Baltimore Curriculum Project Draft Lessons

Introductory Notes

These lessons generally follow the grade-by-grade topics in the Core Knowledge Sequence, but they have been developed independent of the Core Knowledge Foundation. While the Core Knowledge Foundation encourages the development and sharing of lessons based on the Core Knowledge Sequence, it does not endorse any one set of lesson plans as the best or only way that the knowledge in the Sequence should be taught.

You may feel free to download and distribute these lessons, but please note that they are currently in DRAFT form. At this time the draft lessons on this web site do NOT have accompanying graphics, such as maps or cut-out patterns. Graphics will be added to this site later.

In participating BCP schools, these lessons are used in conjunction with the Direct Instruction skills programs in reading, language, and math. If you use or adapt these lessons, keep in mind that they are meant to address content and the application of skills. You will need to use other materials to ensure that children master skills in reading, language, and math.

First Grade - Science - Lesson 17 - Electricity

Objectives

Become aware of the presence of static electricity.

Create static electricity using friction.

Suggested Books for the Unit

Glover, D. *Young Discoverers: Batteries, Bulbs and Wires.* New York: Kingfisher, 1993.

Teacher Resources for the Unit

Challand, Helen. *Experiments with Electricity.* Chicago: Childrens Press, 1986.

Background Information

Static electricity is an accumulation of electric charges on an insulated body. It is an electric discharge resulting from such an accumulation. When it is around, it creates a cracking noise and/or a shock from the electric charges.

Static electricity can be obtained by vigorously rubbing two different dry materials together. Friction from rubbing and close contact causes electrons to transfer from one dry material to another. Static electricity usually cannot harm anyone. It is not powerful like current electricity. It is okay and safe to play with, but it is not safe to play with current electricity (unless the voltage is low, as with 6-volt batteries).(1)

Materials

Two balloons, piece of wool

Note to the teacher

Tell the children that working with electricity can be very dangerous. Make sure to warn the children that they should never use main electrical outlets in their homes to experiment with electricity.

Procedure

Ask: Has anyone ever had the experience of getting a small shock, or zap, while touching a door knob or another person? Tell the children that the cause of this feeling is static electricity.

Static electricity is made by rubbing two different dry materials together. Ask: Can you name other times when you have witnessed static electricity? (clothes sticking to each other and making a crackling noise when they are separated, hair being attracted to a comb or standing up on end)

Demonstrate for the class how static electricity can be generated. Blow up two balloons and tie the ends in a knot or with string. Have the children gather around you as you rub one balloon with a piece of wool (wool cloth or sweater). Have the children listen for the crackling sound the static electricity makes as you rub the balloon with the wool. Tell the children that the sounds are made by tiny sparks of electricity.

[1]Elaine Levenson. *Teaching Children About Physical Science* (New York: TAB Books, 1994), 57

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Now hold both balloons against a wall. Let go of the balloons. Ask: What has happened? (One balloon sticks to the wall.) Which balloon is sticking to the wall? Tell the children that when you rub the balloon against the cloth, static electricity is created. The rubbing causes static charges or energy to be transferred from the wool cloth to the balloon. The balloon becomes charged with electricity and therefore clings or sticks to the uncharged wall, acting somewhat like a magnet.

Tell the children that static electricity is an interesting thing that happens in nature, but it isn't useful to us in everyday life. We have to collect and control electricity before it can be used. The power we use in our homes is also electricity, but it is called current electricity. Current electricity is made in a power plant. Our homes have wires throughout them that allow electricity to travel from a power plant to our electric outlets, into which we plug things like a refrigerator or a television. For homework, have the children make a list of the different things in their home that use electricity.

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First Grade - Science - Lesson 18 - Electricity

Objectives

Define the term circuit.

Describe the flow of electricity in a circuit.

Observe the construction of a simple circuit.

Gain an understanding of how a switch works.

Materials

Most of the following materials can be found in the STARS unit "It's Electrifying"

4.5 or 6 volt battery

1 foot of plastic-coated wire

2 paper clips

Bulb and bulb holder

Wire cutter or pliers

Procedure

Tell the children that in our last science lesson we began talking about electricity. Remind the children that the power we actually use in our homes is called current electricity. Say: Current electricity is different from static electricity because the electric current travels through wires to places where it can be used. Anything that electricity can flow through, such as metal wire, is called a conductor. Wires that carry electricity are made of metal on the inside and have a plastic or rubber coating on the outside that keeps the electric current inside the metal. Show the children an electric cord in the classroom and point out the plastic covering on the cord.

