

Round vs. Oblong – the Greatest Resistance? Lab

Teacher's Guide

Topic:

Electric Circuits

The following information is provided to the student:

Question:

What bulb has the greatest resistance - the round bulb or the long bulb?

Purpose:

To determine which bulb has the greatest resistance - the round bulb or the long bulb.

A complete lab write-up includes a Title, a Purpose, a Data section, and a Conclusion. The Data section should include a diagram of the two single-bulb circuits and the results of the measurements. Calculations of R should be performed. The Conclusion should respond to the question raised in the Purpose.

Materials Required:

Two D-cells; battery holder; alligator leads; two small ~3 - 5 V bulbs with a different resistance; bulb bases.

Description of Procedure:

Students construct a one-bulb circuit consisting of two D-cells and a *round* bulb. They observe the brightness of the bulb. They then switch out the *round* bulb for the *oblong* bulb and make observations of its brightness. They repeat the procedure to insure accurate results. They then draw conclusions about which bulb has the greatest resistance.

Alternative Materials and Procedure:

Any two types of bulbs which have a distinguishable visible appearance and a clearly different brightness when connected to two D-cells will suffice for this lab.

Safety Concern:

There is always a higher than usual level of risk associated with working in a science lab. Teachers should be aware of this and take the necessary precautions to insure that the working environment is as safe as possible. Student *horseplay* and off-task behaviors should not be tolerated.

Suggestions, Precautions, Notes:

1. The round bulb and the long bulb just happen to have a different resistance; this obviously has nothing to do with the fact that the globe of one bulb is round and the other oblong. It is helpful if the two bulbs which you find have a visible difference between them (e.g., brass base vs. chrome base).
2. This activity provides students with an opportunity to apply information from the previous labs about the inverse relationship between current and resistance and to think qualitatively about the connection between bulb brightness, current and resistance. But perhaps more importantly,

The Laboratory

conclusions about the differences in resistance between the two types of bulbs will be used in later labs in this unit - in the **Bulbs in Series Circuits Lab** and in the **Bulbs in Parallel Circuits Lab**.

Auxiliary Materials:

None

Scoring Rubric:

| C5. Round vs. Oblong - The Greatest Resistance? Lab | Score |
|---|---------|
| <ul style="list-style-type: none">___ Included, labeled and organized all parts of the lab report.___ Data section includes a labeled diagram of the two tested circuits; measurements are recorded and seem reasonably accurate. The resistance values are calculated accurately; work is clearly shown and labeled.___ Conclusion answers the <i>question</i> posed in the Purpose; <i>answer</i> is correct. | ___/___ |

Connections to The Physics Classroom Tutorial:

The following readings are a suitable accompaniment to this lab:

<http://www.physicsclassroom.com/Class/circuits/u9l3b.cfm>

<http://www.physicsclassroom.com/Class/circuits/u9l3c.cfm>

Connections to Minds on Physics Internet Modules:

Sublevels 4 and 5 of the Electric Circuits module are suitable accompaniments to this lab:

<http://www.physicsclassroom.com/mop/module.cfm>