



Series and Parallel Lamp Circuits Lab

PSI Physics

Objectives:

- Learn how to build circuits
- Discover the properties of series and parallel circuits

Description:

In this lab, you're going to:

- figure out how to make an electric circuit that lights up 1 lamp
- design two different circuits with 2 lamps:
 - one where the lamps burn as bright as in the circuit with only one lamp
 - one where the lamps are dimmer than in the circuit with only one lamp

Materials:

- Battery (or other DC voltage source)
- Connecting wires
- 2 or 3 Lamps (bulbs and bulb holders)
- Knife switch

Circuit 1:

- 1) Connect the battery, one lamp and switch with wires to make the lamp light up when the switch is in one position and go dark in the other position.
- 2) Draw a diagram of the working circuit.
- 3) Describe the switch position when the lamp is on versus when the lamp is off.
- 4) If the lamp is lit and you disconnect a wire in the circuit, what happens to the lamp?
- 5) What do your answers to 3) and 4) tell us is a necessary condition for the lamp to be on?



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Circuit 2 (Series):

- 1) Add one more bulb to your circuit so both bulbs are lit (on) but a lot dimmer than one bulb in a circuit of its own.
- 2) Draw a diagram of the working circuit.

- 3) With both bulbs lit, what happens when you remove one of the lamps from its holder? How does this relate to your finding for Circuit 1 question 5)?

Circuit 3 (Parallel):

- 1) Rearrange the two bulbs in your circuit so that both bulbs are lit (on) and burn about as bright as one bulb in a circuit of its own.
- 2) Draw a diagram of the working circuit.

- 3) With both bulbs lit, what happens when you remove one of the lamps from its holder? How does this relate to your finding for Circuit 1 question 5)?



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Conclusion and Application:

- 1) Looking back at circuit 2, what are two properties of lamps connected in a series?

- 2) Looking back at circuit 3, what are two properties of lamps connected in parallel?

- 3) Which of the 3 circuits you built do you think will run down the battery fastest? How can you tell?

- 4) Do you think the lights (or outlets) in your home are connected in series or parallel? Why?

- 5) Name at least one more experiment you would try if you had more batteries, switches and/or lamps? For each experiment, say what you would expect to see and why!