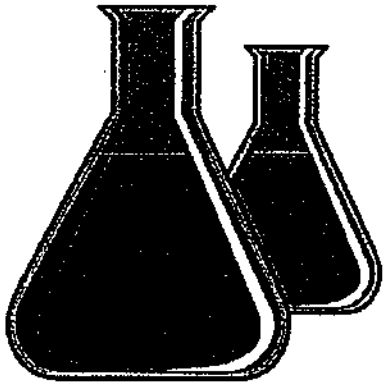
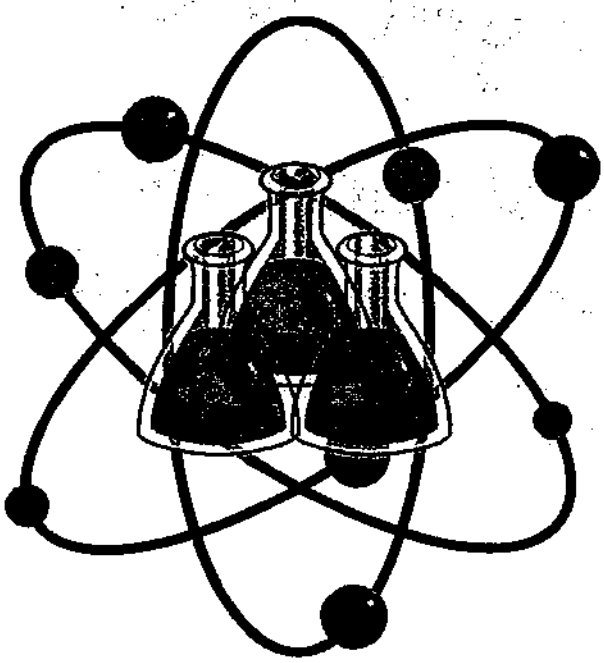
7th Grade Science



Mrs.Howard



Name _____ Date: _____

Current Electricity

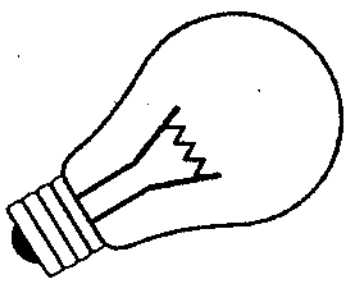
Electricity is an important part of your life. This morning, you probably shut off your alarm clock (unless your alarm clock is your mom waking you up), and turned on your bedroom light. You might have used a toaster while making breakfast and you probably opened your refrigerator at least once. Maybe you flipped on the TV to watch a few minutes before you finished getting ready for school. Without electricity, you would have had to rethink quite a few parts of your morning routine.

While electricity is extremely useful, it does need a few things to work. For example, it needs to travel. An electric current is the flow of electric charge, and a vital part of making sure that electricity makes it into our homes and into our fridge, hair dryer and television.

In order to successfully get electricity to travel to another place, it needs a power source and a circuit. The power source provides the steady flow of electrons that is needed to make your appliance or toy work. An example of a power source might be a battery or a main breaker in your home.

Once you have a power source, you need a way for all those electrons to get moving. You need a circuit, or a path, for the electricity to move on. The circuit needs to ultimately be a giant circle, leading from the power source, around the circuit, and back to the power source. The electrons move out of the power source and on the circuit, creating current electricity. This current can flow through your home, or through your battery operated remote control. As long as there is a circuit that leads to and from a power source, electricity will move along the path. A circuit that meets all of these requirements and allows electricity to move is known as a closed circuit. If there is a break in the circuit or if the circuit is incomplete, the circuit is known as an open circuit.

Next time you turn on your light in the morning or watch your favorite television show, remember that current electricity makes that possible.



Name _____ Date: _____

Static Electricity

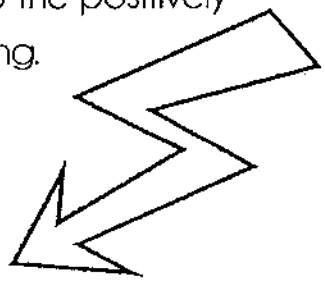
Have you ever been shocked when you touched someone? Or, have you ever had a sock stick to your t-shirt? If you have experienced these things, you have had a first-hand meeting with static electricity. In order to know why your hair flies out of control in the winter months, or why that sock is sticking to your pants, you need to know a little bit about the charge of atoms.

