

Experiment: Sparky, the Electrician

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

Equipment/Supplies:

size D battery
3 flashlight bulbs

jumper wire
1 bulb holder

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:

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.

Question 1: Describe the similarities among your successful trials.

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.

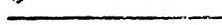
Question 2: What two parts of the bulb does the holder make contact with?

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

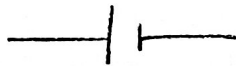
Question 3: What arrangements using only one battery made the most bulbs glow?

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

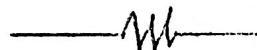
Figure A:



Wire



Battery



Resistor or lightbulb

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

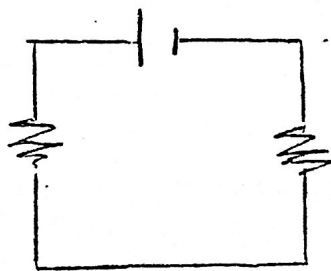
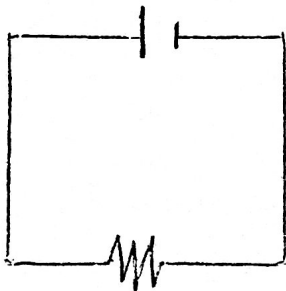


Figure B:

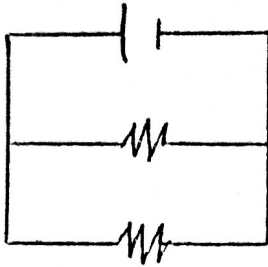
Question 4: Do the bulbs light in each of these series circuits?

5. In the circuit with two bulbs, unscrew or remove one of the bulbs.

Question 5: What happens to the other bulb?

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

Figure C:



Question 6: Do both bulbs light in this parallel circuit?

7. Unscrew or remove one of the bulbs in the parallel circuit.

Question 7: What happens to the other bulb?

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

Extra:

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

Question 9: What arrangements using two batteries lit the most bulbs?