

What Is the Difference Between Series and Parallel Circuits?

For electric current to flow, it needs a circuit — that's a path from the negative end of a power source to the positive end. The path needs to be made of a good conductor, like copper wire. When the circuit is closed, current flows and can be made to do work — like light a lightbulb.

Objective

Observe the characteristics of series and parallel circuits using lightbulbs.

Materials

- a 6-volt battery
- wire strippers
- a lever switch
- cases for the lightbulbs
- several 1.5 watt lightbulbs
- single-stranded 20 AWG wire

Safety Notice: All applicable laboratory safety rules must be followed. Students should not perform any experimental activity without the teacher's supervision and express permission. Students must follow safety guidelines and wear appropriate protective gear.

Procedure

1. First build a **series circuit**. Screw lightbulbs into case #1 and case #2.
2. Connect a wire, starting from either terminal of the battery, to one contact on the switch. Make sure the switch is open.
3. Now connect a second wire from the other end of the switch to a contact on case #1.
4. Connect another wire from the other contact on case #1, to case #2.
5. Connect a wire from case #2 back to the remaining terminal on the battery.
6. Once you have all your wires connected, close the switch. What happens? Why?

7. Now, with the switch closed, loosen one bulb until it goes out. What happens? Why?

8. Wire the same bulbs, switch and battery in an arrangement called a **parallel circuit**. First, connect a wire from the battery terminal to one contact on the open switch.

9. Connect a wire from the other contact on the switch to a contact on lightbulb case #1, and then another wire from case #1 to case #2.
10. Next, connect a wire from the other contact on case #2 back to the remaining contact on case #1.
11. Connect one last wire to the remaining battery terminal.
12. Now close the switch and let the current flow. What happens? Why?

13. Unscrew the first bulb again. Notice what happens to the other bulb. Why?

Conclusions

- What kind of circuits do you think are wired in most homes? Why?