Atoms are the foundations of matter, super small things made up of protons, electrons and neutrons. Each atom has a center, or nucleus, that is made up of protons and neutrons. Hanging out and circling around the nucleus are electrons. Protons and electrons have a unique relationship - they are attracted to each other. Not in a boyfriend-girlfriend way, but more in an electrical charge type of way. You see, the protons have a positive charge and the electrons have a negative charge. These two charges are opposite, and attract one another. The positive protons in the nucleus keep the negative electrons circling nearby.

In a typical atom, the number of protons and electrons are neutral. This makes sure that the atom carries no charge because all of the positive protons cancel out the charge that the negative electrons have. However, sometimes electrons want to leave the atom and check out other atoms that are hanging around. When an electron jumps ship, it can leave the atom unbalanced and charged up. Electrons jump to other atoms and this causes a spark of static electricity.

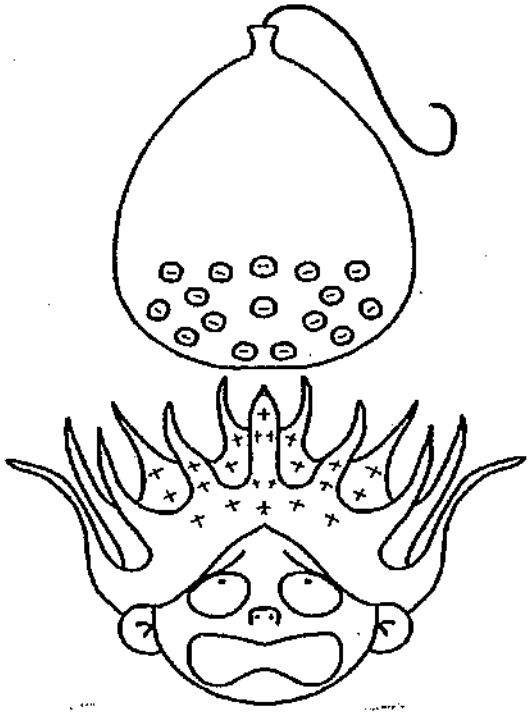
Static electricity can show itself in small or large ways. If you shuffle your feet on carpet, electrons jump ship from the carpet to you. Then, when you touch a doorknob, the extra electrons jump from you to the knob and cause a spark. This spark is relatively small compared to what static electricity can do in a larger way. Lightning is probably the best, and biggest, example of static electricity that you can easily see. Lots of extra electrons moving from negatively charged clouds to the positively charged earth can cause a big burst of static electricity - lightning.

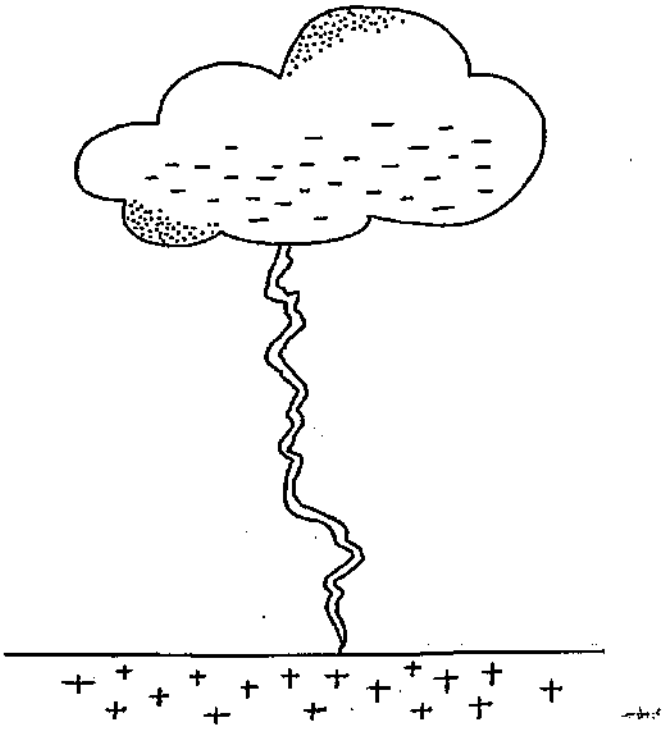
The next time you get shocked from a doorknob, you will now know to thank jumping electrons for the spark.



