

# Batteries I

## Apparatus

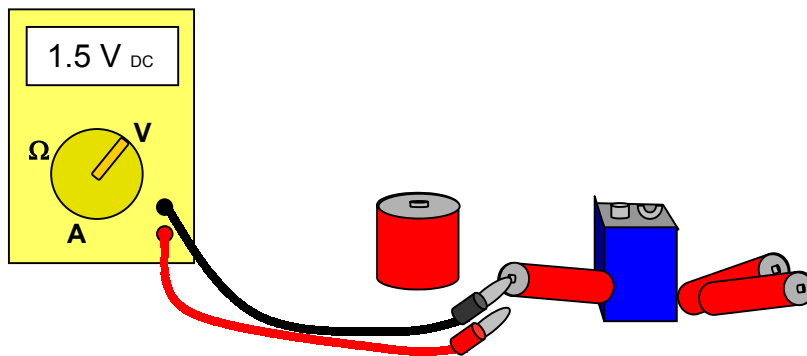
selection of different batteries, voltmeter

## Action

The students examine the different batteries and describe how energy is stored in them. They can measure the potential difference across the terminals of the different batteries using the voltmeter.

## The Physics

A battery [or cell] is a source of energy in electric circuits – a device for providing an electric current. This is done through the potential energy stored in the chemical bonds of the materials that make up the battery. Electrochemical cells are the simplest type of cell capable of producing an *emf*. They consist of two different metal plates [Zn and Cu] immersed in an electrolyte [sulfuric acid solution]. In chemical cells work is done by the disintegration of zinc or lead in acid. The copper plate loses electrons and becomes deficient in electrons, and this causes more electrons to flow via the conducting circuit from the zinc plate. Hence there is a current in the external circuit carried by electrons flowing from zinc to copper and a current in the cell carried by hydrogen ions flowing from zinc to copper. In a Dry Cell the electrolyte is a moist paste instead of a liquid solution. It has a carbon rod down the centre, which replaces one of the metals. The other electrode is in the zinc surrounding the paste. The cell is then covered with an insulating material. Rechargeable batteries are recharged with the negative terminals of the charger and battery connected to each other. This forces the current to run backward through the battery, reversing the chemical reactions.



## Accompanying sheet

### Batteries I

Observe the different batteries.

Use the voltmeter to measure the potential difference across the terminals of some of the batteries.

Does the size of the battery relate to the potential difference?

How is energy stored in the batteries?