4 Making motors go faster and slower

A motor can be speeded up and slowed down by changing the voltage it receives.

Just as a light bulb can be made dimmer and brighter by changing the voltage, so the speed of a motor can also be changed.

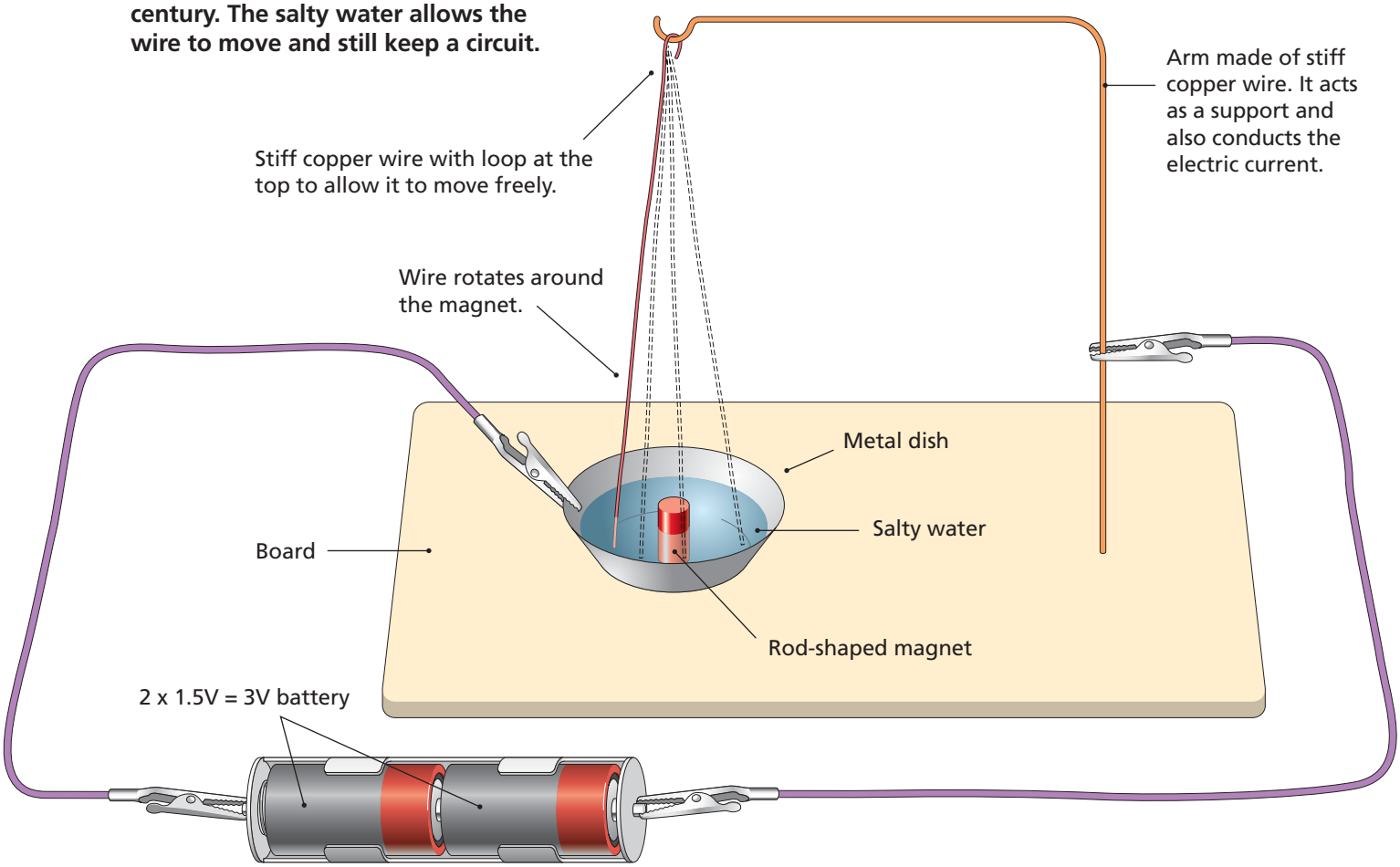
A modern motor might look complicated, so before we examine how to change its speed, we will first show you how simple a motor really is.

A simple motor

An electric motor uses electricity to make a spindle turn. Picture 1 shows you a version of the first motor ever made. This version is simple enough for you to make.

A copper wire dangles in a metal dish containing salty water. In the centre of the dish is a rod-shaped magnet. When the copper wire and the dish are connected to the battery, something

▼ (Picture 1) This equipment is a version of the world's first motor, made by Michael Faraday in the 19th century. The salty water allows the wire to move and still keep a circuit.



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astonishing happens. The wire moves away from the magnet and then begins to spin around it.

