



Sustainable Development Goal 7: Affordable and Clean Energy

Investigation 2A: GENERATING ELECTRICITY WITH MOTION

Learning Outcome: Build and test a generator to observe that it converts a form of energy (e.g., mechanical) into electricity.

Materials

- 10 cm PVC pipe
- 5 m of 28–30 AWG enameled copper wire
- sandpaper
- 1 or 2 pre-wired LEDs
- 4–6 strong neodymium disc magnets
- cotton balls
- tape

What to Do

1. A solenoid is a series of wire loops making a cylinder. One has been constructed for you using PVC pipe, wire, and tape, and connected to pre-wired LED lights.
2. Place the magnets into the PVC pipe.
3. Put a wad of cotton into each end of the PVC pipe. Put several layers of tape over the end of the pipe to reinforce it.
4. Hold the tube in one hand, placing a thumb over one end and a finger over the other.
5. In your other hand, hold the LEDs together.
6. Shake the tube vigorously so the magnets move from one end to the other very rapidly.
7. Observe what happens to the LEDs.

Consider

1. How does shaking the tube slower change what you observe?
2. How does shaking the tube faster change what you observe?
3. The number of winds and the number of magnets can be called variables, because they are features of the Investigation that can vary and might affect the results.
Predict what would happen:
 - a. if you had more winds of wire in the solenoid
 - b. if you had more magnets in the pipe
4. What other variables could be changed that might affect the results?
5. How could having the ability to generate their own electricity benefit communities?
6. How could movement be used to generate electricity in your community?

Extension – Testing Variables

Test variables that you predicted might affect the results. Compare your observations to the original results to see if your predictions were accurate.