

# > IDENTIFYING CIRCUITS

## GRADE 5



Students have an opportunity to examine the workings of a power window circuit system.

### DETAILS

#### Featured Trade(s)

Automotive Service Technician

#### Contributors

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#### Concepts

Mechanisms using electricity

#### Materials

Power seat circuit kit.

#### Time

15 minutes

### TRADES CONNECTION: WHY DO I NEED TO LEARN THIS?

Automotive service technicians diagnose and troubleshoot electrical problems within a vehicle. The number of circuits and electrical systems in a vehicle is overwhelming, but technicians must understand them for proper repair and safe operation. A multimeter is a tool used by automotive service technicians to take electrical readings over different points of a circuit.

### CURRICULUM CONNECTIONS

GLO 5-5. Demonstrate safe methods for the study of magnetism and electricity, identify methods for measurement and control, and apply techniques for evaluating magnetic and electrical properties of materials.

SLO:5. Distinguish electrical conductors from insulators.

SLO:10. Draw and interpret, with guidance, circuit diagrams that include symbols for switches, power sources, resistors, lights, and motors.

GLO:5-6. Construct simple circuits and apply an understanding of circuits to the construction and control of motorized devices.

SLO: 1. Identify example applications of electrical devices in the school and home environments and classify the kinds of uses.

SLO: 3. Recognize the importance of switches and other control mechanisms to the design and operation of electrical devices and identify the purposes of switches in particular applications.

### QUESTIONS?

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### PREPARATION

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Have the kit plugged into the wall outlet using the adapter and cord, or have the battery connected to the side of the box.

### PROCEDURE

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Students will be able to identify a switch, motors, power source, and circuit system running throughout the kit.

Challenge students to identify and trace the different circuit components of the system, creating a stimulating and engaging interactive activity!

1. Show your class the video that is linked to the lesson.
2. Introduce the window motor kit to the class.
3. Inform students that a power window uses circuits to operate. Have students identify (or even label) the power sources, switches, overload protections, and motor that they see.
4. Using the switches, operate the power motor. Discuss with students what happens when the switches work and the circuit closes. Potential questions might include: what moves? Where? What purposes do you see? Why? Which switch does what?
5. Talk about insulators and conductors. What is the purpose of an insulator? What is the purpose of a conductor? Using the power window video, explain how the wire is the conductor and the rubber coating acts as an insulator. NOTE: You'll need to find that part of the video prior to the lesson. Identify the insulator and conductors in the circuit. Using the colours, challenge students to trace the circuits and identify the different components of each circuit system.

6. Hold the magnet on top of one of the testing points to show the magnetic field that is created with the flow of electrons. Use both directions of travel to show the different polarity of the field.
7. As a class, draw a schematic for the power window and compare it to the labelling of the kit.

### DISCUSSION QUESTIONS

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1. What is the purpose of this electrical device? How does this benefit us?
2. What is the importance of this circuit to the working of this device?
3. What is an insulator and how does it protect us when we are working with electricity?
4. What is a conductor?