Name: _____   Date: _____

Worksheet: Simple Circuits and Ohm's Law

Completion

1. The flow of electrons through a circuit is called _____.

2. Potential energy is a term that refers to any type of energy that is _____. A difference in the amount of potential energy between two points is called _____.

3. A _____ circuit is a complete, unbroken path, which is made of a conducting material.

4. A _____ is anything that can slow down the flow of electric current.

5. Batteries are made of one or more smaller units, called _____.

6. A circuit where there is only one path for electrons is called a _____ circuit, while one with multiple paths is called a _____ circuit.

7. Ammeters are tools that measure _____. They are always connected in _____ with a load.

8. Voltmeters are tools that measure _____. They are always connected in _____ with a load.

Word Bank	You may use a word more than once, or not at all		
cells	current	resistor	stored
closed	open	series	voltage
	parallel		

9. Complete the chart:
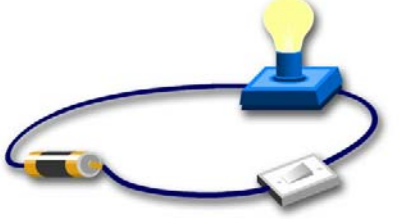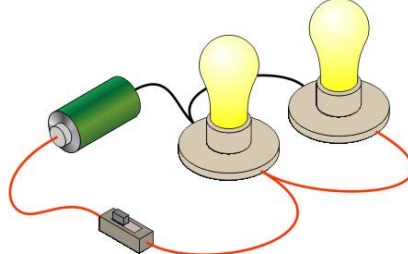
Quantity	Symbol	Unit	Measured using…
	I		
			voltmeter
		ohms (Ω)	---------

Drawing

10. Draw circuit symbols for the following:

a. 2-cell battery	b. closed switch	c. resistor/load
d. light bulb	e. ammeter	f. voltmeter

11. Draw circuit diagrams for the following circuits. Assume each battery is made up of 2 cells.

Picture of Circuit	Schematic circuit diagram

12. Draw a circuit diagram that has the following features: A 3-cell battery, two resistors, 2 light bulbs, and two switches. The resistors are in series with each other. Each light bulb is connected in parallel with the resistors. One switch controls only the two resistors, and one controls both of the light bulbs (but not the resistors).

13. On the circuit diagram below,
    a. label the **positive and negative** electrodes of the battery
    b. draw an **arrow** to show the direction that the current flows
    c. use Ohm's Law to calculate the **resistance** of the resistor. Voltmeter and ammeter readings are indicated on the diagram.


V = 6 V

R = _____

I = 3 A
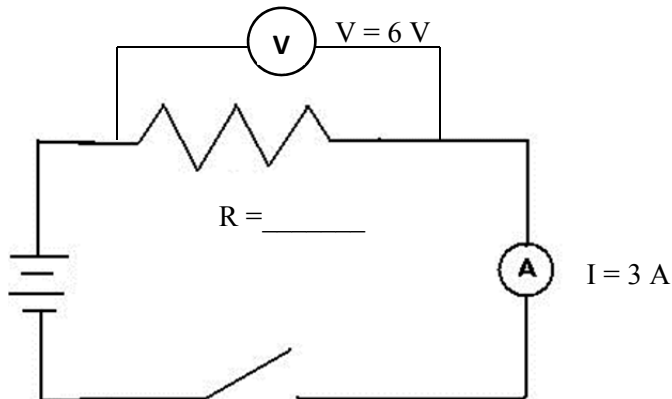
Calculations

14. A technician measures the current going through a light bulb to be 0.35 A. If the resistance of the light bulb is 8 Ω, calculate the potential difference across the light bulb.

15. A 4.5 V battery is used to power a small toy car. The motor in the car has a resistance of 5 Ω. What amount of current runs through the motor?

16. 8 A of current runs through a circuit that is powered by a battery with a potential difference of 10 V. There are **two** identical resistors in this circuit. What is the resistance of **each** of these two resistors?

Extension

17. Study the <u>series</u> circuit diagram below. Review the following concepts:
    - **Potential difference** (voltage) measures the difference in the potential energy, between two points (e.g., out/into battery or before/after a load)
    - **Current** describes the rate at which electricity is flowing through a point

$V_T = 12$ V
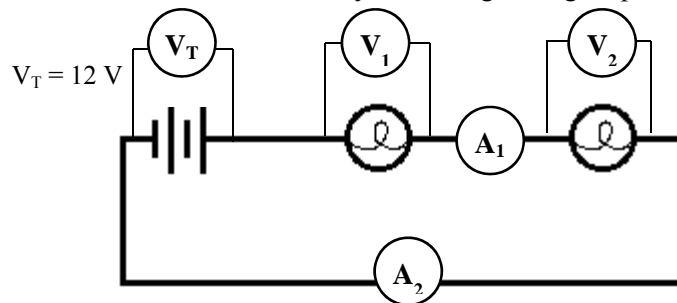
a. Is the current measured at the two ammeters (A_1 and A_2) going to be the same, or different? Explain.

b. The potential difference across the battery is 12 V. Assuming the two light bulbs are identical, predict the potential differences measured by each of the two voltmeters: $V_1 = $ _____ $V_2 = $ _____

18. Study the <u>parallel</u> circuit below.

$V_T = 12$ V

$I_T = 10$ A
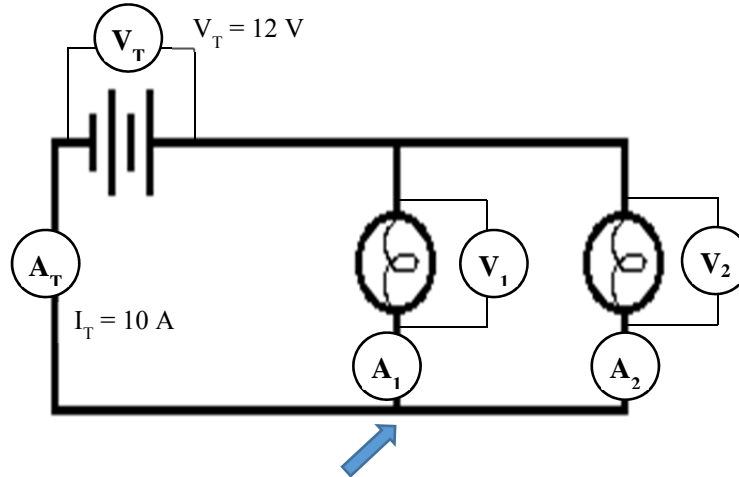
a. Describe what happens to the electrical current when it reaches the fork in the circuit (the arrow)?

b. Predict the current that is measured by each of the two ammeters: $A_1 =$ _____ $A_2 =$ _____

c. Predict the voltage that is measured by each of the two voltmeters: $V_1 =$ _____ $V_2 =$ _____