



? How to use this worksheet

- Ask the children to make a circuit following the drawing on the worksheet and to check that it works. They should notice the type of battery and bulb in the circuit. You could point out that a 1.5V 'battery' is really a cell and that 'battery' means a series of cells used together: for example, a 3V battery contains two 1.5V cells and a 4.5V battery contains three cells.
- Ask them to discuss and then predict what difference will be made if the bulb is exchanged for a 2.5V, 3.5V or 6V bulb. They might predict that the higher voltage bulbs will be brighter. Before they measure the brightness of the bulbs using sheets of thin paper, as explained on the worksheet,



ask them what they should do to ensure that the test is fair. A fair test would use sheets of paper of the same type to test each bulb, placed the same distance away from the bulb every time.

- The children could record their predictions. Ask if the tests they did supported these or contradicted them. Can they explain why?

⚡ Key Electricity Facts

- The voltage marked on a bulb is the voltage it requires in order to produce the wattage marked on it.
- If the electricity supply (here, a battery) provides a lower voltage than the bulb requires, the light will be dimmer.
- If the voltage of the battery is higher than the bulb requires, the light will be brighter but higher voltage is not recommended because it will cause the bulb to burn out. A very much higher voltage than is needed by the bulb could overheat it enough to shatter it. For safety reasons, explain this to the children and test all the bulbs with only a 1.5V battery.
- Breakage is unlikely to happen with batteries of up to 6V, but the bulb will probably burn out very quickly. For the extension activity, ensure that only 6V bulbs are available.



Exercise Extension: Let the children discuss in groups how they could test the brightness of the bulbs and explain why, before telling them to use paper. Collect suggestions and either decide as a class which one every group will use, or let each group use their chosen material.

National Curriculum supporting information

SCIENCE

Sc1 Scientific enquiry, Investigative skills:

2a-m) planning, obtaining and presenting evidence, considering evidence and evaluating Sc4 Physical processes, Electricity:

1a) to construct circuits, incorporating a battery or power supply and a range of switches, to make electrical devices work

1b) how changing the number or type of components in a series circuit can make bulbs brighter or dimmer

DESIGN & TECHNOLOGY

Breadth of study:

5a) investigating an evaluating a range of familiar products, thinking about how they work and how they are used

Related Material

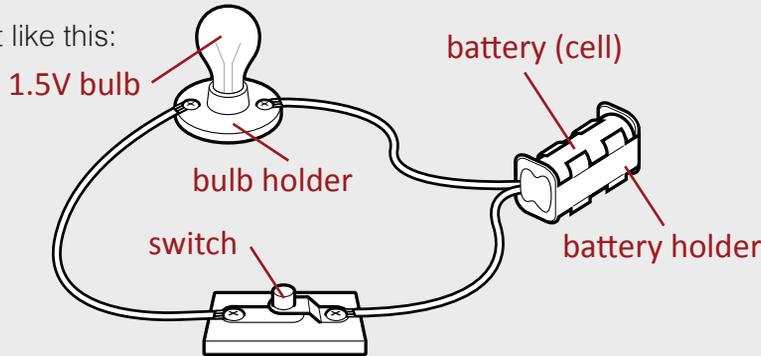
www.bbc.co.uk/bitesize/ks2/science/physical_processes/electrical_circuits/play/





Create a circuit with a battery to light a bulb and find out about voltage (V).

1. Make a circuit like this:



You also need

- 2.5V bulb
- 3.5V bulb
- 6V bulb
- pieces of tracing paper or other very thin paper (about 10cm x 10cm)

2. To measure the bulb's brightness, hold up a sheet of thin paper in front of it then keep adding extra sheets one at a time until you can no longer see the light through the paper. Make sure it is a fair test. The only change is the number of sheets of paper. Write what needs to stay the same for a fair test:

3. Predict what will happen with the other bulbs then test each one. Record all your results in the chart below.

 Always check the voltage of a bulb and battery. Never use a battery of a higher voltage than the bulb.

Battery	Bulb	Prediction	Sheets of paper used
1.5V	1.5V		
1.5V	2.5V		
1.5V	3.5V		
1.5V	6V		

Now try this!

- Predict what will happen if you use the 6V bulb with these batteries: 3V, 4.5V, 6V
- Check your predictions.
- Explain the results.

