

STATION 1 VOCABULARY

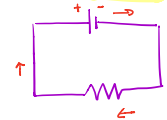
Make sure you know what each of these words mean. If you know, check the box. If you don't, ask someone in your group and write down the definition

- Potential energy: *stored energy*
- Kinetic energy: *energy of motion*
- Law of electric charge: *opposite charges attract ; like charges repel*
- Source: *provides electrical energy*
- Conductor: *a material charges can travel through*
- Load/Resistor: *a material that changes electrical energy into another form of energy*
- Switch: *controls the flow of current (open switch → stops current closed switch → current will flow)*
- Current: *rate where electric charge flows past a certain point*
- Electrical Potential Difference: *amount of potential energy between two points of the cell (Voltage)*
- Resistance: *degree where the flow of current is slowed down by a load*
- Short circuit: *when there is not enough resistance in the circuit so the current is too high.*
- Insulator: *A material where charges cannot flow through*
- ~~Conductor~~
- Series Circuit: *A circuit with only one pathway for current to flow*
- Parallel Circuit: *A circuit with multiple pathways for current to flow*
- Phantom load: *when appliances draw out energy even if it is not on.*
- Generating electrical energy: *when one type of energy is transformed into electrical energy (usually through a generator system)*

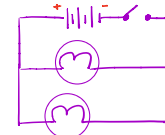
STATION 2 DRAWING CIRCUIT DIAGRAMS

Draw a circuit diagrams for the following circuits. Be sure to identify the direction that current is travelling for each scenario.

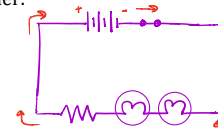
1. A circuit with a **cell** that runs a **buzzer**. (load)



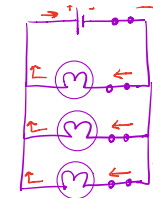
2. A circuit with a battery where an **open switch** has turned off **two lights** placed in **parallel** to each other.



3. A circuit with a battery, a closed switch, two light bulbs, and a **clock** all in **series** with each other. (load)



4. A circuit with an **electrochemical cell**, a **closed master switch**, and **three light bulbs** all in **parallel** with each other. Each light bulb has its **own switch** that turns it on and off.



STATION 3
CALCULATING OHM'S LAW



	Symbol	Unit
Current	I	Amperes (A)
Voltage	V	Volts (V)
Resistance	R	Ohms (Ω)

1. What is the resistance of a toaster if a **current of 12.5 A** flows through it when it is connected to **120 V**?

$$I = 12.5A$$

$$V = 120V$$

$$R = ?$$

$$R = V/I$$

$$R = \frac{120V}{12.5A}$$

$$R = 9.6\Omega$$

2. A light bulb has a **resistance of 90 Ω** . What current flows through the bulb when it is connected to **120 V**?

$$R = 90\Omega$$

$$V = 120V$$

$$I = ?$$

$$I = \frac{V}{R}$$

$$I = \frac{120V}{90\Omega}$$

$$I = 1.33A$$

3. The current through a load in a circuit is **2.5 A**. If the voltage is **75 V**, what is the resistance of the load?

$$I = 2.5A$$

$$V = 75V$$

$$R = ?$$

$$R = \frac{V}{I}$$

$$R = \frac{75V}{2.5A}$$

$$R = 30\Omega$$

4. How much **electrical potential difference** is necessary to generate **9.5 A** in a circuit with **2.0 Ω** ?

$$I = 9.5A$$

$$R = 2.0\Omega$$

$$V = ?$$

$$V = IR$$

$$V = (9.5A)(2.0\Omega)$$

$$V = 19V$$

STATION 4
ENERGY SOURCES AND TRANSFORMATIONS

Identify the type of energy associated with each of the following sources:

- The Sun **Solar ; Thermal**
- River flow **Mechanical**
- A battery **Chemical ; Electrical Potential**
- Uranium **Nuclear**
- Food **Chemical**

	ORIGINAL ENERGY FORM	FINAL ENERGY FORM
Photosynthesis	Solar	Chemical
Nuclear power plant	Nuclear	Electrical
An oven	Electrical	Thermal

List the three key parts of a generator system. Briefly describe their functions

Turbine : steam, water, wind will cause the turbine to spin
Shaft : connects the turbine to generator
Generator : kinetic energy from the shaft is transformed to electrical energy in the generator

What is the difference between a renewable and non-renewable energy source? Provide at least 2 examples for each.

Renewable energy is energy from renewable resources (can be naturally replenished)

- ↳ Sunlight (solar panels)
- ↳ Wind (wind turbine)
- ↳ Water (dam)

Non-renewable energy is energy from sources that will run out or will not be replenished in our lifetimes.

- ↳ Fossil fuels (coal, gasoline)

↳ Nuclear (nuclear fission reactions in nuclear power plants)