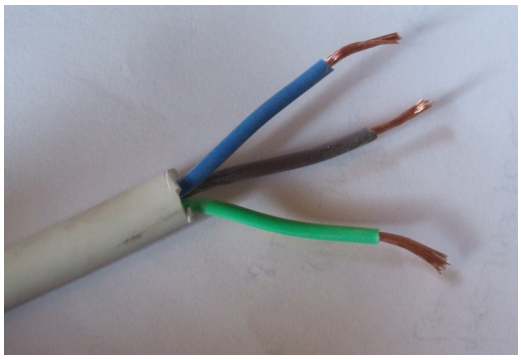
INSULATION ACTIVITY

Construction Context



Every wire you see at home is coated with insulation. You don't see the wire itself. Just like a coat insulates you from the cold air during the winter, the coating on wires insulates you from the electricity flowing in the wires. This is both for safety so that you don't get shocked and hurt. But it is also makes sure that the thing plugged into the outlet gets the electricity necessary to make it run. The appliance plugged into the wall (e.g. toaster, coffee maker, TV, etc.) requires the electricity to run.

One reason for learning about electricity in school science or technology classes is because these ideas are directly useful in your life now! Understanding how electricity is generated, distributed, and used inside a home, school, or work can be of great benefit to you now! This knowledge can keep you safe, keep things working, and perhaps be knowledge useful in a job, earning you more money.

Materials

C or D cell battery

Flashlight bulb

Pieces of wire with ends bare

Optional items: Holders for batteries and bulbs, Differential Voltage Probe

Activity Description

1. Try connecting a battery, bulb, and wire together to make the bulb light (see the **Battery & Bulb activity**). If you have not done the Battery and Bulb activity on this

site, this might be a challenge. What you will discover is that some places on the battery and bulb do not conduct electricity. In effect, these parts are insulators.

2. Once you have gotten the bulb to light, you can use this configuration to get the bulb to light that involves other materials. For example, you can connect the battery and bulb to a metal chair and use the wire to connect another part of the chair to the bulb and it will light. The metal is a conductor. However, if the chair is painted, the paint will act as an insulator and will not light the light.

3. Try connecting to various materials around the house or classroom.

4. Look at cords and plugs on various appliances in your home or at school. Examine how these are designed to protect you from the bare wire.

5. Look at spare wires in the garage or that the maintenance person at school can provide you. Examine the types of insulation and its thickness.

6. Go outside and look at the wires on the top of a power pole. Note how these wires are connected to the poll through insulators (see **Distribution video** on this site).

Science Concepts

Insulation

Next Generation Science Standards

Scientific and Engineering Practices:

- Planning and carrying out investigations

Crosscutting Concepts:

- Energy and matter: Flows, cycles and conservation

Discussion

1. Why would some insulation be thicker and some thinner?

2. Why are some wires thicker and some thinner?

3. Count the number of insulating disks on cable connections to different power poles. Why are there different numbers of disks? (see Distribution video on this site)

4. Examine the electrical connections going to the furnace or to the circuit breaker box. Electrical distribution in the house always put wires inside of metal pipes called conduit. If the wires are already insulated, why put them inside of conduit? What is the house being protected from?