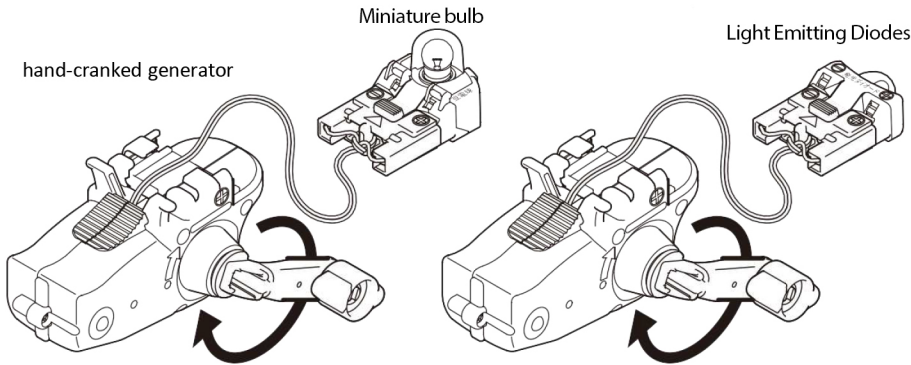


Let's make electricity

Experiment 1: Generating electricity with a hand-cranked generator

Power generation experiment

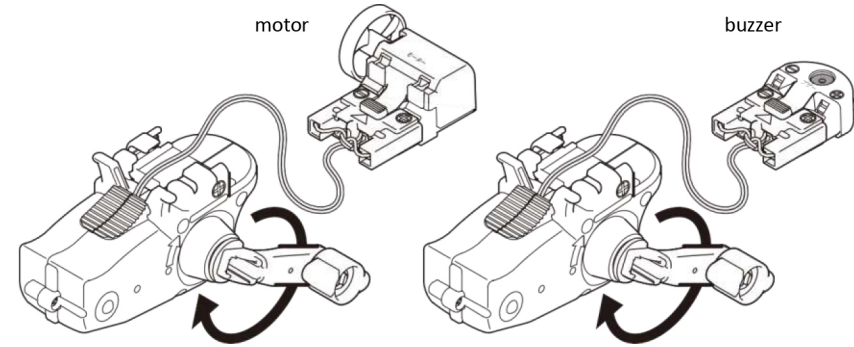
- 1) Attach a miniature bulb to the hand-cranked generator and slowly turn the handle.
- 2)Find out if there is a difference in how the light bulb's light glows when the handle is turned faster.
- 3) Find out what happens to the light bulb when you turn the handle backward.
- 4) Replace the light bulb with a light-emitting diode and turn the handle simultaneously.
Compare the difference in response to turning the handle with the light-emitting diodes.
(If it is difficult to see the difference in response, switch the light-emitting diode and the bean bulb several times.
- 5) Find out if there is a difference in how the light-emitting diode glows when the handle is turned faster.
- 6) Find out what happens to the light-emitting diode when the handle is turned in the opposite direction.



The results of the experiment are summarized in the table below.

	Miniature bulb	Light Emitting Diodes
Response to turning	Heavier than when nothing is on	Lighter than a miniature light bulb
When turning slowly	Glow a little	Glow a little
When turning fast	Shining brightly	Shining brightly
When turned in the opposite direction	It glows the same way	It doesn't glow

- 7) Switch to a motor and try turning the handle in the same way. Compare the feeling of turning the handle with that of a miniature bulb.
- 8) Turn the handle faster to find out if there is a difference in rotation.
- 9) Turn the handle backward to find out if there is a difference in rotation.
- 10) Replace it with a buzzer and turn the handle in the same way.
- 11) Turn the handle fast and see if there is a difference in sound.
- 12) Find out what happens to the buzzer when you turn the handle backward.



Let's summarize the result of experiment below

	motor	buzzer
Response to turning	Heavier than a miniature light bulb	
When turning slowly	Turn slowly	Makes a small sound
When turning fast	spin fast	Makes a loud sound
When turned in the opposite direction	Turn in the opposite direction	No sound

- ☆ Write the words in brackets () about power generation.
- If you generate electricity slowly, you generate (**less**) electricity, and if you generate electricity quickly, you generate (**more**) electricity.
 - If we generate electricity in the opposite direction, the flow of electricity will be (**reverse**).
- ☆ Let's summarize what we have learned about power generation.

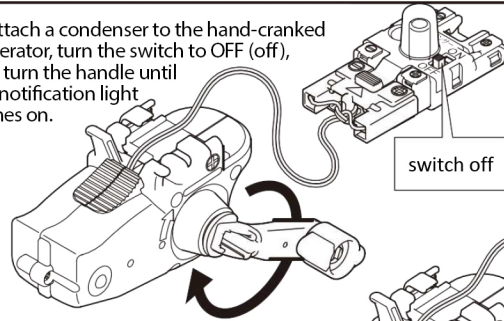
<example>The electricity generated can be used to light up a light bulb or a light-emitting diode, turn a motor or sound a buzzer. The response to turning a hand-cranked generator depends on what is connected to it. The amount of electricity and the direction of the current can be changed.

Can the electricity we make be stored and used?

