Shocking Isn't It?!

Pre-Lab Assignment -25pts

Directions:

- Read entire lab before you begin Pre-Lab assignment

Title of lab **and unit (Electricity)**

- On a separate page in your notebook, create data table for the teacher approval checkpoints. Include the # of the check-off along with a one or two word description of what is being signed off . See example below for a partial list!!

Question	Description	Teacher Signature	Teacher Comment
part 1	17 reviews question		
----	Pre-lab		
4	balloon data		

- Purpose: In a sentence, write the purpose of the lab.
- Write and answer all preliminary questions
- List the "key points" as they relate to data collection.
- Define: static electricity, electroscope, & conduction, induction, and friction as it relates to static electricity
- Create an observation sheet for Part 2 on two facing pages in your lab notebook. Basically you need to read through Part 2 and identify the 12 observations you will be making. Make sure you have 3-5 lines available to write in your actual observations later.
- Have your teacher initial your pre-lab before you begin the lab.

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Introduction:

Electrons are the particles which are involved in chemical interactions since they are located in the outermost parts of the atom. In metals the electrons are loosely associated with all of the atoms in a given sample, allowing the electrons to move easily within a metal. This results in metals being good conductors of enegy through the movement of electrons. You will study two forms of energy transfer through electrons: (1) electrostatic charge/discharge and (2) electric current.

Materials:

Part 1	*Part 2*		*Part 3*
•Electrostatics Packet	•1 electroscope •fabric •1 inflated balloon	•sample materials 1. foil 2. salt 3. tissue 4. Styrofoam •2 pieces of cellophane tape (~5 cm each)	•Circuit Kit •2 D-cells

Preliminary Questions:

1. What will happen if two electrons are brought near each other and released?
2. How can you charge a balloon?
3. What is an electroscope, and how does it work?
4. Is the electrical wiring in your bedroom a series circuit or a parallel circuit?

Part 1 – Electrostatics information

1. Read the packet – Electric Charges and Current. Take some notes, but not in your lab notebook.
2. Answer the Review Questions at the end of the packet. This should be done in your lab notebook.
3. When you are finished show your work to your teacher and you may check your answers.
4. **When the entire group is approved you may continue to Part 2**

Part 2 – Electrostatics in action

1. Collect necessary materials, **except the tape**.
2. Briskly rub the balloon with a piece of fabric. Observe how the "rubbed" balloon interacts with sample material #1. **Record your observations**. Clean off the balloon.
3. Repeat #2 for sample materials #2 – 4.
4. Do the interactions of the balloon with the samples tell you anything about the charge of the balloon? Specifically, do you think the balloon is positive or negative and why?

Have your teacher approve your work up to this point.

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Part 2

5.Charge the balloon again. Bring the balloon near the top of the electroscope and **record what happens to the electroscope**.
6.*Individually sketch* the electroscope on your own paper and explain how it works based on your observations.
7.Make sure the electroscope is discharged by touching the top with your finger. How does this discharge the electroscope?
8.Charge the balloon again. Touch and release the top of the electroscope with the balloon and **record what happens to the electroscope**.
9.Discharge the electroscope.
10.Charge the balloon again. Bring the balloon near the top of the electroscope, without contact, and have your partner touch and release her/his finger to the top of the electroscope while the balloon is near, then remove the balloon and **record what happens to the electroscope**.
11.Without changing anything, bring the balloon near the electroscope and **record what happens to the electroscope.**
12.What is the charge on the electroscope relative to the balloon at this point?

Have your teacher approve your work up to this point.

13.Now, go get the two pieces of tape. Please get the correct length so as not to waste the tape.
14.Make a handle on each piece of tape by folding about 1 cm of one end of the tape over on itself.
15.Stick the first piece of tape to your lab table. Stick the second piece of tape directly on top of the first. Pull, quickly, the bottom piece of tape off the lab table, the top will come with it. Pull, quickly, the two pieces of tape apart and bring the non-sticky sides close to each other. **Record the behavior of each piece of tape.**
16.Bring each tape's non-sticky side near the charged balloon. **Record the behavior of the piece of tape.**
17.What is the relative charge of each piece of tape? Compare them to each other and the balloon.
18.Stick the two pieces of tape to the lab table next to each other. Pull, quickly, each piece of tape off the lab table and bring the non-sticky sides close to each other. **Record the behavior of each piece of tape.**
19.Bring each tape's non-sticky side near the balloon. **Record the behavior of each piece of tape.**
20.What is the relative charge of each piece of tape? Compare them to each other and the balloon.
21.Return your lab area to its original pristine condition by cleaning up after yourselves.

Have your teacher approve your work up to this point.

Part 3 – Simple Electric circuits

1.Arrange one bulb (without a holder), one battery (without a holder), and one wire in as many ways as you can to make the bulb emit light. Sketch and label each of your arrangements, both failures and successes. **Describe what was required to successfully light the bulb.**

Have your teacher approve your work up to this point.

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Part 3

2.You will now construct a few more circuits. Use the following combinations of batteries and light bulbs (use the holders now) and successfully connect them so the light bulb(s) shine**. Be careful when using multiple batteries to always connect (+) to (-).** Describe the brightness of each bulb when your circuit is complete. Draw a circuit diagram for each setup. (Look at **Figures B** and **C** for guidance) Use the symbols provided in **Figure A**.

a)One battery and one bulb
b)One battery and two bulbs
c)Two batteries and one bulb
d)Two batteries and two bulbs

3.Identify each circuit as series or parallel? I realize you might be guessing at this, but make is an educated guess.

