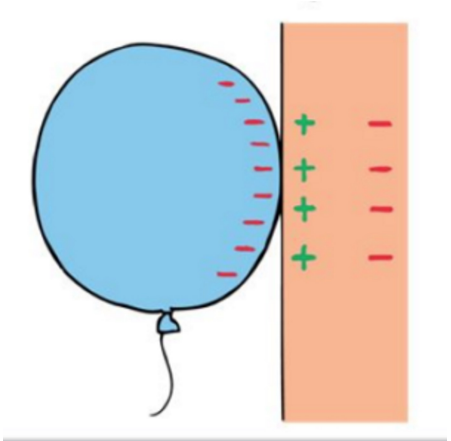
P2 Electricity Review Topics

January 21, 2020 9:13 AM

1. **Static Electricity**

- Positive, negative, neutral charges
  - What structure holds which charge?
    - Positive - protons
    - Negative - electrons
    - Neutral - neutrons
  - Which charge moves?
    - Electrons(negative) are the only charges that move
- Friction
  - What is friction?
    - Resistance between two surfaces
      - We looked at it as **rubbing**!
  - How can friction charge objects?
    - Friction energizes electrons and causes them to transfer
- Attraction and repulsion of charges
  - Opposite charges attract
    - Positive attracts negative
    - Negative attracts positive
  - Like charges repel
    - Negative repels negative
    - Positive repels positive
- Insulators and Conductors
  - What are insulators? What are examples?
    - Insulators do not allow electrons to freely flow through them!
      - Examples: rubber, wood, wool, Styrofoam…etc
  - What are conductors? What are examples?
    - Conductors allow electrons to freely flow through them
      - Examples: metals (copper, aluminum, iron, nickel, gold, silver…etc)
  - Which are easier to charge?
    - Insulators are easier to charge!
      - Because they hold the electrons in one place to keep a charge
      - Conductors will let the electrons flow through, and then ground out
- **Polarization**
  - Polarization is when you temporarily charge a neutral object with a charged object.

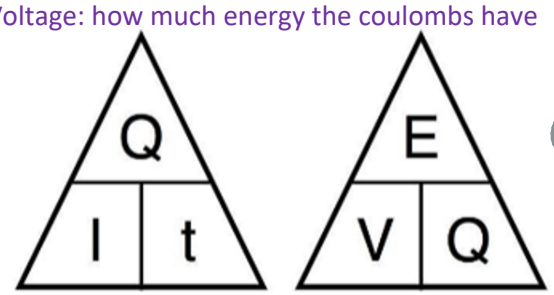
- 
  - How does polarization work?
    - When a charged object come near a neutral object, the charge is either going to attract or repel the electrons in the neutral object. This causes a temporary moment for the charged object to attract the neutral object.
  - How can a positive object cause polarization?
    - Yes, it can
    - With a positive object, the electrons in the neutral object will be attracted to the positive which causes a temporary negative charge on one side of the neutral object.
  - How can a negative object cause polarization?
    - Yes, it can
    - With a negative object, the electrons in the neutral object will be repelled, and this causes a temporary positive charge on one side of the neutral object.

2. **Current Electricity**

- Creating Current Electricity
  - What is current electricity?
    - This is the movement of electrons through a conducting loop (wire)
  - What 2 basic steps are needed to create current?
    - Take electrons from some source (build them up)
    - Let the electrons flow back to their source through a loop (wire)
  - What are the 5 different ways current can be created?
    - Chemical, thermoelectric, piezoelectric, photoelectric, electromagnetic
    - What kind of energy is being turned into electrical energy?
      - Chemical - chemical energy
      - Thermo - heat energy
      - Piezo - pressure (mechanical energy)
      - Photo - solar energy
      - Electromag. - mechanical
  - What are differences between static and current electricity?
    - ***see table in Notes 3.02****

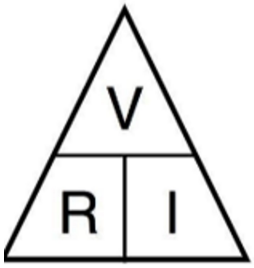
SIMILAR	DIFFERENT
Both: need **input of energy** to create charge *(friction or other source)*	**Static**: displaced electrons are ***localized (in one spot)*** **Current**: displaced electrons ***move***
Both: 1st step is charge separation 2nd step is **charge transfer** *(neutral object or battery)*	**Static**: ***brief*** transfer of small amounts of charge (shock) **Current**: ***continued*** transfer of

	large amounts of charge
Both: will **discharge** (*run out*) when all electric charge is transferred back	**Static**: discharges ***randomly*** **Current**: discharges through a ***conducting path***

- Components in a Circuit
  - Cell (Battery)
    - What happens to create the current in a cell?
      - One metal loses electron
      - One metal gains electrons
      - A chemically reacting substance that causes this to happen
    - What are the 3 parts of a cell?
      - Negative electrode
      - Positive electrode
      - Electrolyte
  - What is a coulomb (Q)?
    - It's a grouping of electrons (6.25 quintillion)
    - How do coulombs relate to voltage and current?
      - .Voltage: how much energy the coulombs have
      - 

I = current
Q = Coulomb
t = time
V = Voltage
E = energy

      - Current: how fast the coulomb is moving
  - What is voltage?
    - How much energy the electron have
    - Aka: potential difference
    - What measures it?
      - voltmeter
    - What are the units?
      - Volts (V)
    - How do we calculate it?
      - See triangle above (V=E/Q)
  - What is current?
    - How fast the electrons are moving
    - What measures it?
      - ammeter
    - What are the units?
      - Amperes (amps) (A)
    - How do we calculate it?
      - See triangle above (I=Q/t)
  - What is resistance?
    - The force working against the current (electrons)
    - What are the units?

        - Ohms (Ω)
        - 

        - What is the difference between a load and a resistor?
            - Both add resistance to a circuit, but loads will use the energy for a use, while resistors just use the energy to produce heat
- Schematics
    - Know what symbols mean what.
        - SEE NOTES 3.04!!
    - Be able to draw a circuit, either series or parallel
        - SEE ASSIGNMENT 3.04!!
- Series vs Parallel Circuits
    - Series circuit:
        - Know the total voltage across the battery equals the sum voltage drop across each load.
        - Know the overall current decreases as you add more loads.
        - Know current is the same throughout the entire circuit.
    - Parallel
        - Total voltage is equal to the voltage drop on each branch
        - Know the overall current increases as more branches are added
        - Know the sum of the current on all branches equals the current at the common point
    - ***SEE ASSIGNMENT 3.06****
- Electricity at Home
    - Know how to read a Hydro meter
        - To always go to the lower number!!
        - Remember: 0 is lower than 1, but 9 is lower than 0!
        - Remember, to figure out the amount of electricity used in one month, you take the current reading and subtract the last month's reading
    - Know how to calculate how much electricity costs
        - Be able to compare appliances against each other
        - Think of Monday!!!
          kWh x 8.7 cents!
        - To turn watts (W) into kW, you divide by 1000!

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