**BUILDING A BATTERY**

**Can lemons be used as batteries to play your CD? How? Today we are going to conduct experiments using lemons and batteries. Each person will be responsible for their own investigation and recording their findings.**

* Lemons
* Paperclip
* Coins (1982 or Before)
* Wire

**Each group will be responsible for their own lemon battery. Your first goal is to squish the inside of the lemon WITHOUT BREAKING THE SKIN OF THE LEMON. If the skin of your lemon breaks all of the juices will be lost and the experiment will become much harder.**

**After your lemon is thoroughly squished, Mr. W will put two holes in the lemon. From this point your job is to use the remaining materials to create a battery using two electrodes of different metals to cause current to flow across the wires. ALL MATERIALS should be used in order to properly conduct electricity.**

**A multimeter is a tool used to identify various electrical outputs. Mr. W will be coming around with a multimeter to determine if your lemon battery is ready to attempt to power the calculator.**

What is the power output of **your** lemon battery?

1. Using your multimeter, what is the voltage of your lemon battery in volts (V)?

2. Using your multimeter, what is the current that your lemon battery produces in amps (A)?

Draw as detailed of a setup that you can for your lemon battery

3. Using the following equation, what is the power output of your lemon battery (it will be in watts, W)? voltage \* current = power

**Once all groups have a functional lemon battery, we will connect multiple lemons to attempt to power a calculator. MAKE SURE TO THINK ABOUT WHAT A CIRCUIT NEEDS TO FUNCTION PROPERLY. DIRECTION MATTERS.**

4. What is the TOTAL voltage of all Lemon batteries connected?

5. What is the TOTAL amperage of all Lemon batteries connected?

Draw the setup of all lemon batteries connected to the calculator as detailed as you can

**Conclusions & Wrap Up**

Were we able to power on the calculator? Why or Why not?

What were the electrodes in this experiment? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What was the electrolyte in this experiment? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. Why do you think the year of the coins mattered when performing this experiment?

7. The Tesla Model T batteries can supply 30,000 W. How many lemon batteries would we need to deliver that?