1.0 - Resistors and Ohm's Law

About resistors

Resistance is a fundamental characteristic of all electronic components, and resistors are passive electronic components designed to exhibit a constant amount of resistance. Ohm's Law establishes the mathematical relationship between potential, current, and resistance in a circuit.

Resistor activity

1. You will be given a variety of resistors. Identify their colour code, tolerance, and value. Measure the resistance of each resistor. Is the actual value within the tolerance of the colour code value?

Colour 1	Colour 2	Multiplier	Tolerance	Value	Measured Ω

2. Choose a resistor with a value of less than 1kΩ. Draw a schematic diagram of your resistor connected to a 6 V potential source. Label your diagram.

3. **Calculate** the expected circuit current at a 6V potential.

   I_T =

4. Connect your resistor on a breadboard. **Do not connect the power supply yet.**

5. Measure the resistance of the resistor.

   R1 =

6. Set the power supply to 6 V. Measure the power supply potential.

   V_T =

7. Connect the power supply to the resistor and measure the potential drop across the resistor.

   V_{R1} =

8. Using a calculator, **calculate** the circuit current from your measured values.

   I_T =

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9. Disconnect one power supply lead from your circuit. Switch the red meter lead to the current jack, and insert the multimeter in series with the power supply lead to measure the DC current.

   I_T =

10. Did your measured current, in step 9, agree with your calculated current in step 8?

11. How close was your measured current to your calculated current in step 3?

12. Predict what will happen to the current if you double the power supply potential to 12V.

13. Set the power supply to 12V. Measure the circuit potential across the resistor.

    V_{R1} =

14. Measure the total circuit current at 12V. Does the current match your prediction in 12?

    I_T =

15. Turn off the power supply and replace your resistor with one having more than 1kΩ of resistance. Predict the effect you think this resistor change will have on the circuit current.

    R2 =

16. Set the power supply to 12V. Measure the potential across the resistor.

    V_{R1} =

17. Measure the total circuit current again. Does the current match your prediction in 15?

    I_T =

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