Name _____ Date: _____

Explain what is happening in each illustration below in terms of electricity. Write your explanation in the box.



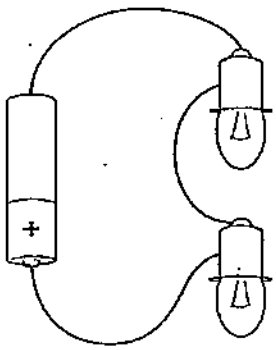


Name _____ Date: _____

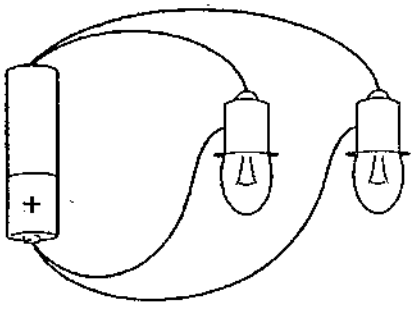
Circuits

Electricity needs a path to follow. Circuits are paths that allow electrons to flow through, creating electricity. Simple circuits have three main parts: a power source, a path, and a load. A power source can be a battery or an outlet. The path must be made out of a conductor, which is a material that allows electrons to flow through easily. A load is the object that will use the electricity. Some circuits include switches, to allow or stop the flow of electrons.

There are two types of circuits: series circuits and parallel circuits. Series circuits only have one pathway for the electrons or electric current to flow. If the path of electricity is broken, the flow of electricity is stopped. Parallel circuits have more than one pathway for the current to flow. If the path of electricity is broken in a parallel circuit, the electrical current can choose another path to take. Think of lights used to decorate Christmas trees. If the lights are on a series circuit and one lightbulb burns out, this will stop the flow of electrons. When this happens, the path has been broken and none of the lights will light up. On the other hand, if the lights are on a parallel circuit and one light goes out, the flow of electrons will find another path to take. The other lights will remain lit because of the additional path.



Series Circuit



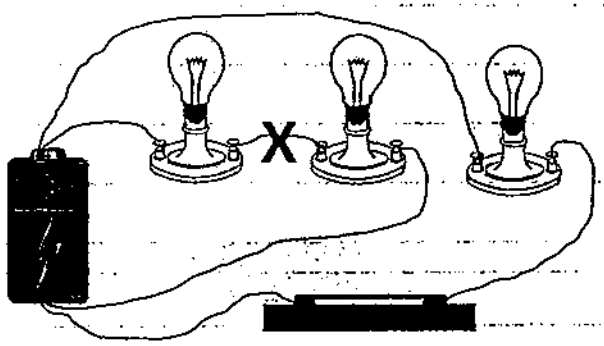
Parallel Circuit

Name: _____ Date: _____ Class: _____

Pick What's Lit

Directions: The following are complete circuits—but what would happen if you cut the wire where the X is? Which bulbs will stay lit, and which won't work? If it stays lit, color it yellow. If it doesn't, put an X on the bulb. Using green, trace the path of the circuit that works.

1.



