

Electricity

Lighting a Standard Bulb

(Lesson 4)

Background: (What you're studying today) Have you ever wondered how **electricity flows** along a circuit? In our investigations, we are using a D-Cell **battery** as an **energy source**. The battery gives the electricity its "**push**" through the circuit. This "push", called **voltage**, is like **electrical pressure**. It is similar to the water pressure that pushes water out of your faucet or hose. The pressure of the electricity inside the circuit is measured in **volts**. Batteries come in many different shapes and sizes, but the common batteries that we buy in the store, including D-Cell batteries, all produce about 1.5 volts. A standard light bulb, like the bulbs you use in your house, is about 120 volts. It is similar to the bulbs you have been using, but has a larger filament which makes a brighter light. Believe it or not, you can use a 1.5 volt D-Cell battery to make a 120 volt standard bulb begin to glow. How many batteries would it take?

Question: (What you want to find out) How many 1.5 volt D-Cell batteries will it take to make a 120 volt standard light bulb begin to glow?

Hypothesis: (Prediction) I think it will take...

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

1.5 volt D-Cell batteries to make a 120 volt standard light bulb begin to glow.

Materials: (What you'll need) 15 D-cell batteries 1 standard bulb
2 five foot pieces of wire (ends stripped) 2 meter sticks or the chalkboard tray

Procedure: (Numbered steps needed to complete the investigation)

1. Start with 1 battery placed between the 2 meter sticks or in the chalkboard tray.
2. Hold the bare end of one wire on the north pole of the battery and hold the bare end of the second wire against the south pole of the battery. Touch the loose end of one wire to the metal tip of the bulb and touch the other wire to the side of the bulb base.
3. Look to see if the bulb begins to shine dimly. If the bulb does not shine, continue adding batteries end to end, one at a time, until you see light dimly shining from the bulb. Make sure all the batteries are facing the same way and are held snugly together.
4. Record your data when you first see light glowing from the bulb.
5. Once the bulb begins to glow, add the remaining batteries and test the bulb again.

Data: (What happened)

Number of 1.5 volt D-Cell batteries needed to first see a dim glow from the 120 volt bulb:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Conclusion: (What you learned)

My hypothesis was **proven** **disproved** because it took _____ D-Cell batteries to dimly light a standard light bulb and I thought it would take _____ batteries.

- If each D-Cell battery is 1.5 volts and it took _____ batteries to light the bulb, it took... 1.5 volts X _____ batteries = _____ volts to see a dim light in the bulb.

(Do the math!)

Discussion: (What else can you say?)

1. When we added the rest of the batteries, I observed that the light bulb was getting **dimmer** **brighter** **staying the same**.

2. How many 1.5 volt D-Cell batteries do you think it would take to light a standard 120 volt light bulb to its full brightness? How could you figure it out?

3. Can you find the variables in this investigation?

- List two controlled variables. (What you kept the same to make the investigation fair)
1. _____ 2. _____
- What was the manipulated variable? (The one thing you changed to get an answer)
- What was the responding variable? (The one thing you were testing)

