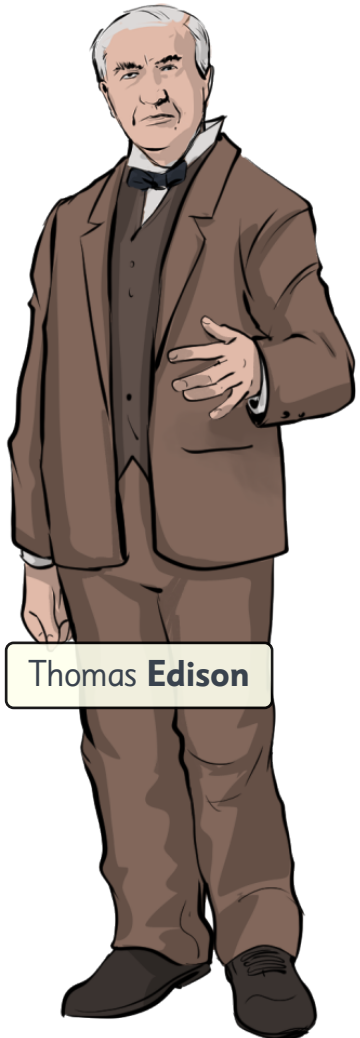


Nikola Tesla

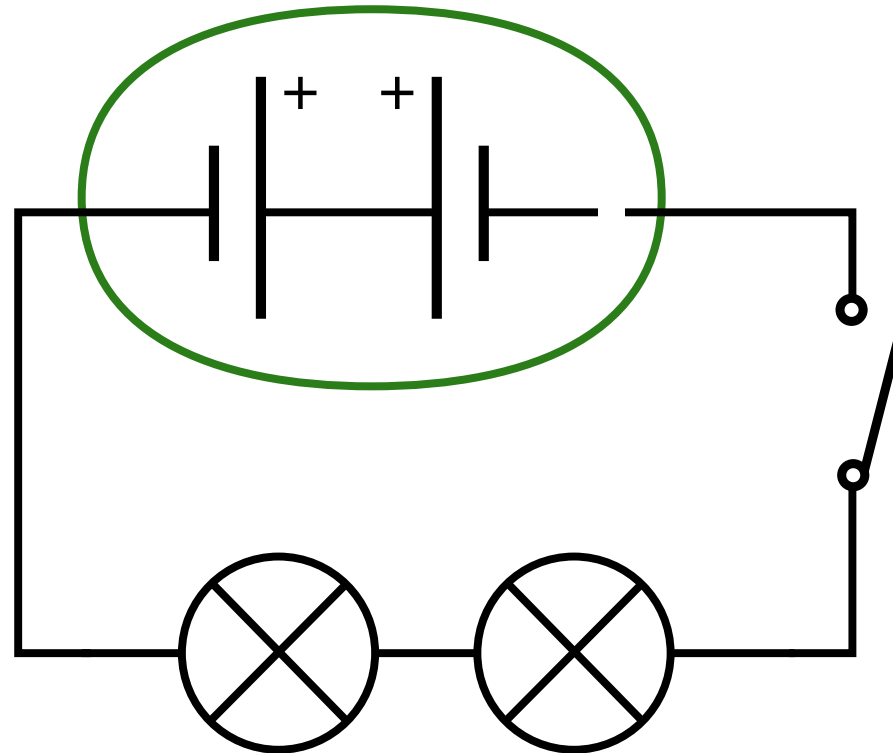
Be ready to **share your feedback** with the class **before the answers** are revealed.





Challenge answers



Thomas Edison



Nikola Tesla

There are two cells in the series circuit , but they face in **opposite directions**. This means the electricity will not flow around the circuit , so neither bulb will be lit.