How the motor works

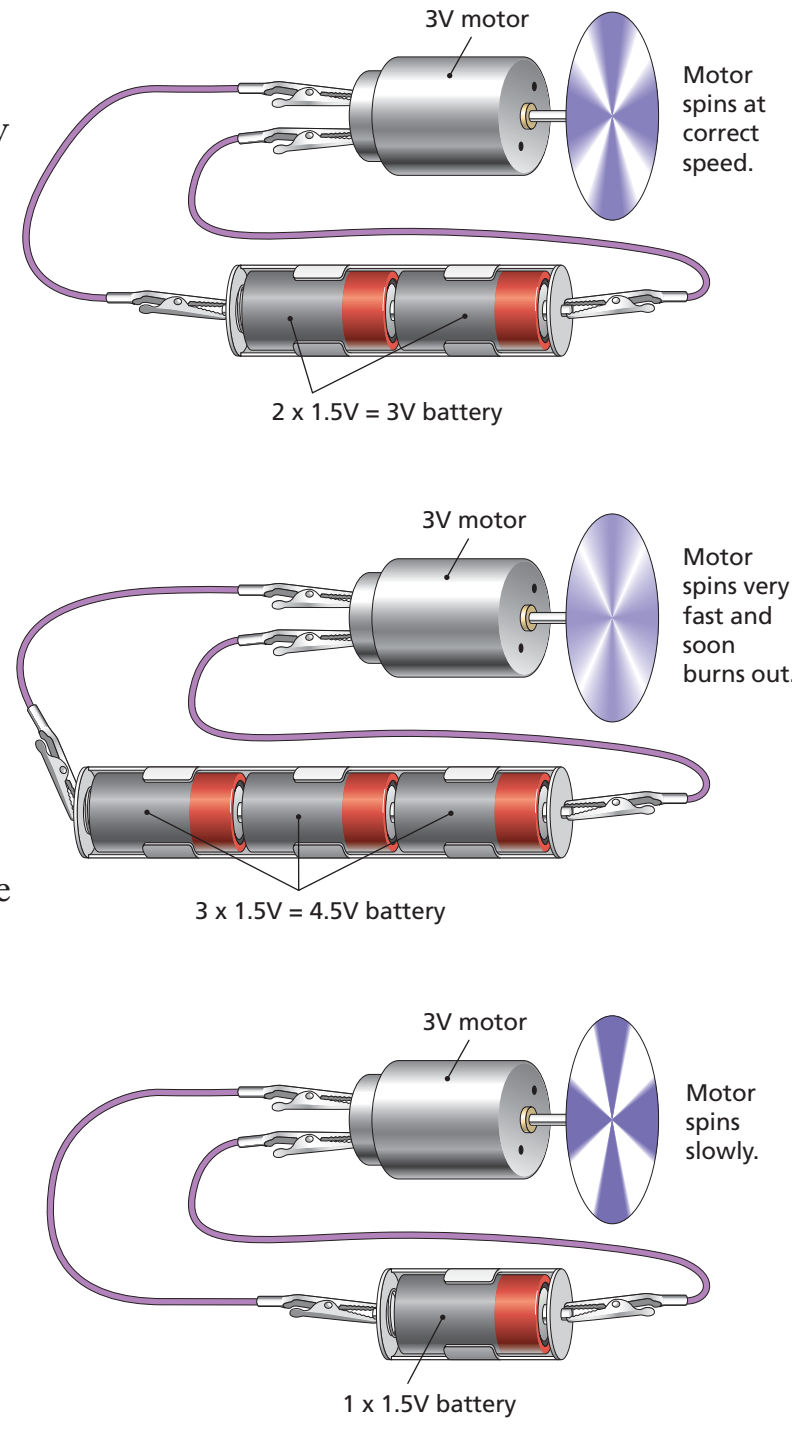
When the battery is connected, electricity flows through the wire, the salty water (salty water conducts electricity – see pages 14 and 15) and the dish. The electric current flowing through the wire turns it into a magnet. Because the wire is now a magnet, one end of it is pushed away (repelled) by one end of the rod-shaped magnet.

The wire goes around and around the magnet, trying to fall back to rest but, while the current flows, it never can. In this way we have changed electricity into movement. This is the principle of the motor. A modern electric motor (Picture 2) is an 'inside-out' version of the first motor made by Faraday.

Making the motor go faster

The speed of the motor depends on the voltage of the battery, just as the brightness of a bulb depends on the voltage. In the top diagram in Picture 2, the battery gives out 3 volts (3V) because it is made of two 1.5V batteries end to end. The total voltage is found by adding together the voltage of both batteries. If you add another battery (making the total voltage 4.5V), the motor would go faster; if you take one away (leaving just 1.5V) the motor will go slower.

▼ (Picture 2) A motor turns faster if it is powered by more batteries. However, if too many batteries are used there is a risk of burning out the motor.



Summary

- **The speed at which a motor goes around depends on the voltage sent to the motor; the greater the voltage, the faster the motor turns.**

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