Tell the children that in order for an electric current to provide us with electrical energy, the flow of energy must flow in a loop that does not have any breaks in it, called an electrical circuit. Hold up a piece of string with its ends tied together to form a loop. Show and point out to the children that the loop can be made into different shapes. Tell the children that this is the way an electrical circuit is--electricity can flow in any shape.

Have the children gather round as you construct a simple circuit using a 4.5 or 6 volt battery, 1 foot of plastic-coated wire, 2 paper clips, a bulb and bulb holder.

Cut the wire in half. Strip the plastic coating from the ends using wire cutters or pliers.

Point out to the children that the wire inside is considered a conductor because the electric current is able to flow through it and the plastic covering is considered an insulator because the electric current is not able to pass through it, but instead keeps the electricity inside. Wrap the bare end of one piece of wire around each connecting screw on the bulb holder. Tighten the screws to hold the wire in place. Attach the other ends of the wires to the paper clips, then connect the clips to the battery terminals. Make sure that all your connections are properly made and the bulb will light.

Tell the children that another part of a circuit is a switch. Draw the diagram shown below on the board.

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Point to the switch in the on position and the switch in the off position at the appropriate times as you read the following description of a switch to the children:

Most things that run by electricity have a switch--a part that is used to turn the electric current on and off. The electric current moves along the wire across the switch to another wire inside the bell, lamp, or radio. The switch is a "bridge" in the path the electricity follows.

Inside the switch is a metal piece that moves when you turn the switch on and off. When you turn the switch on, the metal piece touches both wires. The "bridge" is down. The electricity coming into the switch can cross the "bridge" and keep traveling along the pathway.

But when you turn the switch off, the metal piece moves away from the wire. The "bridge" is up. Without the "bridge," the electric current can't cross the switch and follow the path. So, the electric current stops moving, and things stop working until you lower the "bridge" in the pathway by turning the switch on again.[(2)]

Discuss the following questions with the children. Ask: Have you ever lost power in your home during a storm? How did this limit what you were able to do? What machines does your family use to cook food, wash clothes, wash dishes, open canned foods, etc.? How many of these machines use electricity? Point out to the children that electricity is a very important part of their lives.

[2]*How Things Work, Childcraft--The How and Why Library*, vol. 7 (Chicago: World Book, 1982), 232-233.

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First Grade - Science - Lesson 19 - Electricity

Objective

Classify objects as conductors or insulators.

Materials

Simple circuit from Lesson 18

2 additional paper clips

Wire cutters or pliers

Procedure

Copy the following chart onto the blackboard (add any objects that you would like to test to the chart):

Materials/Objects	Conductor	Insulator
fork		
thin piece of wood or cardboard		
pencil		
key		
cork		
plastic pen		
glass		
eraser		

Tell the children that they are going to test the materials and objects listed on the board to see if they are conductors or insulators. Remind the children that conductors are materials that allow electric charges to pass through them and insulators are materials that do not allow electric charges to pass through them, but instead keep the electric charge in the conductor.

Using the simple circuit from Lesson 18, cut one side of the loop in half. Using pliers or wire cutters, strip the plastic coating from the ends and attach a paper clip to each end. Touch the two paper clips together to make sure your conductor tester is working.

Touch the object you are testing with both clips. Tell the children that if the bulb lights up, the object they are testing has filled in the circuit so that it is now complete. Because the circuit is complete, electricity is able to pass in a loop from the battery to the bulb.

As you test each object, put a check mark in the appropriate column to indicate whether the object is a conductor or an insulator. Tell the children that some materials are better conductors than others. When the bulb shines brightly the object is a better conductor in the circuit, than when the bulb shines dimly.

Ask: Do the objects that are classified as conductors have anything in common? Explain to the children that metals are the best conductors.

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First Grade - Science - Lesson 20 - Electricity

Objectives

Communicate the structure of a flashlight.

Identify safety practices and hazards when using electricity.

Materials

Flashlights, batteries

Procedure

Tell the children that a flashlight runs on electricity, but unlike a television or a radio a flashlight does not have to be plugged into an electrical outlet. Ask: Does anyone know what we put inside a flashlight to make the flashlight work? (a battery, or batteries) Say: A battery has chemicals stored in it that make energy for the flashlight. The energy travels from the battery through the bulb and back to the battery. This electric current causes the bulb and therefore the flashlight to shine.

