

Light Bulb Resistance

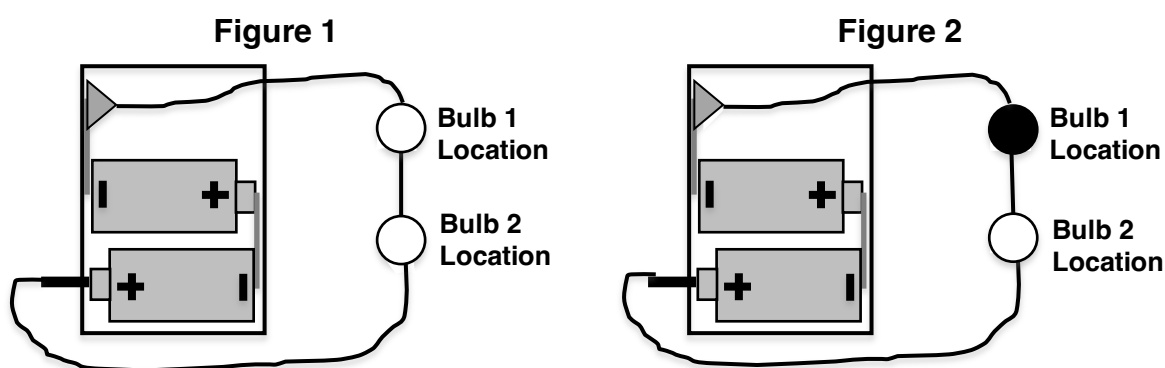
Two students are investigating the resistance of light bulbs. Their materials include two different types of light bulbs - a type **A** and a type **B** bulb.

Experiment 1

In **Experiment 1**, the students use two D-cells and two **Type A** light bulbs to construct the electric circuit shown in **Figure 1**. When they make the final connection to the *battery*, they observe that the bulbs both Location 1 and Location 2 are lit.

Experiment 2

In **Experiment 2**, the students use two D-cells and two types of light bulbs – **Type A** and **Type B**. They construct the circuit in **Figure 2**. They observe that the **Location 1** bulb is lit and **Location 2** bulb appears to not be lit. Bulb Location 1 is a **Type B** bulb and Bulb Location 2 is a **Type A** bulb.

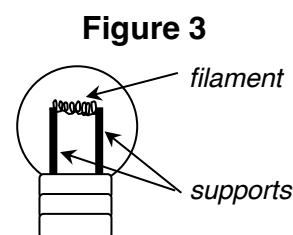


Experiment 3

In **Experiment 3**, the students use the same circuit used in **Experiment 2** except that they switch the positions of the two light bulbs. Bulb 1 Location has a **Type A** bulb and Bulb 2 Location has a **Type B** bulb. Bulb 2 appears lit and bulb 1 appears to not be lit.

Experiment 4

In **Experiment 4**, the students use a microscope to compare the diameter of the filaments and the support posts of the two types of bulbs. See **Figure 3**. They observe that the support posts of both types of bulbs have equal diameters. They observe that the filaments are significantly narrower than the support posts. And they observe that **Type A** bulbs consist of a larger diameter wire than **Type B** bulbs.



Experiment 5

In **Experiment 5**, the students model the flow of charge through wires by the flow of air through straws of varying diameter. They take a deep breath and exhale the air in their lungs through a coffee stirrer, a drinking straw and a milkshake straw. The straw diameters and the times to exhale a full breath of air are listed in **Table 1**.

Table 1: Exhale Times for Straws

Straw Type	Diameter (mm)	Time (s)
Coffee Stirrer	1 mm	34
Drinking Straw	6 mm	12
Milkshake Straw	12 mm	5