The Labubu Generator:

Testing a Toy Hand-Crank Generator Using LED Lights

A Research Paper Presented to

Mr. Jacko Kim Mabeza

In Partial Fulfilled of Requirements for

Little Scientist

By:

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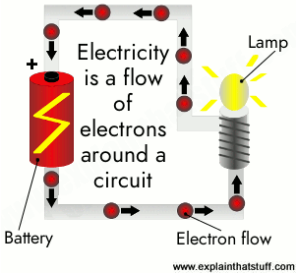
ABSTRACT

This project investigates how a toy hand-crank generator produces electricity when it is spun by hand. The generator was assembled by attaching wires and LED lights to the output terminals. The experiment tested how the number of spins affected the voltage produced and the brightness of the LED lights. A multimeter was used to measure voltage output. The results showed that increasing the number of spins increased the voltage produced and caused the LED lights to glow brighter. This experiment demonstrates how motion can be converted into electrical energy using a simple generator.

BACKGROUND RESEARCH

What Is Electricity?

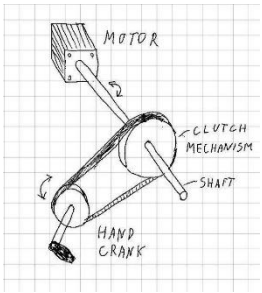


Electricity is a form of energy that powers many devices used every day, such as lights, televisions, and phones. Electricity flows through wires and can be created in different ways, including using motion (U.S. Department of Energy, n.d.).

What Is a Generator?

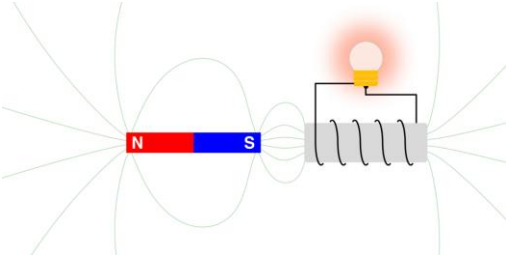
A generator is a device that changes mechanical energy (energy from movement) into electrical energy. Many generators work by spinning parts inside them to produce electricity. Large generators are used in power plants, while smaller generators are used in toys and emergency tools (Energy Information Administration, n.d.).

How a Hand-Crank Generator Works



A hand-crank generator produces electricity when a handle is turned by hand. Turning the handle causes parts inside the generator to spin. Inside the generator are magnets and coils of wire. When these parts spin, electricity is produced (Science Buddies, n.d.).

Electromagnetic Induction



Electromagnetic induction is the process of making electricity using magnets and wire. When a magnet moves near a wire, it creates a changing magnetic field. This change causes electricity to flow through the wire. This principle is how most generators work (BBC Bitesize, n.d.).

Research Question

How does the number of spins of a toy hand-crank generator affect the voltage produced and the brightness of LED lights?

Hypothesis

If the number of spins of the toy hand-crank generator increases, then the voltage produced will increase and the LED lights will become brighter because the generator creates more electrical energy.

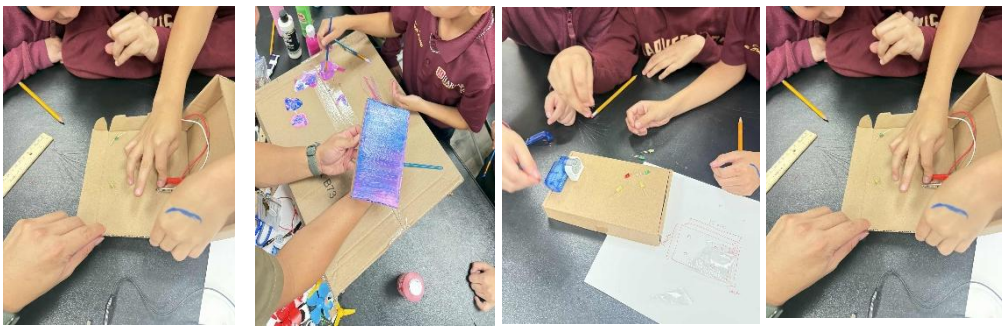
Methodology

Materials

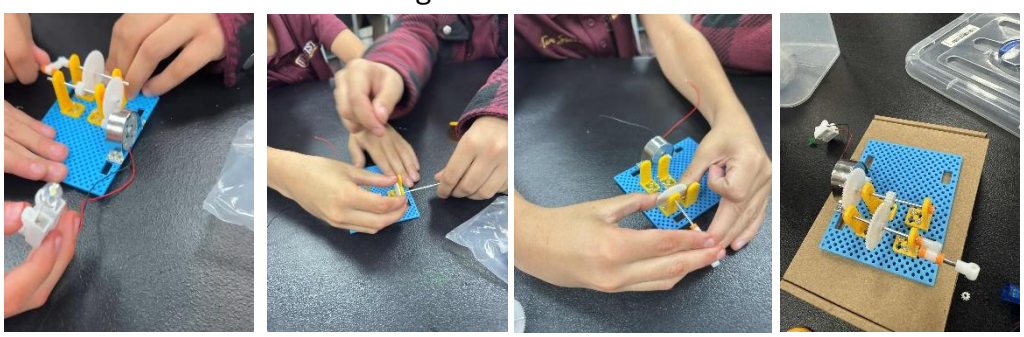
- Toy hand-crank generator
- LED lights
- Connecting wires (with alligator clips if available)
- Multimeter (set to AC voltage)

