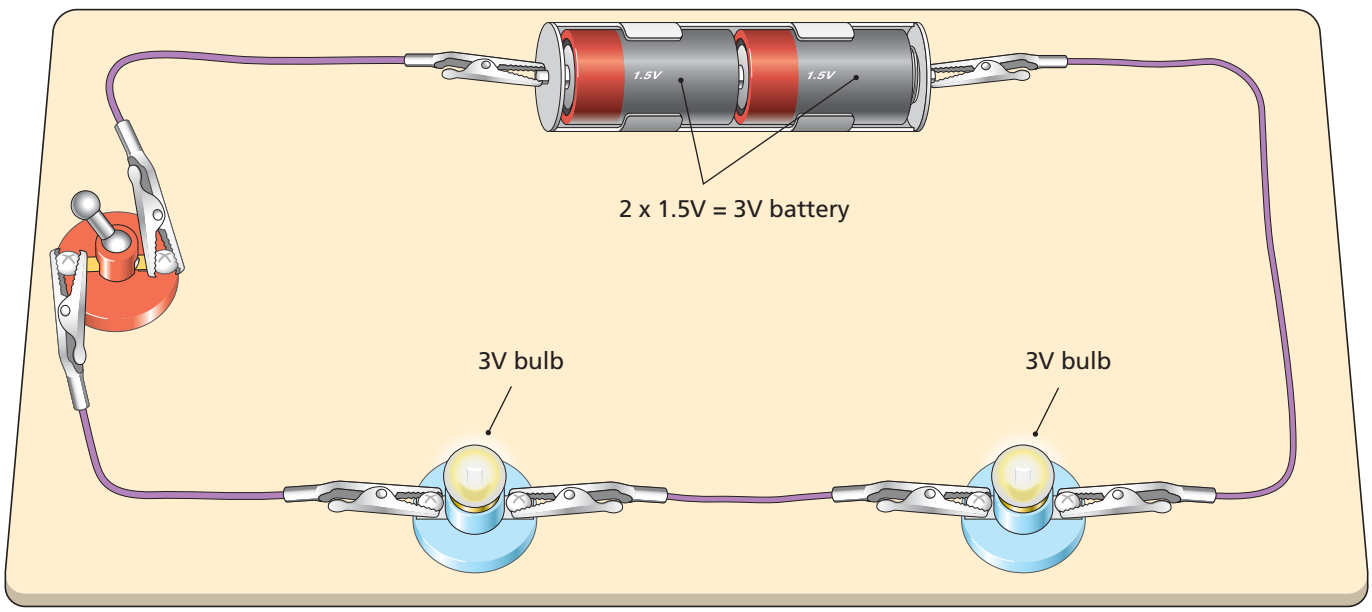
Making bulbs brighter and dimmer

Bulbs get brighter if they have more VOLTAGE, and dimmer if they have to share the voltage with other components.

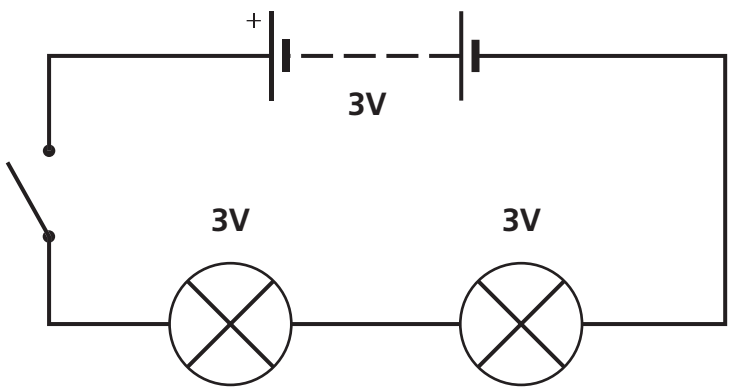
Picture 1 shows two batteries connected in a loop to a switch and two light bulbs. Picture 2 is a circuit diagram of the same loop. Notice that each of the light bulbs is part of the single loop; *there are no junctions*.

If you were to make this circuit and switch it on, you would find that the bulbs shine more dimly than if the circuit had just one bulb. To make the light bulbs shine more brightly you have to use more batteries.

This shows that when bulbs are connected in a line (in series), the voltages of the batteries and bulbs must always be matched.