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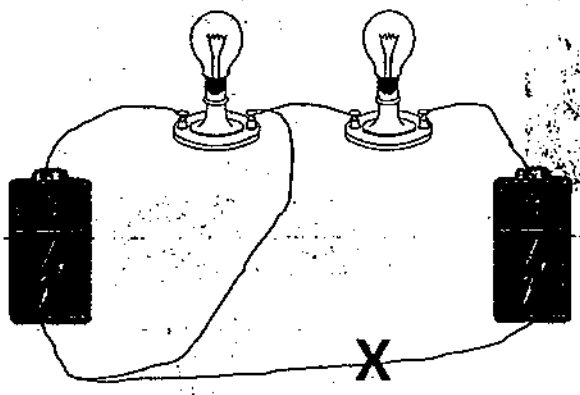

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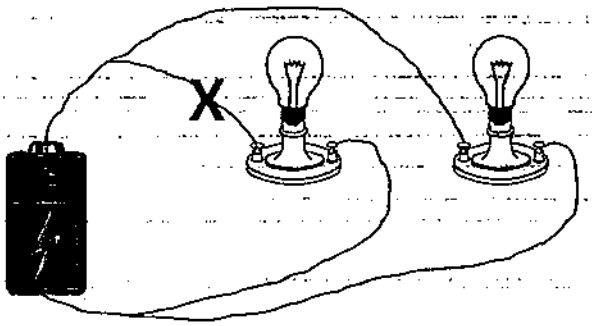

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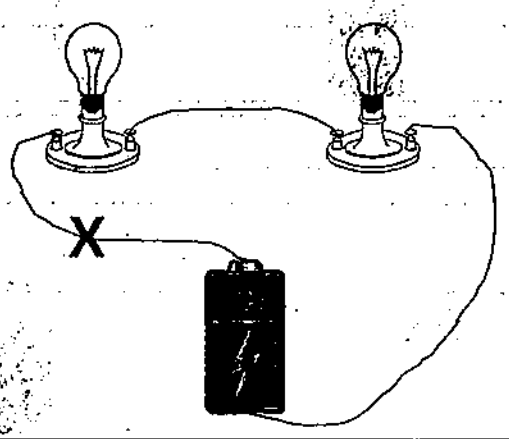

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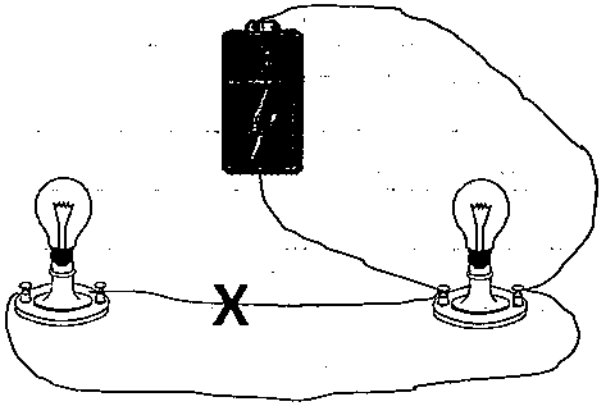

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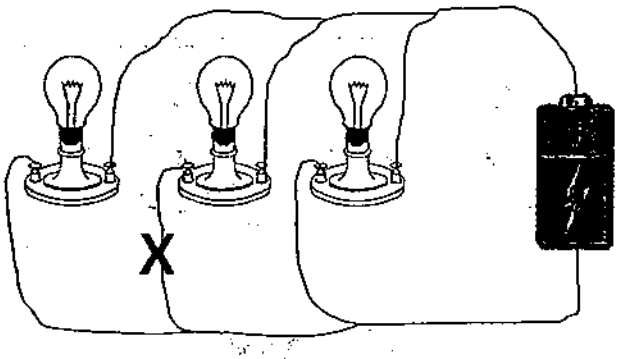


Directions: Circle the letter of the correct answer below.

7. What is the purpose of the rubber coating on wires?

   A. serves as a conductor for the circuit

   B. prevents the light bulb from using up too much energy

   C. serves as an insulator for protection

   D. closes the circuit

8. Which is NOT a required part of a complete circuit designed to light a light bulb?

   A. battery

   B. switch

   C. wire

   D. light bulb

9. A circuit is open when...

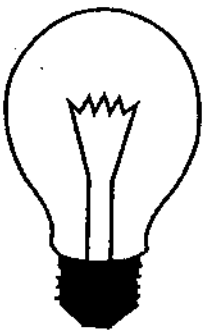
   A. the switch complete the circuit

   B. the light bulb is lit

   C. the circuit is incomplete

   D. a buzzer is used instead of a light bulb

10. Finish drawing the circuit below by using only one of the switches to make a closed circuit.



Name _____ Date: _____

Insulators and Conductors: Comprehension Questions

1. Determine the meaning of the word "hinder" as used in the text.

2. According to the text, why are people conductors of electric currents?

3. Explain the meaning of this sentence, "Both types of materials serve their purpose in our world of electricity."

4. Based on what you read in the text, infer why insulators are important.

Insulator or Conductor?