Procedure

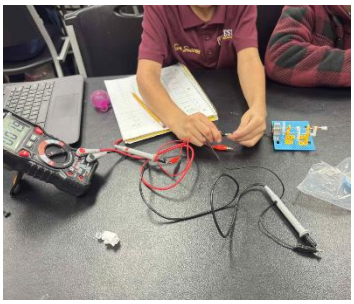
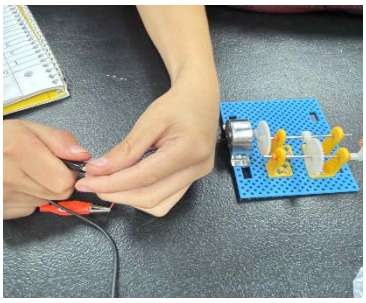
1. Prepare the platform by painting and creating holes for LED lights.



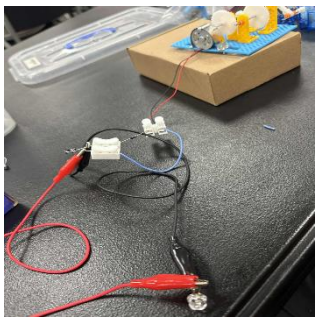
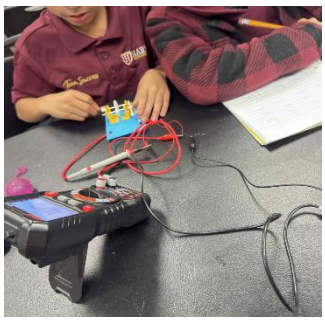
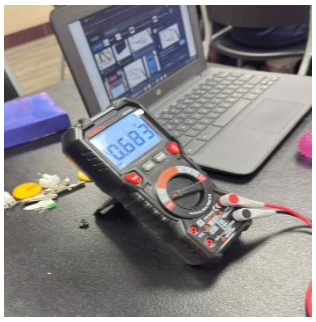
2. Assemble the toy hand-crank generator and attach wires.
3. Connect the wires to an LED light.



4. Connect the generator to a multimeter set to measure AC voltage.

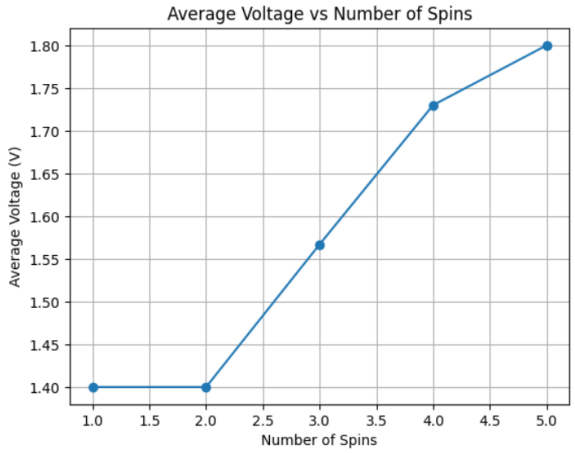
5. Turn the hand crank the selected number of times.
6. Record the voltage shown on the multimeter.
7. Observe and record the brightness of the LED.
8. Repeat each test three times for accuracy.
9. Calculate the average voltage for each number of spins.

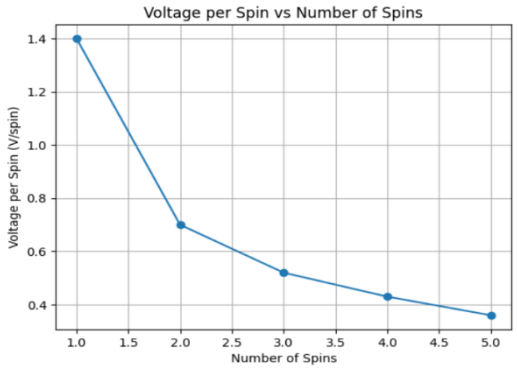




RESULTS

SPINS	Voltage Output (V)			Average
1	1.4	1.5	1.3	1.4
2	1.4	1.4	1.4	1.4
3	1.6	1.7	1.7	1.567
4	1.5	1.6	1.9	1.73
5	1.9	1.7	1.8	1.8

Spins	Average Voltage (V)	Voltage per Spin (V/spin)
1	1.4	**1.4**
2	1.4	**0.7**
3	1.567	**0.52**
4	1.73	**0.43**
5	1.8	**0.36**





The Labubu Generator was tested by spinning the **handle 1 to 5 times**, and the voltage was measured each time. At 1 spin, the generator produced about

1.4 volts. At 3 spins, it produced about **1.6 volts, and at 5 spins** it produced the most electricity at about **1.8 volts.** These results show that increasing the number of spins increases the amount of electricity produced.

RATE ANALYSIS

The voltage per spin was also calculated. At 1 spin, the voltage per spin was 1.4 volts per spin, while at 5 spins it decreased to about 0.36 volts per spin. Even though each spin produced a little less voltage, spinning the generator more times still resulted in more total voltage.

CONCLUSION

The purpose of this experiment was to see how the number of spins affects the voltage produced by a toy hand-crank generator. The results showed that **spinning the generator more times made more electricity**. When the generator was spun **1 time**, it produced about **1.4 volts**, and when it was spun **5 times**, it produced about **1.8 volts**. Even though each spin made a little less voltage, spinning more times still increased the total voltage. This experiment shows that motion can be changed into electricity using a hand-crank generator.

References

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