

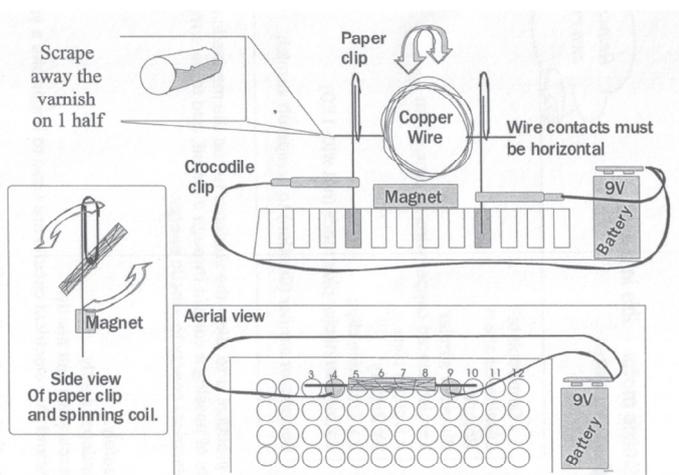
MAKING AN ELECTRIC MOTOR - LIFE IN A SPIN

Many electrical items have motors inside, including household equipment, e.g. food mixers, fans, or microwave ovens.

In this experiment we will be making a motor with some everyday materials.



Eye protection must be worn in this area



Method

1. Wrap a length of varnished copper wire several times around a cylinder, e.g. a cylindrical battery, overlapping previous windings. Look at the diagram to help you.
2. Take the coil off the cylinder and secure the windings by circling them with copper loops from the same continuous wire.
3. Each end of the copper wire should be pulled out to form 'wings'. They need to extend outwards from the middle, as shown in the diagram.
4. Scrape off (with a knife or similar) half the varnish from the wire at each end, scraping the same side at each end, i.e. either top or bottom on both ends.
5. Straighten out one end of 2 paper clips out and fix them into wells A4 and A8 using Blu-Tac.
6. Rest the copper coil onto the paper clips by the 'wings', and place a magnet underneath the coil. Use the side-view diagram to help you. The coil must be able to rotate without interference and the 'wings' must be horizontal throughout the experiment.
7. Attach a crocodile clip to each paper clip, and connect the leads to the battery.
8. You may need to gently flick the coil into action, trying in both directions.

Question

Can you think of any more equipment where motors are used?



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Results

How could you improve the motor to be: more reliable; & more powerful?

Conclusions

1. Describe briefly why the coil moves when a current is passed through it. Use the following words to help you.

**Current
repels**

**magnetic field
repulsion coil**

**attract(ion)
spin**

2. Describe the energy transfers that occur in this experiment. Identify wasted energy and useful energy.

Useful energy _____

Wasted energy _____

3. How could we improve the performance of the motor?

4. What do you think would happen if you reversed the direction of the current?

5. What do you think would happen if you reversed the magnet (and therefore the magnetic poles)?
