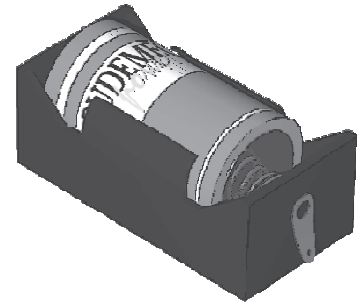
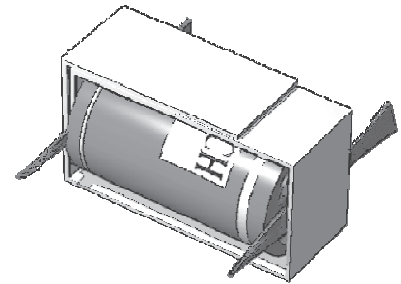


You won't find any mention of electricity in the Technology Guidelines, you will have to look in 'Science - energy and forces'. Nevertheless, it's both informative, and fun, to use electrical power to make technology models move, so here are a few points you might find useful.

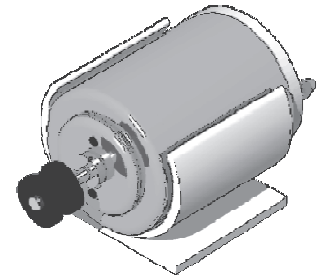
- To use electricity you must create a circuit, a loop of conducting material linking the source of power ie. a battery and the component you wish to operate, a lamp or a motor or whatever. Unless you want the battery to empty in one go you'll need to have some way of breaking the circuit. This could be a switch, or just somewhere that it's possible to break the loop.
- The 'battery' which consists of one single cylinder, however large, is always 1.5 volts. The single cylinder is called a cell. When they are grouped together they become a battery of cells (so the single cell isn't really a battery!). A 12v car battery contains eight cells.
- A single cell will drive many basic circuits which might be incorporated into a technology model. A single cell will power a little lightweight buggy (slowly) or light a lamp. It will struggle to do both for very long and it won't power a buzzer. *An LED, (light emitting diode) also needs a higher voltage.*
- The ideal batteries for technology use are the flat 4.5v batteries. Being flat they are easy to mount, they have substantial contact strips making them easy to connect to, and the voltage is high enough to run several components simultaneously.
- Check the voltage of bulbs, it's printed on the side and difficult to read. If the rating of the bulb is higher than the battery then it will be very dim (or just not showing at all). If the rating is lower than the battery you will get a good bright light - but not for very long! (maybe only seconds).
- The bulb holders that will fit on the end of a lolly stick are best for fastening to models, but be warned, they are often so badly made that some of them don't allow the bulb to connect correctly.
- Crocodile leads are useful for 'designing' a circuit on a model. Once everything is working satisfactorily they can be replaced with wire.
- Plastic battery holders are relatively cheap and can be fastened to models with sticky fixers, double sided adhesive tape, or by using the glue gun. It's easy to make card battery holders though. Cut a strip of stiff card about 2cm wide and wrap it tightly around the battery, lengthwise. Remove and crease the folds then re-fold and glue the end. The battery should slide into this 'cradle' and be held reasonably firmly. Now cut a couple of aluminium foil strips from a disposable food container (that's the foil that's thicker than baking foil). Double them over lengthwise to increase the stiffness and slip them, one each end, between the battery and the card. These form the connecting strips. These units can be glued side by side to create multiples, with common connecting strips running through more than one unit.
- Remember, when increasing the voltage by combining cells you must connect the positive terminal of one cell to the negative terminal of the next. This occurs almost automatically when you slide cells into a tube, like a torch, but is less obvious when mounting cells side by side.
- Small electric motors are surprisingly inexpensive, but they don't always come with a drive pulley attached, it's worth checking the catalogue because you'll need to order the pulleys if they're not included. The motor mounts are very useful. They have a self-adhesive pad making fixing easy.



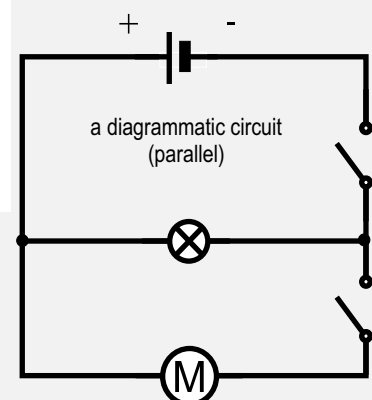
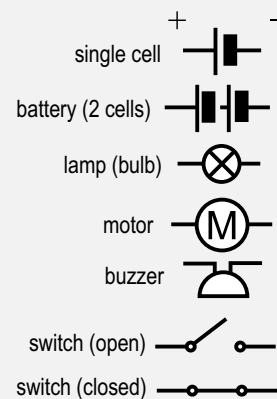
C size single cell in a plastic holder



C size single cell in a holder made from a strip of stiff card. Note the foil connectors



Small electric motor in mounting clip. Note the small plastic pulley fitted



Children at level C are expected to be able to draw circuit diagrams. We have listed the symbols, on the right, that they are most likely to use if drawing circuit diagrams for their technology models. Below the list you will see a sample diagram. Note that where two wires are joined the point is marked by a black dot.