Have your teacher approve your work up to this point.

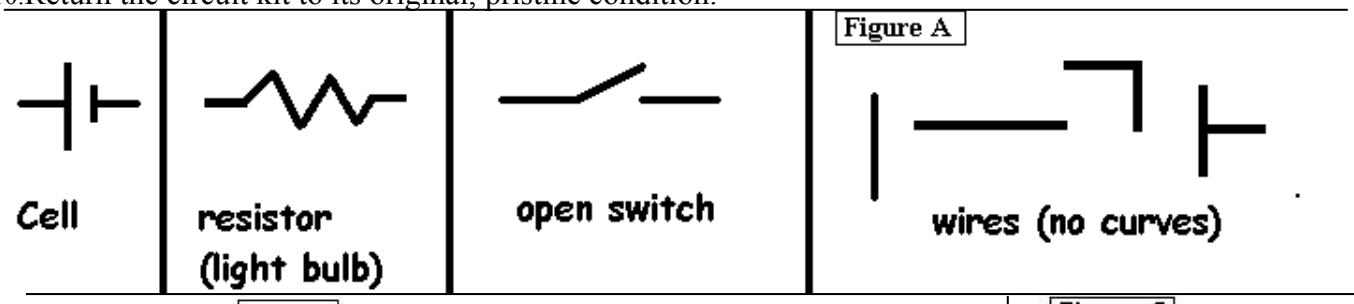
4.Connect the bulbs (in holders), one battery, and wires as shown in each circuit diagram of **Figure B**. Circuits like these are examples of series circuits. Do the bulbs light in each of these series circuits?
5.In the circuit with two bulbs, unscrew one of the bulbs. What happens to the other bulb?
6.Set up the circuit shown in the circuit diagram of **Figure C**. A circuit like this is called a parallel circuit. Do both bulbs light in this circuit?
7.Unscrew one of the bulbs in the parallel circuit.

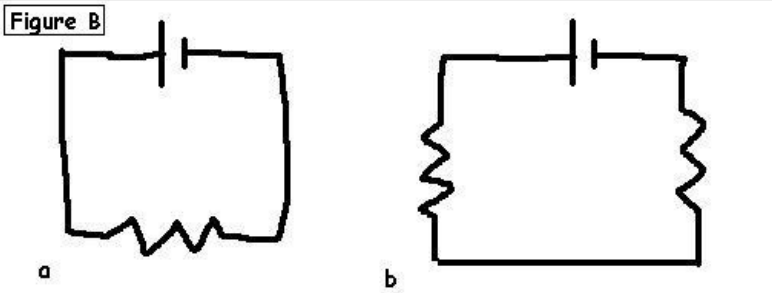
a)What happens to the other bulb?
b)In your own words, describe the differences between series and parallel circuits.

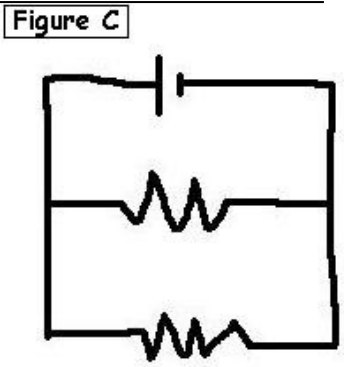
8.Based on what you have just learned about series and parallel circuits, identify each of the four circuits you made in step #2 as series or parallel.

Have your teacher approve your work up to this point.

9.Build a circuit containing a switch, two batteries, and two bulbs. This circuit should have one bulb always on and the other bulb only shines when the switch is pressed. Draw the circuit diagram for your circuit. Label this circuit as series or parallel.
10.Return the circuit kit to its original, pristine condition.







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Individual Report- Must follow this format. Double-space between sections **(50pts)**

Cover Sheet – separate page

Lab Title, Your name, group, group members, date, class period

Lab Title:

Purpose: State the purpose of the lab.

Background Information: In a paragraph use and relate the following terms to provide background information about electrostatics, & electricity

charging by friction, induction, conduction; polarization; series & parallel circuits.

Procedure: Summarize the lab procedure in a numbered list include materials used.

Data & Observations:

Now that you have completed the lab procedure,

- **Re-answer** all **four** of the preliminary questions. Then explain why you were right or how you changed your thinking if you were wrong. You need to include specific concepts learned.
- In addition to "human error," **list** possible sources of error in this lab investigation.

Conclusion: Write the question & answer in COMPLETE SENTENCES!!!

1. Describe the charging by induction process
2. Describe the charging by friction process
3. Describe the charging by conduction process
4. Describe polarization
5. Draw a diagram of a series circuit using proper circuit symbols, include one battery, one light bulb and wires.
6. Draw a diagram of a parallel circuit using proper circuit symbols, include one battery, one switch, 2 light bulbs, and wires.
7. Distinguish between a circuit wired in series to one wired in parallel in terms of the flow of charge.

Lab Notebook Scoring (50 pts)
pre-lab (-2 pts/day late) -- 6 pts
Quia pre-lab Quiz (on time only) -- 3 pts
Part 1: approval -- 4 pts
Part 2: approval #4 -- 6 pts
Part 2: approval #12 -- 6 pts
Part 2: approval #21 -- 6 pts
Part 3: approval #1 -- 2 pts
Part 3: approval #3 -- 8 pts
Part 3: approval #8 -- 5 pts
Switch circuit -- 4 pts