Experiment 2: Using a capacitor (also known as an electrical condenser) to store electricity

Energy Storage Experiment: Store electricity in a condenser

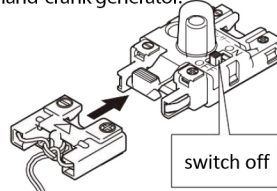
1. Attach a condenser to the hand-cranked generator, turn the switch to OFF (off), and turn the handle until the notification light comes on.



Let's take a look at what happened to the response of the turning handle as the electricity accumulated.

It got lighter and lighter

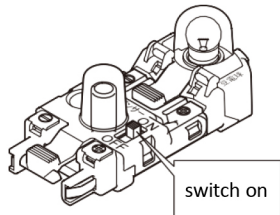
2) When the notification light comes on properly, remove the capacitor from the hand-crank generator.



The Use of stored electricity

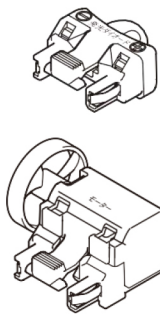
3) Attach a light bulb to a condenser that stores electricity, and turn the switch on to see what happens. In the same way, investigate light-emitting diodes, motors, and buzzers.

☆ What happened to the light-emitting diode?



It glowed

☆ What happened to motor?



It spins

☆ What happened to buzzer?



It glowed

A sound was made

☆ Write a word in the blanket to describe what the electricity has changed to.

- When a miniature bulb and a light-emitting diode were attached, electricity changed to (light).
- When I put the motor on, the electricity turned into (movement).
- When I turned on the buzzer, the electricity turned into a (sound).

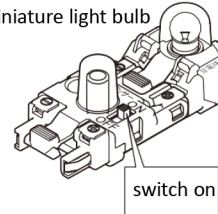
Compare miniature bulbs and light-emitting diodes

4) Store electricity in a condenser using the method described in step 1 and measure and compare the lighting time of a light-emitting diode and a miniature light bulb.

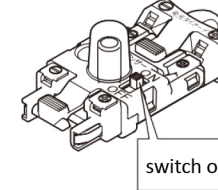
☆ Let's summarize the results of the experiment below

	lighting time	Electric current strength
miniature light bulb	Enter the actual time of measurement	Write the actual current value measured Amps
light emitting diode	Enter the actual time of measurement	Write the actual current value measured Amps

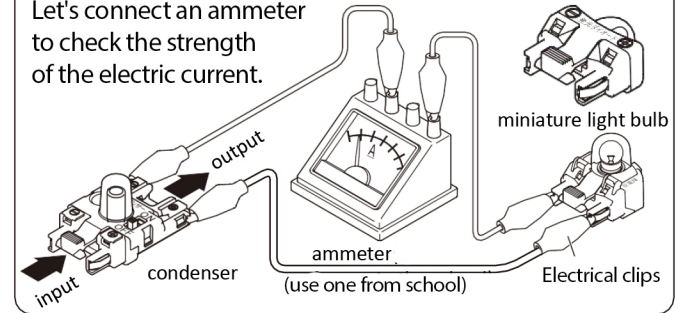
miniature light bulb



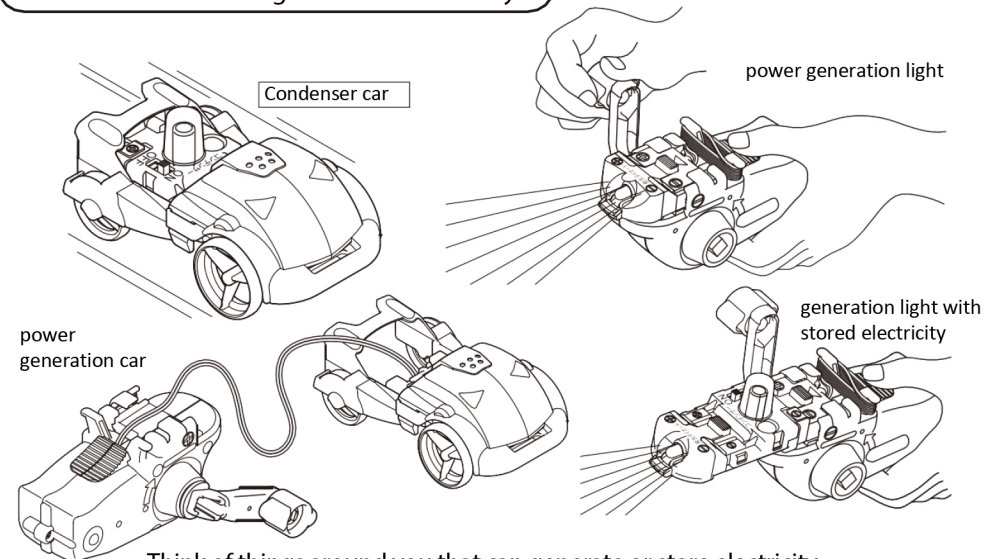
light emitting diode



Let's connect an ammeter to check the strength of the electric current.



Let's make something that uses electricity!



Think of things around you that can generate or store electricity.

<example> Wind power generation, electric bicycle, mobile phone, laptop computer, etc.