▲ **(Picture 1) This is a SERIES CIRCUIT with two bulbs in a continuous loop.**



◀ **(Picture 2) The circuit diagram for Picture 1.**

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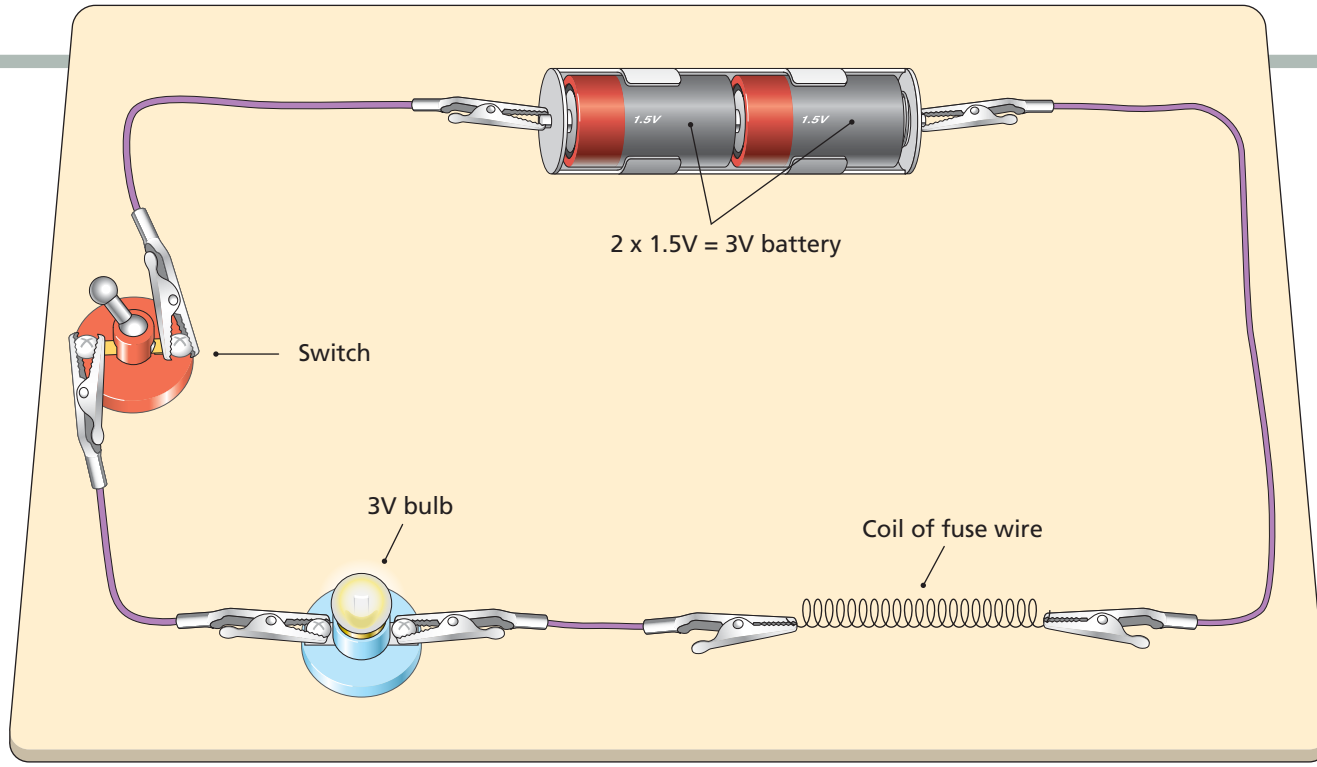
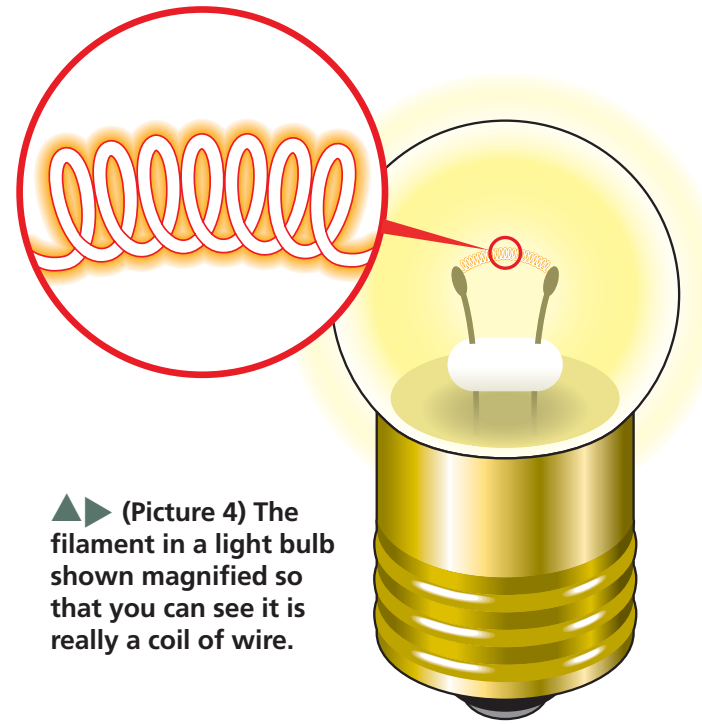


▲ **(Picture 3) A circuit using a coil of wire such as fuse wire. The loops in the coil should not touch each other.**

The effect of wires

Short, thick wires are very good conductors and use almost no electricity. However, long, fine wires do use up electricity.

Picture 3 shows a coil made of several meters of very fine wire connected in a simple circuit with a bulb, a switch and a battery. The bulb will shine only dimly, showing that the coil of thin wire is using up electricity. We should not be surprised at this, because inside every bulb is a coil of fine wire, called a filament (Picture 4).



▲▶ **(Picture 4) The filament in a light bulb shown magnified so that you can see it is really a coil of wire.**

Changing the length of the wire

If you connect the coil of wire to the circuit using crocodile clips, you can find out how different lengths of wire affect the brightness of the bulb. You simply connect one of the crocodile clips to various parts of the coil and look at the brightness of the bulb.

Summary

- **The brightness of a bulb is controlled by the number of components in the circuit. The more bulbs there are, the less voltage there is to make each one work at its best.**

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