

Name: KEY

Chapter 7: Electrical Current

You should be familiar with the following vocabulary words: Ohm, Electric current, Electric circuit, Conductor, Insulator, Voltage, Resistance, Ohm's Law, Series circuit, Static Electricity, Parallel circuit, Short circuit, Circuit breaker, switch, Amp or Ampere, Voltage

Use the words above to fill in the following statements:

- 1) Insulator is material that does not easily allow electric charges to flow
- 2) Ohm's Law states that resistance in a circuit is equal to voltage divided by current.
- 3) A complete, unbroken path through which electric charge can flow is electric circuit
- 4) Voltage is the difference in electrical potential energy per charge between two places in a circuit.
- 5) Conductor a material that allows electrons to flow through it with little resistance.
- 6) Parallel circuit is an electric circuit in which different parts of the circuit are on separate paths or branches.
- 7) A circuit breaker is a reusable safety switch that breaks the circuit when the current becomes too high.
- 8) Series circuit is an electric circuit in which all parts are connected one after another along one path.
- 9) A switch allows a circuit to be open or closed, allowing electrons to flow or not flow a circuit.
- 10) A short circuit is a connection that allows current to take the path of least resistance.
- 11) Resistance is the measurement of how difficult it is for charges to flow through an object.
- 12) Ampere (amp) is the SI unit used to measure the rate of current.
- 13) Volt is the SI unit used to measure voltage.
- 14) Ohm is the SI unit used to measure resistance.
- 15) Current is the continuous flow of electrical charges through a material.
- 16) Static electricity is the build up the charges on an object.

Name: _____

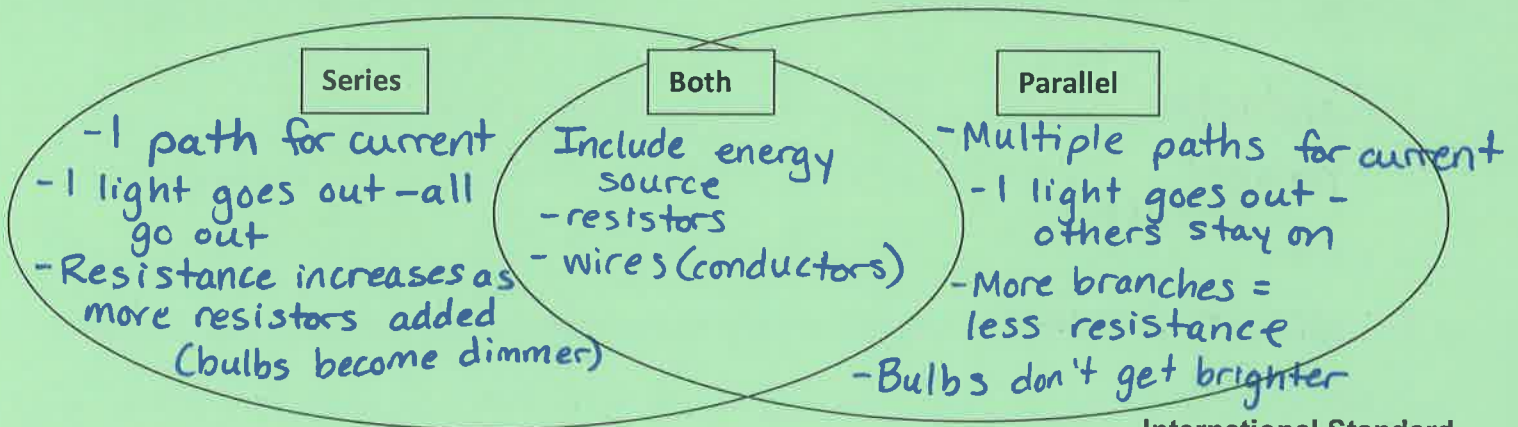
17) Ohm's Law – use the formula below to complete the two tables below.

$$\text{Resistance} = \frac{\text{Voltage}}{\text{Current}}$$

Voltage	Resistance	Current
120 volts	10 ohms	12 amps
120 volts	40 ohms	3 amps
2 volts	10 ohms	.2 amps

Voltage	Resistance	Current
50 volts	5 ohms	10 amps
9 volts	100 ohms	.09 amps
50 volts	250 ohms	0.2 amps

18) Compare and contrast series circuit and parallel circuit (use pags 246 – 247 in your textbook)

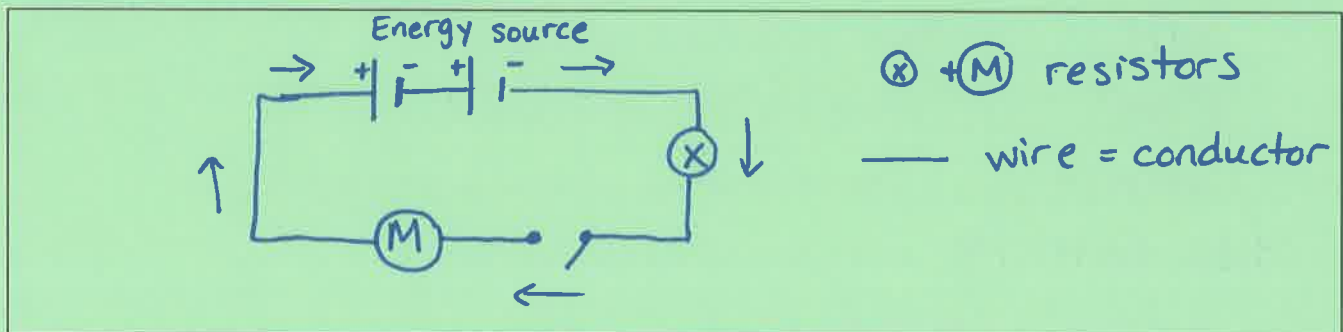


International Standard

(SI) Unit for Electrical Current



19) Directions - Using the SI units for electrical current (above) draw a series circuit in the box below, with two batteries, one bulb, one switch, and one motor. Show the direction of the current and label your resistors, energy source, and one conductor.

