Getting to Know: Electric Circuits

In December, many people put up lights on their homes. Stores put up lighted signs. Some families decorate their homes with strings of colored lights. There is something wonderful about colored lights on a cold winter evening. When you plug them in, the beauty can take your breath away!

Stores use colorful lights to attract customers.

What makes lights work?

All lights need electricity to work. That is why they have to be plugged in. Once you plug them in and switch them on, electricity can flow through them. *Electricity* is a flow of tiny particles that have an electric charge. The particles have energy. When they flow through a light, the energy makes the light glow.

Electric circuits make it possible to light up the night.

How do the particles get to the light?

Inside every electric device is an *electric circui*t. The word "circuit" is related to the word "circle." For electricity to move through wire, the wire must form a complete circuit. The circuit does not have to be round, but the beginning and the end of the wire must be connected.

A string of lights is a big circuit. If the lights are unplugged, the circuit is broken. Electricity cannot flow, so the lights stay off. Many strings of lights also have *switches* in them.

When you switch the lights off, the switch makes a break in the circuit. Electricity cannot flow, so the lights stay off. When you switch the lights on, the circuit is complete. Electricity can flow, and the lights come on.

Misconception 1: ***Ok, let me see if I get it. Electricity flows through metal wires in a circuit like water flows through a hose. Is that right?***

No, in an electric circuit, the wires are solid metal. There is not a hole in the center. When electricity flows through wires, the electricity is moving through tiny particles of the metal wire.

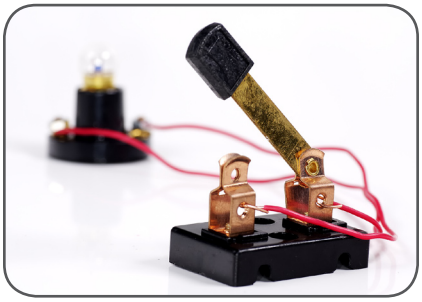
My video game controller does not plug into an outlet. Does it have a circuit?

Anything that uses electricity contains circuits. The charged particles that flow through electric circuits can come from batteries, too. The circuits inside your video game work the same way.

Why do some electronics get hot?

Electricity is a form of energy. Electrical energy can change into other forms of energy. Sometimes, electrical energy turns into thermal energy, or heat. A toaster makes lots of heat. Electricity flows through the electrical circuit in the toaster. The wires in the circuit get very hot when electricity flows through them. The heat from electrical energy is what toasts the bread.

A toaster has an electric circuit that produces thermal energy.



A simple circuit can be made with a light bulb, a switch, and a battery. Which one is missing from this picture?

So what does a switch do?

A switch is a way to easily open and close a circuit. Remember, electric current only flows if the circuit is complete. The circuit has to be complete so that the charged particles can keep moving. If there is a break in the circuit, the charged particles cannot flow any more.

When the switch is off, the circuit is open and particles cannot flow. When the switch is on, the circuit is closed and particles can move through the circuit.

Now that you know more about circuits, when it is time to turn on the lights or to switch on holiday decorations, you can tell your family, "I want to be the one to close the circuit this year!"

Misconception 2: ***Toasters and other electric items must use up a lot of energy!***

Energy is never used up, but it does change forms. In a string of lights, the bulbs change electrical energy into light energy and heat energy. Once the electricity is changed into light or heat, we cannot use it to power electric items any more.