

ELECTRICITY



Discussion Guide (for use during or after reading)

1. What is electricity? (What Is Electricity?, p. 4-5)
 - a. Electricity is a form of energy. Energy makes things move and do work. Even people are powered by electricity!
2. What is matter? What are atoms? What are electrons? (All Charged Up, p. 8-9)
 - a. Matter makes up all things. All matter is made of atoms, which are made of even smaller particles that carry a positive or neutral electric charge in the center of the atom. Electrons have a negative electric charge and circle around the nucleus of the atom. Atoms can lose or gain electrons, and this movement is considered electricity.
3. Explain how static electricity is generated and transferred when you rub your feet on carpet and then touch a metal doorknob. (Static Electricity, p. 10-11)
 - a. When you rub your feet on a carpet, the electrons from the carpet jump to your body. Your body now has extra electrons and a negative electric charge. Because electrons like to flow away from areas with negative charges, they will jump to the metal doorknob when you touch it. You feel that movement of electricity as an electric shock!
4. Why is current electricity considered to be more useful than static electricity? (Current Electricity, p. 12-13)
 - a. Current electricity is considered to be more useful than static electricity because in static electricity, the electric current is released all at once. Current electricity allows energy to flow continuously. Because of this, people use current electricity rather than static electricity to power ordinary machines.
5. What is a circuit? (Current Electricity, p. 12-13)
 - a. A circuit is an electric current that flows in a loop. Simple circuits have three main components: an energy source (which can include batteries), an object that needs an electric current to work, and a wire to connect them.

6. What are switches and how do they work in circuits? (Circuits and Switches, p. 14-15)
 - a. Switches can be added to a circuit to stop the continuous flow of electricity. When you open the circuit, the electricity cannot flow in a loop and the energy stops. Closing the circuit, on the other hand, connects the loop, once more allowing energy to flow.
7. Describe at least two ways we use electricity to create other forms of energy. (How Do We Use Electricity?, p. 18-19)
 - a. We can use electricity to make other forms of energy. For example, lamps use electricity to make light energy. In addition, people use electric motors to turn electricity into mechanical energy like an engine in a car.
8. Explain how electric generators driven by turbines convert mechanical energy to electrical energy. (Generating Electricity, p. 20-23)
 - a. Electric generators are used to convert mechanical energy into electric energy. Steam or falling water spin the blades of turbines, which causes magnets inside the generator to spin around a magnetic wire. This pushes and pulls on the electrons inside the wire. That movement creates an electric current!
9. Describe some potential problems caused by fossil fuels and nuclear fuel. How are people working to address these problems? (Sources of Electric Power, p. 26-27)
 - a. Although burning fossil fuels and using nuclear fuel can produce energy, there are concerns with this source of power. Fossil fuels are finite, meaning we will eventually run out of them, burning fossil fuels harms the planet, and nuclear fuel leaves behind dangerous waste. Some scientists have found other ways of producing energy that are not as concerning including converting energy from running water, using wind turbines, and using solar panels to convert the sun's energy. These sources of energy are not as harmful to the planet as fossil fuels or nuclear fuel and will not run out.
10. According to the text, what can you do to help reduce electricity use? (Reducing Electricity Use, p. 28-29)
 - a. According to the text, we should consider the amount of electricity we use each day. We should ask ourselves if we really need to be using that electric power or if it can be switched off to reduce electricity use.