

Series and Parallel Circuits Physics Project

Objectives: The student should be able to identify the conditions which are necessary for an electric current to be established within a parallel and series circuits. The project should include an explanation of the following concepts: electricity, current, voltage, power, resistance, and Ohm's law. It should also explain the similarities and differences between parallel and series circuits.

The assignment will have two steps for **options 1 and 2**. Part of your project is due to help you organize your time and pace your effort for a better project.

- **step 1** - You must submit progress of your project including a rough draft/outline of your presentation (slides, not actual video) and at least 200 words describing/explaining your project by **May 29**.
- **step 2** - The final electronic version of your project is due Monday, **June 8**. Circuits must be connected correctly and working. Send me the video's link or presentation's link.

Choose and do ONLY ONE of the following three options:

Option #1: Build a Parallel and Series Circuits

What You Need:

- Small **light bulbs** (or a flashlight bulb)
- 2 **batteries** (with the correct voltage for your light bulb)
- 2 **alligator clip wires** or aluminum foil strips, connectors, conductor, Paper clips
- Electrical tape (Scotch® tape also works)
- **Bulb holder** (optional)
- **Battery holders** (optional**)

*To use foil instead of wires, cut 2 strips each 6" long and 3" wide. Fold each one tightly along the long edge to make a thin strip.)

**To use paper clips instead of battery holders, tape one end of a paper clip to each end of your battery using thin strips of tape. Then connect your wires to the paper clips.

Part 1 – Making a Circuit:

1. Connect one end of each wire to the screws on the base of the light bulb holder. (If you're using foil, ask an adult to help you unscrew each screw enough to fit a foil strip under it.)
2. Connect the free end of one wire to the negative ("-") end of one battery. Does anything happen?
3. Attach the free end of the other wire to the positive ("+") end of the battery. Now, what happens?

Part 2 – Adding Power

1. Disconnect the battery from your circuit. Stand one battery so that the "+" end is pointing up, then set the other battery next to it so that the flat "-" end is pointing up. Tape around the middle of the batteries to hold them together.
2. Set a paperclip across the batteries so that it connects the "+" end of one to the "-" end of the other. Tape the paperclip in place with a narrow piece of tape (do not tape over the metal battery ends).
3. Turn the batteries over and tape one end of a paper clip onto each of the batteries. Now you can connect one wire to each paper clip. (The bottom of the battery pack should only have one paper clip – do not connect a wire to it.)
4. Connect the free ends of the wires to the light bulb.

(Note: Instead of steps 1-3, you can use two batteries in battery holders and connect them together with one wire.)

Option #2 Video Presentation

Prepare a video presentation to teach your classmates about parallel and series circuits. The presentation should include all the following :

1. Identify the component/parts of the parallel and series circuit and their purpose
2. Explanation of the following concepts: electricity, current, voltage, power, resistance, and Ohm's law.
3. Visuals that represent concepts and circuits.
4. Explain the similarities and differences between parallel and series circuits.
5. If you choose this option, you must also turn in a written report and a PowerPoint or google slide presentation that contains the information provided in your video presentation.

Option #3 PHET Simulations

a. Parallel and series circuits Due 28

b. Ohm's Law Due June 8