

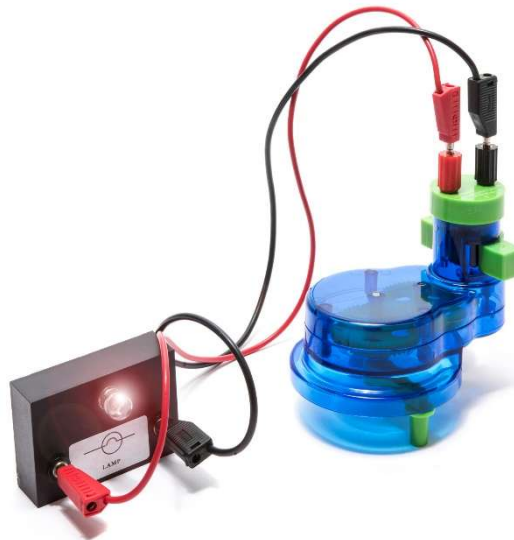


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IPC Irwin Hand Electricity Generator

Part Number: IRHDR

Experiments



1. Generating Electricity.

- **Objective:** Demonstrate how mechanical energy is converted into electrical energy.
- **How it works:** By rotating the hand generator, you convert mechanical energy into electrical energy. This experiment shows the relationship between mechanical work and electricity.
- **Setup:** Connect the hand generator to a small light bulb or LED. As you rotate the generator, the bulb will light up. This demonstrates the basic principle of energy conversion.

2. Measuring Voltage and Current.

- **Objective:** Measure how the voltage and current change as you vary the speed of rotation.
- **How it works:** The faster you rotate, the higher the voltage and current generated. You can use a multimeter to measure these values.
- **Setup:** Connect the generator to a multimeter (set to measure voltage or current). Rotate the generator at different speeds and record the readings to observe how they change.

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3. Effect of Load on Generator Output.

- **Objective:** Show how different loads affect the performance of the generator.
- **How it works:** The load connected to the generator will determine how much electrical power is drawn. You can use different resistors or electrical components (like a motor or fan) as loads to see how the generator's output changes.
- **Setup:** Connect various resistors or electronic components (like a small fan or bulb) in series or parallel with the hand generator. Observe how the speed of rotation changes as the load increases or decreases.

4. Exploring the Relationship Between Speed and Power Output.

- **Objective:** Investigate how the speed of rotation affects the power output of the hand generator.
- **How it works:** This experiment can help demonstrate the relationship between speed (or work done per unit of time) and electrical power. The faster you rotate; the more energy is produced.
- **Setup:** Use a multimeter to measure the voltage or current while rotating the generator at various speeds. Plot the data to examine how both voltage and current increase with speed.

5. Building a Simple Motor Using the Generator.

- **Objective:** Use the hand generator to power a simple motor.
- **How it works:** The hand generator can be used to power a small electric motor, demonstrating how a motor works by converting electrical energy back into mechanical energy.
- **Setup:** Connect the hand generator to a small DC motor. Rotate the generator to observe the motor spinning, showing how electrical energy can drive mechanical motion.

6. Charging a Capacitor.

- **Objective:** Investigate how a hand generator can charge a capacitor.
- **How it works:** By rotating the hand generator, you can store electrical energy in a capacitor. The capacitor will charge up over time as you generate electricity.
- **Setup:** Connect the hand generator to a capacitor through a diode and use a voltmeter to measure the voltage across the capacitor as you rotate the generator. Observe how the voltage rises as the capacitor charges.

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7. Demonstrating the Conservation of Energy.

- **Objective:** Show the conservation of energy by comparing the mechanical energy you provide by rotating, with the electrical energy produced.
- **How it works:** This experiment can help demonstrate the principle of energy conservation by comparing the work done by rotating the generator to the electrical energy generated.
- **Setup:** Use a stopwatch to time how long you rotate the generator and measure the electrical output (voltage and current). Compare the mechanical work done with the energy output using basic physics equations (e.g., $W = F \times d$ and $W = F \times d$).

8. Creating a Simple Circuit.

- **Objective:** Use the hand generator to power a basic electrical circuit.
- **How it works:** A hand generator can be used to demonstrate how electricity powers a simple circuit, such as lighting up an LED or powering a small motor.
- **Setup:** Build a simple circuit with a switch, resistors, and an LED. Use the hand generator as the power source and observe how the circuit functions when the generator is rotated.

9. Testing Different Types of Bulbs (LED vs. Incandescent).

- **Objective:** Compare the performance of different types of light bulbs when powered by a hand generator.
- **How it works:** The hand generator will generate varying amounts of power based on how fast it is rotated. Different bulbs will react differently to the voltage and current produced by the generator.
- **Setup:** Connect the hand generator to different types of bulbs (LED and incandescent) and observe how the bulbs respond. LEDs typically require less power, while incandescent bulbs may not light up as brightly with a hand generator.

10. Demonstrating Electromagnetic Induction.

- **Objective:** Show how electromagnetic induction works by using the hand generator.
- **How it works:** The generator produces electricity via electromagnetic induction, which is the process of generating voltage by changing the magnetic field around a conductor.
- **Setup:** Use a simple coil of wire connected to a milliammeter and place it near a magnet. As you rotate the generator, the induced current can be observed.

These experiments help students and enthusiasts understand important concepts related to electricity, magnetism, and energy conversion in a hands-on, interactive way.

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