

***Basic Electricity***

* *Wiring of computer room*
* *Adwaita Vartak*

*Open Education Resource*

**Productive task1:**

Electric current has three effects that can be harmful or dangerous unless we take proper precautions. These three effects are shock, heating and sparking

Electric shock

The body experiences electric shock when electric current passes through it. Contact with a wire carrying a high voltage can give a person severe, sometimes fatal shock. When a strong current passes through the body, the muscles of the body go into a spasm and burn injuries also occur. Sometimes when a person accidentally holds an object through which a current is flowing he or she cannot release their grip.

**Activity**: Students may be allowed to experience the mild shock or tingling feeling when they touch a wire connected across the terminals of a 1.5 volt cell. They can calculate how many times greater is the voltage across a wire connected to the mains supply. (240/1.5)

**Activity**: Students can introduce different substances – such as metal strips, rubber, plastic, wood into a circuit and measure the current flow. They can then classify substances into conductors and insulators.

**Discuss**: Why are electrical wires covered with insulating material? What is the purpose of insulation tape? What might happen if insulation wears off and a current carrying wire is exposed ? Why are tool handles made of insulators?

**Safety points**:

* While working with wiring mains electricity should be switched off
* Wear rubber foot wear to prevent current flow through the body
* Avoid contact with live wires ie; wires that are carrying current.
* Do not attempt to touch live wire using metal tools
* Cover exposed wire /joints with insulation tape
* Live wire should not come into contact with metallic parts of appliances or window frames etc.
* Plugs should be wired properly and exposed wire should not protrude outside the plug
* While removing plugs, only the insulated part should be gripped and contact with the pins should be avoided. Do not attempt to remove the plug by pulling the cord/wire
* If a person has touched a live wire and is unable to move due to muscle spasm, do not touch the person. Switch off the mains and try to remove the wire touching the person with a wooden stick
* Immersion heaters can be dangerous as water conducts electricity. ALWAYS SITCH OFF AND REMOVE THE ROD WITH THE HELP OF A WOODEN STICK, BEFORE CHECKING IF THE WATER IS HOT

HEATING

When electricity flows through a conductor heat is produced. The amount of heat produced depends on the composition of the conductor, its thickness and the amount of current flowing. Wires are rated according to the current they can safely carry without heating up dangerously. If a lot of accidentally passes through a wire it can overheat. This may cause the insulation around the wire to melt and if the wire comes in contact with a flammable material a fire may result.

A fuse is made of a special type of wire that will heat up and melt if more than the normal current flows through the circuit. Once the fuse melts, the circuit will trip and there will be no danger of a fire due to excessive current in the circuit.

Electronic fuse?

Safe trip?

Activity: Students can observe that a current carrying wire becomes hot.

Activity: Students can learn how to safely replace a fuse. They should be encouraged to find out the reason for the fuse melting by checking for short circuits. Short circuits occur when a low resistance substance is introduce into the circuit or when the two phases of household wiring accidentally come into contact.

SPARKING

When there is a gap in the circuit due to broken wire or when two live wires are close to each other, sparking can occur. Sparks can cause fire.

If a fire is suspected to be of electrical origin then water should not be used to douse the fire as there is a danger of shock. The mains supply should be switched off where possible. Sand should be used to put out the flames.

Activity

Make posters about electrical safety and display these in your school and home.