

Electricity Generator

Apparatus

a coil which can be turned by hand, mounted between a pair of magnets, connected to an LED or low voltage globe

Note – this can be easily made by attaching a handle to a simple kit electric motor and replacing the battery with an LED or small 1.5 V globe.

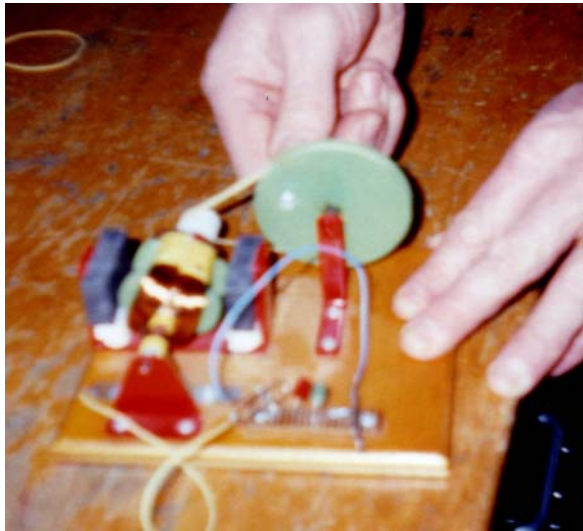
Action

The students turn the handle and watch the globe light up. They should compare this to an electric motor and discuss how this is similar and different.

The Physics

The generator is really just a motor in reverse. Rather than using a current in a magnetic field to produce a torque on a coil, it uses the motion of a coil in a magnetic field to induce a current in the coil. The induced *emf* in the coil is proportional to the rate of change of magnetic flux through the coil. As the coil rotates the magnetic flux oscillates, increasing and decreasing as the angle between the plane of the coil and the field changes. This induces an alternating current in the coil, which lights up the LED as the current flows in one direction only.

The motor converts electrical potential energy (from the battery) into kinetic energy, the generator converts kinetic energy into electrical potential energy.



Small hand driven generator used at Monash University.

Accompanying sheet

Electricity Generator

Turn the handle on the generator.

What is happening? Why?

How is this similar to the electric motor?

How is it different?