Making Fuses

Electricity All Around Us
Learner Activity Instructions
Grade Level: 5-8

What you will learn:

You will learn the importance of fuses and circuit breakers for electrical safety. You will construct a simple circuit and then create a short circuit to melt the fuse and break the circuit.

What you will need:

Making Fuses Learner Worksheet
5 Insulated copper wires
1 Bulb
1 Bulb holder
Steel wool
3 D Batteries
3 D Battery holders
Scissors
Tape

Background

Fuses are important when we use electricity. Like insulators, fuses keep us safe from electricity. A fuse is designed to shut down circuits or appliances that are overloaded or overheated. A fuse is a strip of metal in a glass-like tube that melts if it gets over-heated or if there is too much electricity flowing through it. When the metal in the fuse melts, it opens the circuit, thus shutting it off. When fuses burn out, they need to be replaced with a new fuse.

In most homes, fuses have been replaced by circuit breakers. Circuit breakers complete the same function as fuses, with one difference: they do not need to be replaced after the circuit is broken. They can simply be reset or turned back on.

A short-circuit in an electrical system means that the electricity has found a shortcut. Remember that electricity will always find the easiest path to the ground. Short-circuits can happen when the wire to an appliance is damaged, or if there is some kind of damage in the appliance itself. A short-circuit is a safety hazard. When there is a short in a circuit, an appliance or machine can heat up, possibly causing a fire. Fuses help keep us safe from short-circuit fires.

How to do it

1. Place the batteries in the battery holders and connect them with insulated copper wire.
2. Using an insulated copper wire, connect one end to the last battery holder and the other end to the light bulb holder.
3. Using another insulated copper wire, connect one end to the light bulb holder and the other end.
4. Use a few fibres of the steel wool and twist them into a tight strand.
5. Take the two wires and take off the plastic.
6. Construct a simple circuit.
7. Then take your two wires and touch them together. You may want to use a pencil to hold them together because they will get hot.
8. Record your observations on your worksheet.

As you explore and complete this activity think about these questions:

1. Why are fuses important in our everyday life?
2. Where can fuses be found in the home or school?
3. What materials did you use to construct the fuse?
4. Do you think there are ways to improve the fuse design?
5. What happens when there is a short circuit?