Task: Investigate the resistance of a nichrome wire as a function of length and diameter.

Apparatus: [digital multimeter](http://www.physics.smu.edu/~scalise/apparatus/multimeter/)  (DMM), banana plug wires (2), one long (nichrome) wire, connector box, and meter stick.

Procedure:

1. Set the DMM to measure resistances and connect two banana-plug wires from it to the connector box.

2. Connect one end of the long metal wire to one of the terminals of the connector box.

3. Measure 10 cm length of wire, (do not cut the wire) and connect it to the other terminal so that there is exactly 10 cm of wire between the terminals.

4. Create an Excel data table, first column for length, L and second for resistance, R.

5. Record the length and resistance data and repeat procedure-3 for other lengths, 9 more times. The length of the last measurement will be 100 cm.

6. Plot a graph R versus length, determine its slope, and print a hard-copy of your data table and graph.

  Slope of R versus L, graph:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. Now that you have seen what happens to the resistance as the length increases, can you predict what will happen to the resistance as the diameter increases?

PREDICTION:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. Check your prediction for the effect of diameter, by doing the following investigation:

1. Fold the wire into half, and again half.
2. Measure the resistance of one fold, two folds (together), three folds, and four folds.
3. Tabulate your data, plot an appropriate graph, and see what happens.
4. Print a hard copy of your data table and graph.

EXPLAIN YOUR RESULTS:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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9. Electricity is transported across states using power lines with thick wires. Explain why?

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