7 Teacher Demonstration 1: Generating an Electric Current

Theory:

A length of wire pushed through a magnetic field has an electric current induced (generated) along its length. For KS2 'moving a length of wire *near a magnet'* is enough, rather than the idea of *field,* though you might mention the idea of a gravitational field which acts when something is dropped. Leave the words *field*, *induced* / *induction* for later, but use *generator / generated* as appropriate.

Introduction:

Ask pupils to tell you what they already know about energy, and its conversion from one form to another.

Teacher Demonstration:

Equipment:

- horseshoe magnet (for stage 1), bar magnet (for stage 2),
- long conducting wire, with 4 mm terminals attached at each end (for stage 1),
- sensitive electric meter (for stage 1)
- Coil of electric wire (for stage 2)

Stage 1

1. Push a length of wire connected to a sensitive ammeter down into the magnetic field between the poles of a horseshoe magnet. Explain that this meter shows when an electric current is flowing. *A needle movement is observed on the meter while the wire is moving. The needle returns to zero when the movement of the wire stops.*Explain that current is generated by the movement of the wire in the magnetic field (or near the magnet), or the movement of a magnet near a conducting wire.
2. Askthe pupils what they expect to happen if the wire is pulled back up. Pull the wire out again. *The needle moves in the opposite direction.*
3. Now move the wire in a circular motion within the magnetic field. Ask what happens now? *The needle oscillates back and forward. You have alternating current (AC).*

Ask pupils if they know the significance of AC. *Easier to generate and transfer long distances by overhead (or underground) wires.*

Stage 2

1. Move a magnet backwards and forwards through the coil in apparatus similar to that shown opposite. *The galvanometer oscillates between positive and negative parts of the scale.*
2. Hold the magnet steady and move the coil. *Again the galvanometer oscillates.*

Current is generated by the movement of a magnet near a conducting wire, or of the wire near a magnet.