



Equipment Manager – Simple Circuit

A golf course Equipment Manager must be able to diagnose and troubleshoot a variety of problems as he/she cares for the equipment on a golf course. Understanding basic electrical operation is an essential skill and helps to diagnose root causes and repair electrical issues.

Student Learning Objectives

1. Students should learn the basics of a DC (direct current) electric circuit.

A circuit is a complete path along which electricity flows. It helps make electricity practical by connecting the negative and positively charged ends of a power source to a conductor and allows it to charge the load.

2. Students should be able to name the essential elements of a basic electrical circuit.

Power source (the battery), Load (the light bulb) and Conductor (the wire(s)).

3. Students should understand how to troubleshoot their circuits and what are common causes of failure to work.

The circuit must be closed to operate. Other common problems? Short to ground before load (dead short lots of smoke), short to ground after load (nothing noticeable), short to power (load is always operating) and an open circuit (nothing happens).

Field Trip Requirements

This field trip requires:

- Start with a disabled piece of equipment, such as head light. A head light does not turn on due to an open circuit.
- 3-volt battery
- Light Emitting Diode (colored LED)
- Tape

Field Trip Outline

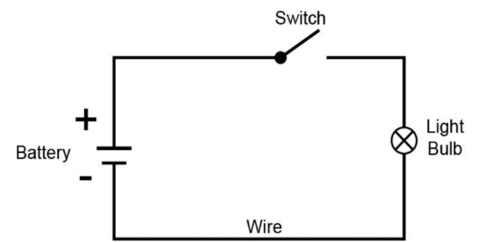
The equipment manager or golf course representative should begin the lesson by asking the students what they understand about electricity. A good way to start this lab is to attempt to turn on a piece of equipment whose headlight has been disabled. If possible, have one of the students try to turn it on. Ask the students to make a guess as to what the problem might be. Now explain to the students we are going to move from their observations regarding switches and electricity to how electricity is used in the various equipment at the golf course. Explain how equipment managers must have a basic understanding of circuits to perform their jobs and reference the malfunctioning piece of equipment as an example.

Have the students build their own circuits with the battery, LED and tape.

Now that the circuit has been built, it can be used as a model to explain the terms “short to power”, “short to ground” and “dead short.” Other electrical principles can be discussed as time and the age of the students allows.

Ask the students share a hypothesis on why the piece of the equipment did not work based on what they have recently learned with their own circuits.

Move to the equipment with the disabled headlight. If possible, show the students how to fix the equipment and have one of them turn it on.



Student Worksheet

1. What is a circuit? How does electricity work? Expect a wide range of answers here and be prepared to share a simple definition.
2. What is the purpose of a switch? It can open or close a conductive path.
3. What are some common problems that can cause the light bulb not to work?
4. Can you think of an example where you could have used this knowledge to fix something at home?”

Additional Resources

You can create hands-on kits for the circuitry lesson plan by visiting a local hardware/auto parts store, or there are kits approved for students available here: <https://www.enasco.com/p/NE30039>