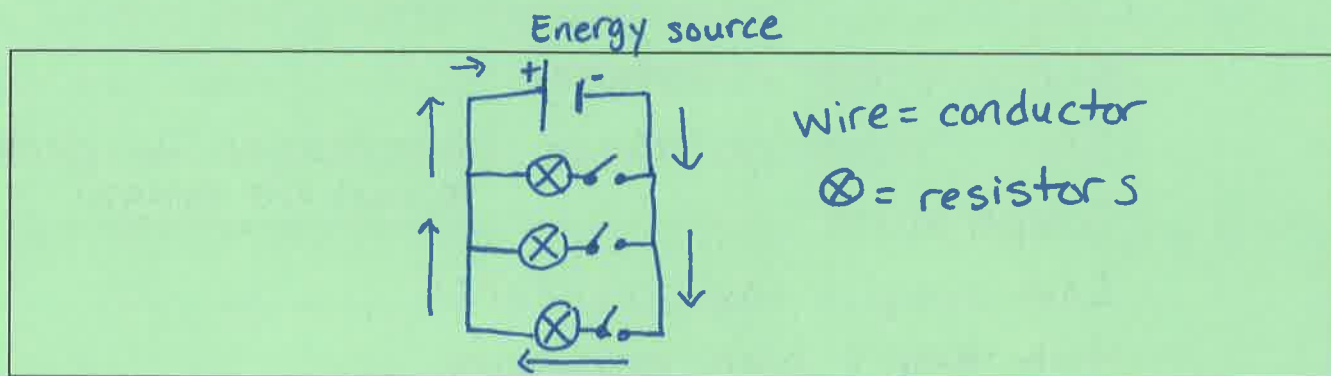


Name: _____

International Standard (SI) Unit for Electrical Current



- 20) Directions - Using the SI units for electrical current (above) draw a parallel circuit in the box below, with one battery, three bulbs, three switches (that turn on and turn off individual lights). Show the direction of the current and label your resistors, energy source, and one conductor.



- 21) Explain why a parallel circuit is a better option than a series circuit for wiring a school building? _____

In a parallel circuit, individual lights/devices can be controlled individually. In a series circuit, everything is connected, so if one device goes out, everything goes out.

- 22) What are the four forms of energy that can be transferred from electrical energy.

1. Heat / thermal - An Example of this energy transfer is light bulb
2. Light - An Example of this energy transfer is light bulb
3. Sound - An Example of this energy transfer is speaker
4. Mechanical - An Example of this energy transfer is motor car

Name: _____

23) Four Factors that Determine Resistance

1. Diameter - how does this affect the electrical resistance? Explain _____
Smaller diameter = more resistance
Larger diameter = less resistance
2. Length - how does this affect the electrical resistance? Explain _____
Short = less resistance
Long = more resistance (more chances for electrons to run into things)
3. Temperature - how does this affect the electrical resistance? Explain _____
Low temp = low resistance
High temp = high resistance
4. Materials - how does this affect the electrical resistance? Explain _____
Conductors = low resistance
Insulators = high resistance

24) The 5 Rules of Parallel Circuits

1. _____

2. _____

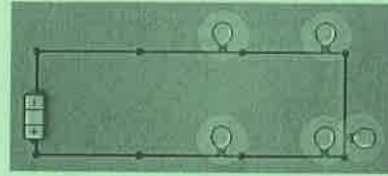
3. _____

4. _____

5. _____

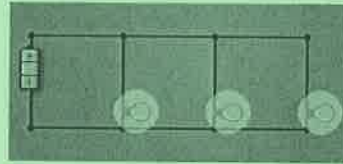
Name: _____

1. In the series circuit shown, what would happen if one of the light bulbs and its attached wire segment were removed?



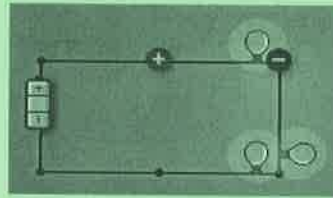
The other light bulbs would go out

2. In the parallel circuit shown, what would happen if one of the light bulbs and its attached wire segment were removed?



The other light bulbs would stay lit.

3. In the circuit shown below, the battery voltage is 12 volts and the light bulbs are all identical. What is the voltmeter reading?



Volts divided among each light bulb if identical

4 volts

4. In the circuit shown below, the battery voltage is 20 volts. What will be the reading of the ammeter shown in the circuit?

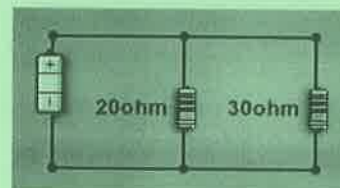


0.4 A

$$\frac{20V}{50\Omega} = 0.4$$

5. What is the total resistance of the circuit shown below?

12 Ω



$$\frac{1}{20} + \frac{1}{30}$$

$$\frac{3}{60} + \frac{2}{60} = \frac{5}{60}$$