Show the children the parts of a flashlight by holding up a flashlight that is assembled and then taking it apart and showing the parts (the battery or batteries, the bulb, the metal connection to the bulb, the switch). You may want to draw a picture of the flashlight on the board and label its parts. Have the children sit in pairs and give each pair a flashlight. If you do not have enough flashlights to do this, hand out however many you do have and have the children rotate the flashlights around so that every child has the opportunity to see the parts of the flashlight.

As you discuss the functions of the basic flashlight parts, have the children disassemble their flashlights to look at the parts up close. Point out that the positive end of the battery has a bump or raised knob. Also, a plus sign is marked on the outside rim at that end of the battery. Tell the children that the connection between the battery and the bulb is formed when the positive end of the battery touches the metal strip below the bulb.

After the children have taken the flashlight apart, ask them to reassemble it and try to switch it on. Some children's flashlights may not work after they have reassembled them. If this happens, ask the class to think about the reasons why the flashlight is not working (batteries in the wrong way, bulb has burned out, batteries are dead). Tell the children that the first thing to check is whether or not the batteries are in the right way by making sure that the positive end is facing the appropriate direction.

Draw a comparison for the class between a flashlight and an electric light in a person's home. Explain that a flashlight works in much the same way a light in your home does. Say: The energy in the flashlight comes from the chemicals in the battery, whereas the energy in an electrical outlet comes from a power plant. The battery in the flashlight is like the electrical outlet. The switch on the side of the flashlight is like the switch you find on a wall or on a lamp.

Explain to the children that although we are working with batteries today, experimenting with electricity can be very dangerous. Tell the children that there are safety rules that they should remember regarding electricity and electric outlets. List the following safety rules on the board and discuss:

1. Never put your finger or anything other than a plug in an electrical outlet.

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2. Never touch a switch or electrical appliance when your hands are wet or when you are in the bathtub or shower.

3. Never touch a cord if the insulation is worn off.

4. Never overload an outlet by plugging in too many cords.

5. Never unplug by pulling on the cord.

6. Never put your finger in a lamp socket.

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First Grade - Science - Lesson 21 - Electricity

Objective

Recognize the accomplishments of Thomas Edison.

Suggested Books

Adler, David A. *Thomas Alva Edison, Great Inventor: A First Biography*. New York: Holiday House, 1990.

Parker, Steve. *Thomas Edison and Electricity*. New York: Harper Collins, 1992.

Quackenbush, Robert. *What Has Wild Tom Done Now?!!: A Story of Thomas Alva Edison*.

Englewood Cliffs, NJ: Prentice-Hall, l981.

Materials

Light bulb pattern and sentence strip ditto--provided

Construction paper

Procedure

Tell the children that no other inventor has made more inventions than Thomas Alva Edison. Some of his inventions include the light bulb, the phonograph, and motion pictures. He also made improvements to other people's inventions such as the typewriter and the telephone. To familiarize the children with the life and accomplishments of Thomas Edison, read excerpts from one of the suggested books above or one with which you are familiar.

Every day we use light bulbs, of which Thomas Edison was the inventor. Imagine what our lives would be like if we were not able to flip a switch and have a light shine. Before we had electric light, people used candles and then gas lamps to light their homes and places of work.

The job of an inventor is a hard one. Even though a person may come up with an idea for a new invention, they must work very hard to make their idea a reality. Read the following information to the class:

Edison was already a successful inventor when he began working on the electric light, or lamp, as he called it. But the job wasn't easy, even for him. A great many attempts and errors, as well as a lot of plain hard work, went into this invention.[3]

[3] *How Things Work, Childcraft--The How and Why Library*, vol. 7 (Chicago: World Book, 1982), 206.

Brainstorm with the children the different things that electric lights help us do. Write the phrases on the board (cook dinner in the kitchen after dark, read and/or write at night, and street lights help us drive or walk outside at night). Give each child a light bulb pattern sheet and sentence strip ditto. Have the children lightly color the lampshade. Next, tell them to cut out the light bulb and lampshade patterns. Using a phrase from the board or one of their own, have the children fill in the sentence strip that says "I use a light when I..." When they have finished, have the children paste the light bulb, lampshade, and sentence strips on a large piece of construction

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paper.

Ask various children to share their responses with the class. Ask how they could manage to do these things without electric lights.

1.

2.

3.