**GRADE 7: TECHNOLOGY**

**TOPIC 3: ELECTRICITY AND ELECTRICAL SYSTEMS**

**Simple Electric Circuits**

The simplest form of electrical circuit is when an energy source (such as a battery) is connected to a load, such as a light bulb or a resistor, as is in the image below.



 

An *electromagnet* is a type of magnet in which the flow of electric current produces a magnetic field. The magnetic field disappears when the current is turned off. *Electromagnetism* is the foundation of a wide range of modern technology.

You can make a simple electromagnet by winding insulated copper wire around an iron nail. The coiled copper wire is called a solenoid. When an electric current flows through the solenoid, it creates a magnetic field. The iron core amplifies this magnetic core. When we switch the current off, the magnetic field fades away.

**Something to try at home: Making an electromagnet**

Please ask an adult to assist you if you try this at home. If you want to make an electromagnet, these are the steps you must follow:

**You will need:**

1. A large iron nail (approximately 50mm or 60mm long)
2.  Thinly coated copper wire
3. A dry-cell battery, e.g. a penlight battery
4. Electrical tape
5. A pair of scissors or a wire cutter
6. Iron filings, paper clips and other magnetic items.

**Method:**

1. Wrap the thinly coated copper wire around the nail.

2. Use the scissors, or wire cutter, to cut the excess wire.

3. Leave at least 5mm of wire uncovered at both ends of the nail.

4. The wires must not overlap when you wrap them around the nail.

5. Attach the wires to the battery terminals by following these steps:

a. Peel the plastic coverings off the copper wire.

b. Attach the one end to the positive terminal of the battery.

c. Attach the other end to the negative terminal of the battery.

d. Use electric tape to stick both ends of the wire to the battery terminals to keep them in place.

6. Use the iron filings, paper clips and other magnetic items to test the electromagnet.



Some interesting facts about electromagnets

Electromagnets work as long as there is electricity running through a wire, as this will automatically allow a magnetic field to be generated. The magnetic field that the electromagnet creates is only temporary. As long as there is a continuous flow of electrons, the electromagnet will work. Ordinary magnets, on the other hand, do not need electric current to work.