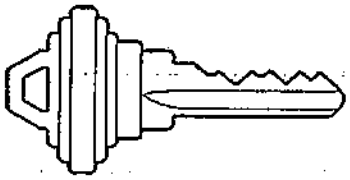
Name _____ Date: _____

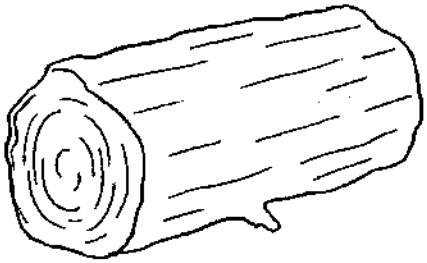
Directions: Determine if the materials are insulators or conductors.

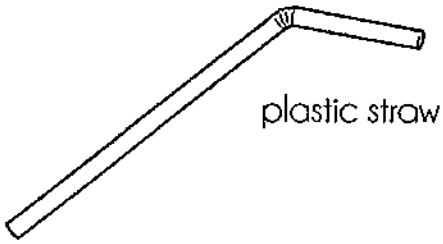
1. 

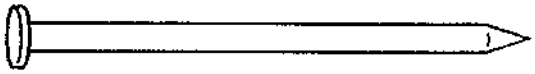
2. 
human body

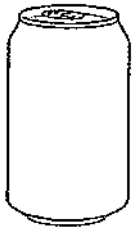
3. 
rubber band

4. 

5. 

6. 
plastic straw

7. 

8. 

Electricity Assessment

Name _____ Date: _____

1. Which of the following objects is a conductor?

a. log of wood
b. plastic straw
c. nail
d. pencil

2. Which of the following materials is an insulator?

a. aluminum foil
b. rubber band
c. a penny
d. water

3. Which of the following is an example of a load in a circuit?

a. battery
b. outlet
c. wire
d. small fan

4. Which of the following is an example of static-electricity?

a. doorbell ringing
b. lightbulb turning on
c. lightning
d. rain

5. If one lightbulb on a string of lights turns off, but the others say on, this is an example of a/an...

a. parallel circuit
b. series circuit
c. static electricity
d. insulation

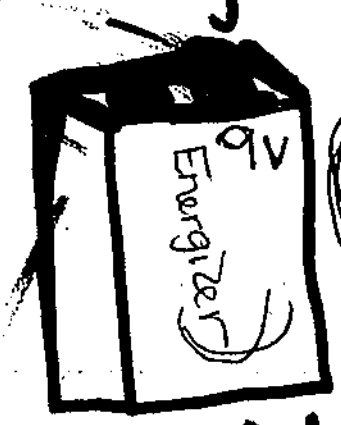
6. Electricity found in nature is known as...

a. circuits
b. static electricity
c. parallel circuit
d. current electricity

Optional challenge

make a circuit!

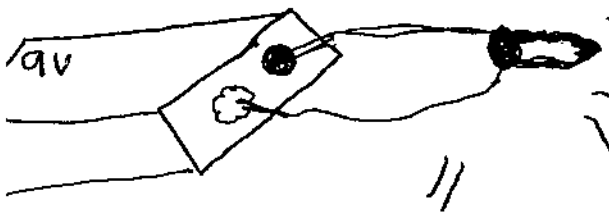
Look around your house for a 9V battery. Maybe there is one in a junk drawer, garage, or basement



(I can't draw but hopefully you get what I'm saying :)

Next: find some old Christmas lights. Cut a Section off

You will have to cut some of the rubber Protectant where the wires will be exposed



Put one side of wire on Positive side of the 9V

Put the other side of wire on negative

Does it light up?