Electricity & Magnetism

Make a graphite resistor

(Bulgaria)

Background

Pencil 'lead' is made of graphite mixed with clay. Graphite is a form of carbon, and is a conductor of electricity. In this activity, students investigate the resistance of pencil drawn rectangles varying in thickness, length, and width.

You will need:

- ✓ Pencil (HB or softer)
- ✓ Piece of paper
- ✓ Alligator clip leads
- ✓ Measuring ruler
- ✓ Multimeter as an ohmmeter

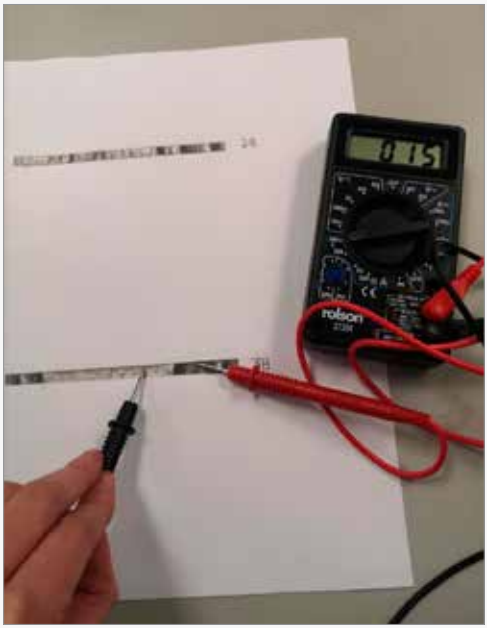
Follow these steps:

1. Using a ruler, draw rectangles of varying length and equal width.
2. Fill in the rectangles with the pencil. Make sure the entire rectangle is completely filled.
3. Using a multimeter and two alligator clip leads, test the resistance of each graphite rectangle by attaching the alligator clips to either end of the resistor rectangle.
4. Record the value of resistance in ohms for each length in a table.
5. Repeat the experiment but this time vary the width of the rectangle and keep the length of the rectangle the same. Record the value of resistance for each rectangle of varying widths.

So what happened?

The resistance in the graphite rectangles increased as the length of the rectangles increased.

The resistance in the graphite rectangles decreased as the width of the rectangles increased.



What next?

- What happens if you make the drawing with harder (e.g. 4H) or softer (e.g. 6B) pencils?
- Light an LED by connecting it to a circuit drawn by a pencil and a battery.