

Science 9: Turn Out the Lights Lab



Introduction

A series circuit is one where electrons only have one path (through conducting wire) to leave the negative terminal of the cell and arrive at the positive end of the cell. A parallel circuit is one where the electrons have more than one path to travel to get from the negative terminal of the cell to arrive at the positive terminal. In this lab, you will construct 2 different circuits and compare the flow of electrons in each circuit. *and voltage.*

Question: Which will have more *voltage (volts)* running through the light bulbs, light bulbs connect in series or parallel? (in other words, which lightbulbs will be brighter?)

Hypothesis (an educated guess to the question using if...then...because...)

If we connect lightbulbs in a parallel circuit then the lightbulbs will have more voltage/brightness compared to a series circuit because, in a series the lightbulbs share the voltage, compared to a parallel circuit which all loads have the same amount of voltage as the source.

excellent ✓

Safety

Disconnect the circuit if any wires become hot.

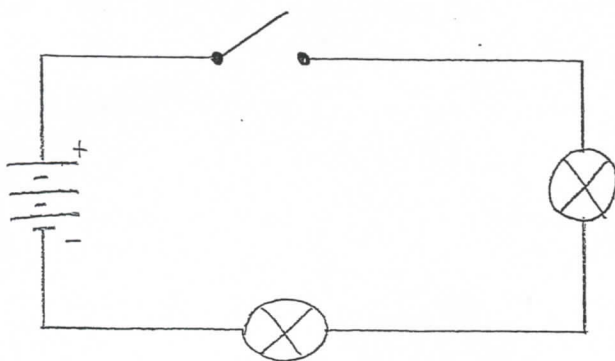
Materials

- 2 x D cells
- 2 x light bulbs
- 1 x Switch
- connecting wires

Procedure

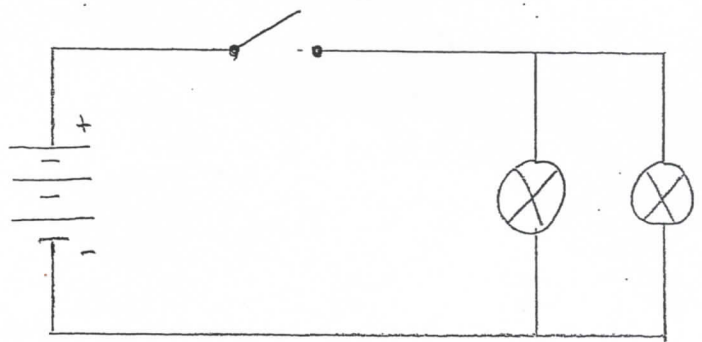
- 1) Create a data table to record your qualitative observations of the lab. Be sure to read over the procedure to find out what your independent and dependent variable are. Remember to give your data table a title.
- 2) Gather all materials and build circuit # 1, drawn below.
- 3) Close the switch and observe the 2 light bulbs. Record your observations in the data table you created.
- 4) With the switch still closed, gently unscrew one of the light bulbs and observe what happens to the remaining light bulb. Record your observations in the data table you created.
- 5) Replace the lightbulb so that both bulbs are again lit. Gently unscrew the other light bulb. Again observe the remaining light bulb. Record your observations in the data table you created. Open the switch when you are finished recording your observations.
- 6) Take circuit #1 apart. Build circuit #2, drawn below.
- 7) Close the switch and observe the 2 light bulbs. Record your observations in the data table you created.
- 8) Repeat steps #4-5 with circuit #2.
- 9) Clean up all your materials properly.

Circuit #1



Series = V - adds up

Circuit #2



(parallel V - is all equal)

Data Table

CIRCUIT 1	Qualitative Observations of Bulb Brightness
Series w 2 bulbs	- Same shade - light very dim ✓
Series w 1 bulb	- both bulbs turn off - removed other - light - still turned off ✓
CIRCUIT 2	Qualitative Observations of Bulb Brightness
Parallel w 2 bulbs	- both on ✓ - Very bright - Same brightness
Parallel w 1 bulb	- opposite gets brighter as you unscrew lightbulb ✓ - both work when opposite light is removed

Questions: Please use full sentences on another piece of paper.

Section A

1. How many ways are there for electrons to travel through circuit 1? *one way*
2. Does this mean that the circuit is series or parallel? *Series*
3. How many lightbulbs do the electrons need to go through? *2*
4. What happened when you unscrewed one of the lightbulbs in circuit 1? Explain Why! *The other turned off, electrons got blocked.*

Section B

1. How many ways are there for electrons to travel through circuit 2? *two ways*
2. Does this mean that the circuit is series or parallel? *Parallel*
3. In circuit 2, how many light bulbs do the electrons need to travel through? *one*
4. What happened when you unscrewed one of the lightbulbs in circuit 2? Explain Why! *The other one stay, electrons could still flow.*

Turn Out the Lights Lab Questions.

1. There is one way for the electrons to travel in circuit one ✓

2. The circuit is a series circuit. ✓

3. In a series circuit the electrons go through two lightbulbs. ✓

4. When we unscrewed the other lightbulb in circuit 1, the other lightbulb turned off because, the electrons got blocked, since there is only one way for the electrons to flow in a series circuit. ✓

5. There is two ways for the electrons to travel in circuit two. ✓

6. The circuit is a parallel circuit ✓

7. In a parallel circuit the electrons go through one lightbulb. ✓

8. When the other lightbulb was unscrewed, the other lightbulb stayed on and got brighter because, in a parallel circuit there is two pathways the electrons can go, so when one is blocked all the electrons go to the other one which makes the light work and become brighter. ✓

perfect
lol
no-ones perfect