



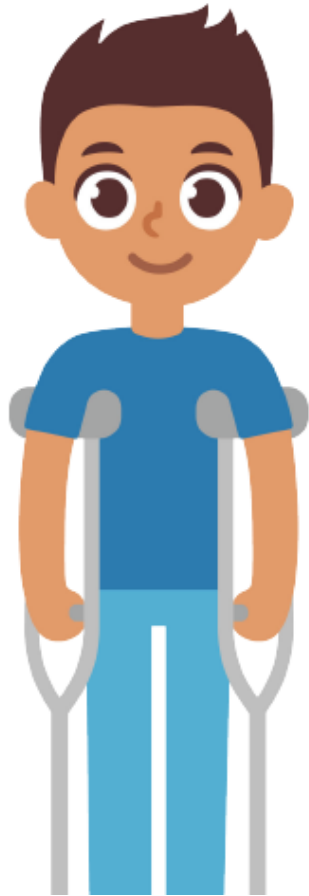
Changing Circuits

Learning Objective: To be able to plan, carry out and evaluate an experiment to see how changing the wire in a circuit affects the brightness of a bulb.

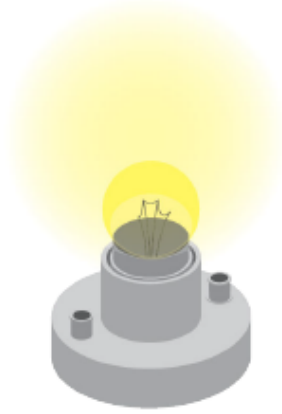
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Think, pair, share...



What can we change in a circuit to make a bulb brighter, or dimmer?



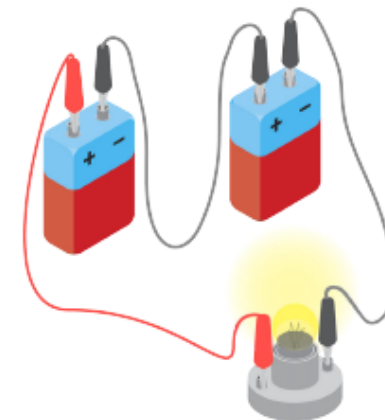
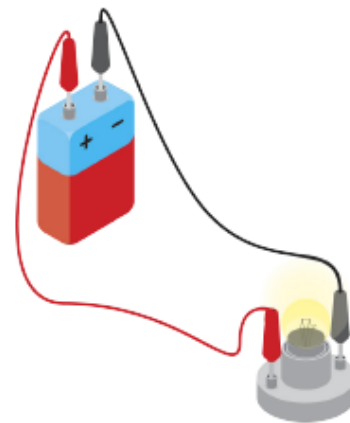
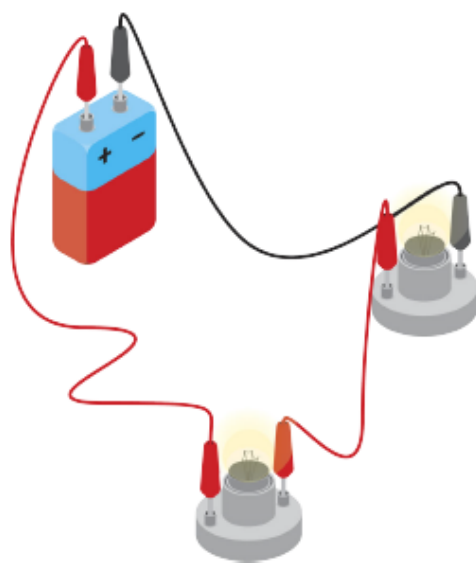
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Did you think of these ideas?

- Number of components in the circuit
- Number of batteries/cells in the circuit



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What about the wires? Do you think they would make a difference to how bright the bulb is?

I think the length of the wire will affect the brightness of the bulb.



I think the thickness of the wire will affect the brightness of the bulb.



I think the shape the wire is in will affect the brightness of the bulb.



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How could we test these hypotheses?

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Today you will plan an experiment to find out if one of those hypotheses can be proven. You will need to think carefully about these questions as you plan your experiment:

How could we carry out this experiment?

How will we make sure it is a fair test?

How could we make this experiment as accurate as possible?

How will we judge the brightness of the bulbs?



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This is the basic plan and results from a similar investigation. Can you spot anything that could be improved to make this experiment fairer or more accurate?

Prediction

I think that the bulb will be brighter when all the wires are red.

Independent variable

The number of wires connected.

Dependent variable

The brightness of the bulb. I will measure this by looking at the bulb and saying if it is bright or not.

Control variables

- Number of batteries in the circuit
- How long the wires are

Method

- I will make a circuit with all black wires and measure the bulb's brightness.
- Then, I will change all the wires to red wires and measure the bulb's brightness.

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With a prediction, it is better to provide, logical and justified reasons behind your thoughts. Try using the 'If ..., then...' structure when writing a prediction.

Prediction

I think that the bulb will be brighter when all the wires are red. ✘

Prediction

I think that if all the wires in a circuit are red, then the bulb will be brighter. This is because I think the red wires are made of a better electrical conductor than the other coloured wires.



A more detailed prediction is a chance to show off your knowledge and understanding before you start the investigation. Even if your prediction turns out to be incorrect, it's proof you've learned something through your investigation!

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Your independent variable is what you will be changing each time in the experiment. It should be linked with the hypothesis you are testing. In this example, the investigation was around the colour of the wire, not the number of wires in the circuit.

Independent variable

The number of wires connected. ❌

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Dependent variable

The brightness of the bulb. I will measure this by looking at the bulb and saying if it is bright or not.

Your dependent variable is what you will be measuring each time the experiment is changed. You need to decide how to measure your dependent variable as accurately as possible, using equipment to measure or your own observations. If you are using observations, it's a good idea to get another person to offer their observations as well to make sure you agree. You may also want to create a numerical scale (1-10) to grade your observations against.

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Control variables

- Number of batteries in the circuit
- How long the wires are

Control variables are what you keep the same to ensure a fair test. You need to try your best to think of all the things that need to stay the same before conducting your experiment.



Do you have any suggestions to add to the list for this investigation?

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Method

- I will make a circuit with all black wires and measure the bulb's brightness.
- Then, I will change all the wires to red wires and measure the bulb's brightness.

Your method should be treated like a set of instructions for conducting your experiment. Someone else should be able to conduct the experiment from your plan.

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