

Experiment Designs

1. Design capacitors

Materials: Capacitance meter (1), masking tape (1), power supply (6 Volts), different capacitors (4), voltmeters (2), A box of various capacitors, different-size washers, pennies, vegetable oil, oil, aluminum foil, wire, wire cutters, paper, wax paper, salt, plastic cups

Design and build three or four capacitors (everyone should build one) that your group predict $C_4 > C_3 > C_2 > C_1$.

Please clearly record your reasoning for your prediction, sketch the structure of each capacitor, record the value of each capacitor from a capacitance meter (the uncertainty in the meter is 5%), and discuss any discrepancies between your predictions and actual readings.

2. Design a DC motor

Materials: Different types of magnets, paper clips, wires with insulating coding, foam boards, wire cutter, single-edge blades, and masking tape.

Motor: Using the materials provided on the cart design and build a motor. And then test qualitatively what would affect the rotational speed of the motor. Your group can use the materials provided on the cart, and are strongly encouraged to work together as a team. Your lab report should clearly report 1) your design plan, including materials used, 2) a sketch of your motor, 3) testing data, and 4) concluded results.

3. Design a generator

Materials: Magnet, Galvanometer, some PVC wire coils, and wires

Design and conduct an experiment so as to generate a current through the Galvanometer. In your notebook, please 1) sketch your experiment setup, 2) record in which ways the magnitude of the generated current could be changed, and 3) record in which ways the direction of the generated current could be changed.