

SECTION 1

Schematic Diagrams and Circuits

SECTION OBJECTIVES

- Interpret and construct circuit diagrams.
- Identify circuits as open or closed.
- Deduce the potential difference across the circuit load, given the potential difference across the battery's terminals.

schematic diagram

a representation of a circuit that uses lines to represent wires and different symbols to represent components

SCHEMATIC DIAGRAMS

Take a few minutes to examine the battery and light bulb in **Figure 1(a)**; then draw a diagram of each element in the photograph and its connection. How easily could your diagram be interpreted by someone else? Could the elements in your diagram be used to depict a string of decorative lights, such as those draped over the trees of the San Antonio Riverwalk?

A diagram that depicts the construction of an electrical apparatus is called a **schematic diagram**. The schematic diagram shown in **Figure 1(b)** uses symbols to represent the bulb, battery, and wire from **Figure 1(a)**. Note that these same symbols can be used to describe these elements in any electrical apparatus. This way, schematic diagrams can be read by anyone familiar with the standard set of symbols.

Reading schematic diagrams allows us to determine how the parts in an electrical device are arranged. In this chapter, you will see how the arrangement of resistors in an electrical device can affect the current in and potential difference across the other elements in the device. The ability to interpret schematic diagrams for complicated electrical equipment is an essential skill for solving problems involving electricity.

As shown in **Table 1**, each element used in a piece of electrical equipment is represented by a symbol in schematic diagrams that reflects the element's construction or function. For example, the schematic-diagram symbol that represents an open switch resembles the open knife switch that is shown in the corresponding photograph. Note that **Table 1** also includes other forms of schematic-diagram symbols; these alternative symbols will not be used in this book.

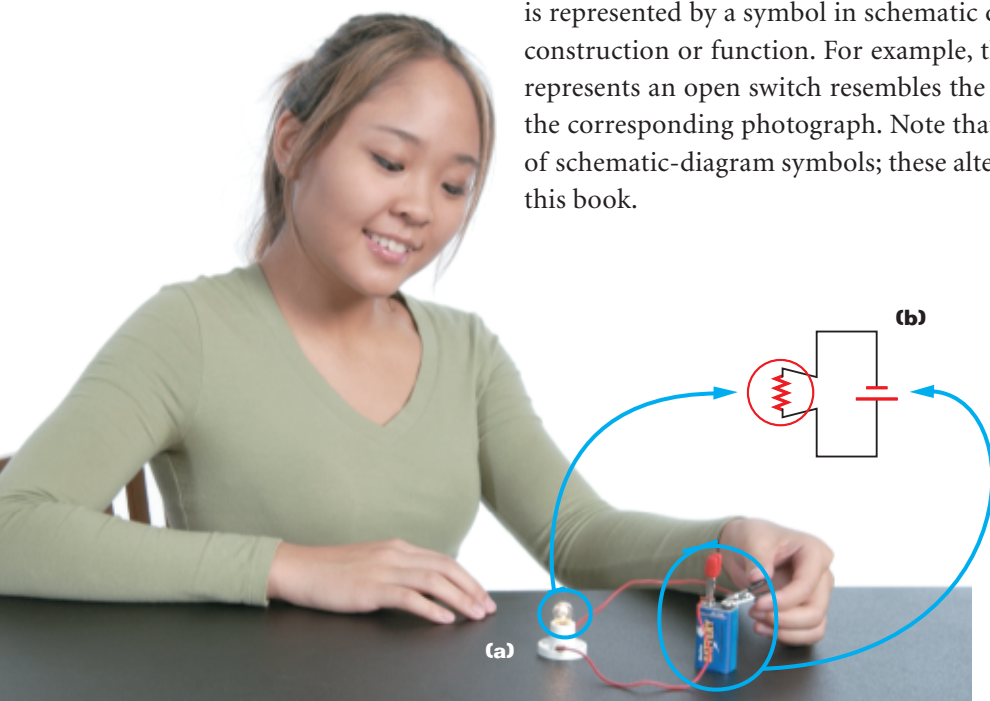


Figure 1

(a) When this battery is connected to a light bulb, the potential difference across the battery generates a current that illuminates the bulb.
(b) The connections between the light bulb and battery can be represented in a schematic diagram.