Teacher's Guide
Grade 5: Electricity

TEKS 5.6 Force, Motion, and Energy: The student knows that energy occurs in many forms and can be observed in cycles, patterns, and systems. The student is expected to:

B) demonstrate that the flow of electricity in circuits requires a complete path through which an electric current can pass and can produce light, heat, and sound.

Background Information: In this unit, students learn that electric current involves the movement of small electric charges along a closed pathway called a circuit. In order to use electricity to light a bulb or to power an electrical device, the electric current must have a complete circuit to flow through. The circuit must also be made of materials that are electrical conductors and must have a power source that produces electric current, such as a battery. This unit also reinforces how important electricity is in our everyday lives.

Students explore how electric current flowing in a closed circuit can be used to make temporary magnets, called electromagnets, which make electric doorbells and junkyard cranes work.

Prerequisite Knowledge: Students know that electricity is a form of energy we use every day. They also know that energy, such as electricity, can be converted to other types of energy. Electricity is the form of energy we use the most because it is easily converted to other forms of energy by the electrical devices we use.

Common Misconceptions: Students may think that in an open circuit, current flows to the place in the circuit where there is a space or gap and then "turns back" to the battery when it cannot flow through the gap. It is important for students to understand that in an open circuit, current does not flow at all; electricity only travels in a closed path.

Students may confuse magnetism and electricity. Magnetism is a force that can attract or repel metal objects made of iron. Magnetism acts across a distance without having to touch the object.

Essential Questions:

1. What is current electricity and how is it used?

Current electricity is the flow of small electric charges through a closed circuit. A power source, such as a battery, converts chemical energy to electricity. The circuit is made of materials that are electrical conductors and usually contains some type of device that requires electricity in order to work. Electricity flows through the circuit and through the electrical device, such as a light bulb, which causes it to work.

2. How does the transfer of energy create electricity?

Energy cannot be created or destroyed, but it can be stored in various forms. One way to store energy is in the form of chemical energy in a battery. When connected to a circuit, the chemical energy that is stored in the battery is converted to current electricity and electric current flows through the circuit.

3. What is a simple electric circuit?

A simple electric circuit consists of a power source, such as a battery, a closed pathway, or closed circuit, made of a material that conducts electricity and a device that requires electricity in order to function, such as a light bulb.

4. How can the power of an electromagnet be increased?

Electric current can be used to create an electromagnet. An electromagnet is a temporary magnet that produces a magnetic field when current flows around an iron core. An electromagnet can be made using a battery, an iron nail, and copper wire. When the copper wire is coiled tightly around the iron nail and the ends of the copper wire are connected to different terminals of the battery, a magnetic field is created. The power of the magnet is increased by adding more wire coils.

Notes: