

## Student Revision Notes (age 11 – 14): Sources of Electricity

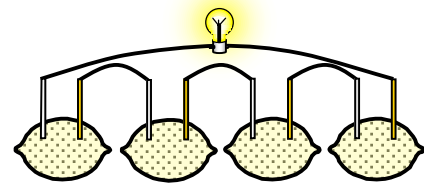
Electricity plays a very large part in all our lives and so it is important to find out how we can make it. Some of the ways described here are quite common but others are much more unusual.

### Generator or dynamo

This is a way of producing electricity from motion energy. A magnet is rotated inside a coil of wire and this makes an electric current, the faster the magnet spins the more electricity is produced. The magnet may be turned by turbines as in a power station (powered by coal, gas, oil or nuclear power), or by wind, or even by friction as in a cycle dynamo.

### Battery

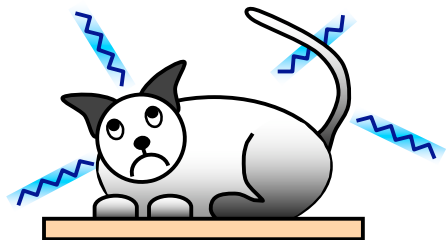
These should really be called **cells**, a battery is a number of cells joined together. You can make a very simple cell by putting two rods, one of zinc and the other copper, into a lemon. A small voltage will be produced, just enough to light a small torch for a few seconds. It works because of citric acid in the lemon and the two different metals.



You can make a simple cell in the laboratory with copper and zinc plates and a beaker of dilute sulphuric acid. Cells like this are called **primary cells**, they work as soon as they are made. There are also cells called **secondary cells** that have to be charged up before they will produce electricity, for example a car battery. Secondary cells can also be recharged.

### Static electricity

By rubbing polythene with fur a static charge can be made. This can be tested by putting the polythene near your hair, some hairs will rise up towards it. You can also make **static electricity** by taking off a woollen jumper over a nylon shirt, sparks may be seen! Even your cat may become charged after it has rolled on a synthetic carpet!



### Electricity from light

When light falls on the special chemical in a **photo-electric** cell, a small amount of electricity is produced. This is called the photo-electric effect. It would need a huge area of such cells to give enough electricity to run an electric fire. These cells do have uses though, you find them in the solar panels of spacecraft, in light meters used in photography and even pocket calculators. Japan has a 1 megawatt solar power station already operating.

## Electricity from heat

If you join a copper wire and one of constantan and then heat the join, a small voltage will be produced, and a small current will flow in the wires. This is called a **thermocouple**. This effect is used in special types of thermometers as the voltage that is made depends on the temperature of the join.

## Electricity from crystals

If you take a crystal of quartz and squash it, a voltage will be produced between opposite faces of the crystal. This can be high enough to give a spark and so you find these crystals in some cigarette lighters, cooker lighters and Bunsen burner lighters. It is also used in some microphones where sound waves squash a crystal very slightly, the electricity is then fed to an amplifier.

## Electricity from gases

Special cells called **fuel cells** make electricity from oxygen and hydrogen and are used in spacecraft.

## **Linked Resources**

[www.twothirtyvolts.org](http://www.twothirtyvolts.org):

Electric Current (11-14) Student Quiz