

Section 10.1 Pushing Charges Around – Answer Key

1) What are the two locations on a battery called where contact is necessary?

The locations on the battery are called the positive terminal and the negative terminal.

2) Define *circuit*. **A circuit is a path where electric current can flow.**

3) Define switch. **A switch is a device for turning an electrical current on and off.**

4) Draw the symbols for the following words; Conducting wire, cell, battery, lamp, switch and resistor.

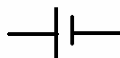
Conducting Wire



Lamp



Cell



Switch



Battery



Resistor



5) Define circuit diagram. **A circuit diagram is a diagram showing a path where an electrical current flows.**

6) Define *battery*. **A battery is a chemical device capable of converting stored chemical energy into electrical energy.**

7) Define *resistor*. A resistor is a part of a circuit that slows down the current.

8) Define *loads*. **A load is a part of the circuit that resists the flow of electrons and converts electrical energy into another form of energy.**

9) What do all resistors have in common? **All resistors resist the movement of charge.**

10) Define *current*. **Current is the movement of charge.**

11) Compare electrical current to water current. **Volts are the pressure. The flow of water is the same as the flow of electrons. The water pipes are already filled with water the same way electrons are distributed throughout the conductors.**

12) What is the formula for calculating current? Write it in symbols and words.

$$I = Q/t \quad \text{current} = \text{charge moving past a point} / \text{time}$$

13) What is charge measured in? **Charge is measured in coulombs.**

14) What is current measured in? **Current is measured in amperes (amps).**

15) Write table 10.1 in your notes.

	Symbol	Unit (quantity)
Charge	Q	C (coulomb)
Current	I	A (ampere)
Time	T	s (second)

16) What does an ammeter do? **An ammeter measures electric current.**

17) Where do electrons leave the battery? **Electrons leave the negative terminal of the battery.**

18) On average, how far do electrons move in one minute? **On average, electrons move less than 3 cm in one minute.**

19) Compare the distance electrons travel in a wire to water in a pipe. **Wires are already filled with electrons. The same way pipes are already filled with water. This is why both lights and water turn on almost instantly because they don't have a long ways to travel. Both electrons and water move because of pressure.**

20) Do electrons need to touch each other in order to repel? **No, they do not need to touch each other in order to repel.**

21) If 300 C of charge pass a point in a conductor in 6 minutes, what is the current through that point in the conductor?

$$Q = 300 \text{ C} \qquad I = \frac{Q}{t} \qquad 6 \text{ min} \times 60 \text{ seconds} = 360 \text{ seconds}$$

$$T = 6 \text{ minutes} \qquad I = \frac{300}{360} \qquad I = 0.83 \text{ A}$$

When 300 C of charge passes a point in a conductor every 6 minutes, the current in the conductor is 0.84 A.

We must convert minutes to seconds because one ampere is one coulomb per second.

22) Compare the current required by appliances that convert electrical energy into heat, to the current required by devices that convert electrical energy into light or sound. What pattern do you see?

Devices that convert electrical energy into heat require more current than devices that convert electrical energy into light or sound.

23) Which current will be greater, the current passing through an electric iron or the current passing through an electric razor, when each is plugged into a 120V outlet?

The current passing through an electric iron will require more current because it converts electrical energy into heat.