

Chapter 34: Electric Current**Series and Parallel Circuits****91****Sparky, the Electrician****Purpose**

To study various arrangements of a battery and bulbs and the effects of those arrangements on bulb brightness

Required Equipment/Supplies

size-D dry cell (battery)
 6 pieces of bare copper wire
 3 flashlight bulbs
 3 bulb holders
 second size-D dry cell (optional)

Discussion

A dry cell (commonly called a battery) is a source of electric energy. Many arrangements are possible to get this energy from dry cells to flashlight bulbs. In this activity, you will test these arrangements to see which makes the bulbs brightest.

Procedure 

Step 1: Arrange one bulb (without a holder), one battery, and wire in as many ways as you can to make the bulb emit light. Sketch each of your arrangements, including failures as well as successes. Label the sketches of the successes.

1. Describe the similarities among your successful trials.

Step 2: Use a bulb in a bulb holder (instead of a bare bulb), one battery, and wire. Arrange these in as many ways as you can to make the bulb light.

2. What two parts of the bulb does the holder make contact with?

Step 3: Using one battery, light as many bulbs in holders as you can. Sketch each of your arrangements, and note the ones that work.

3. Compare your results with those of other students. What arrangement(s), using only one battery, made the most bulbs glow?

Step 4: Diagrams for electric circuits use symbols like the ones in Figure A.

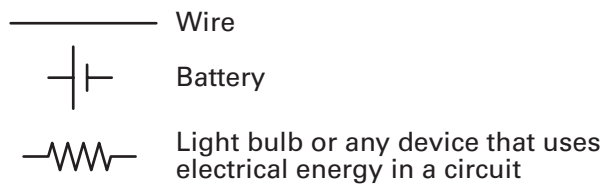


Fig. A

Connect the bulbs in holders, one battery, and wire as shown in each circuit diagram of Figure B. Circuits like these are examples of *series circuits*.

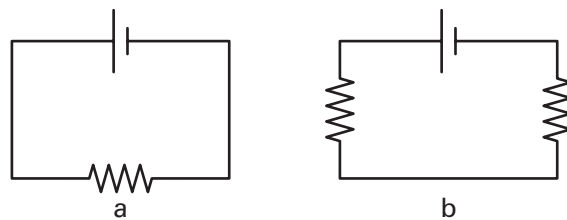


Fig. B

4. Do the bulbs light in each of these series circuits?

Step 5: In the circuit with two bulbs, unscrew one of the bulbs.

5. What happens to the other bulb?

Step 6: Set up the circuit shown in the circuit diagram of Figure C. A circuit like this is called a *parallel circuit*.

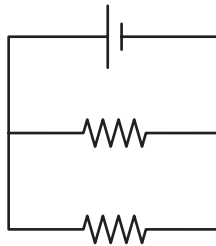


Fig. C

6. Do both bulbs light in this parallel circuit?

Step 7: Unscrew one of the bulbs in the parallel circuit.

7. What happens to the other bulb?

8. In your own words, describe the differences between series and parallel circuits.

Going Further

Step 8: Using two batteries, light as many bulbs as you can. Sketch each of your arrangements, and note the ones that work.

9. What arrangement(s), using two batteries, lit the most bulbs?

Step 9: Using three bulbs and two batteries, discover the arrangements that give different degrees of bulb brightness. Sketch each of your arrangements, and note the bulb brightness on the sketches.

10. How many different degrees of brightness could you obtain using three bulbs and two batteries? Did other students use different arrangements?
