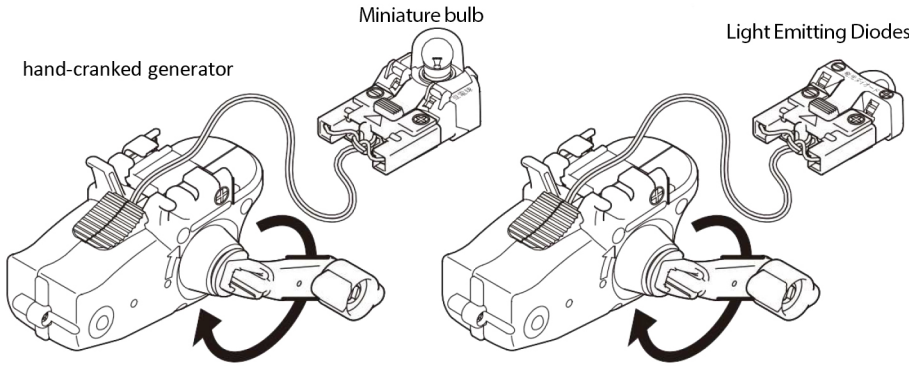


## Let's make electricity

### Experiment 1: Generating electricity with a hand-cranked generator

#### Power generation experiment

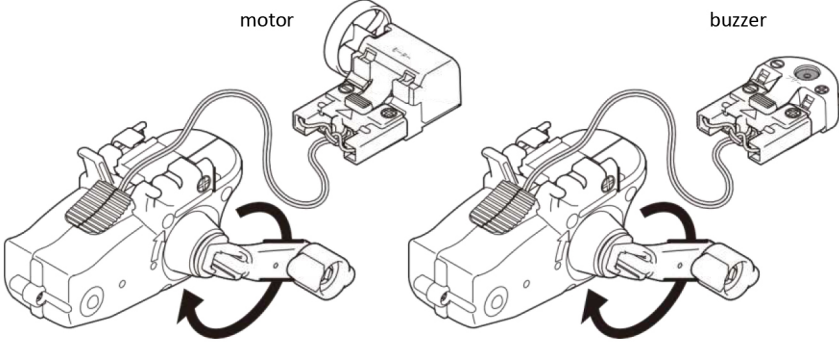
- 1) Attach a miniature bulb to the hand-cranked generator and slowly turn the handle.
- 2) Find out if there is a difference in how the light bulb's light glows when the handle is turned faster.
- 3) Find out what happens to the light bulb when you turn the handle backward.
- 4) Replace the light bulb 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		
When turning slowly		
When turning fast		
When turned in the opposite direction		

- 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		
When turning slowly		
When turning fast		
When turned in the opposite direction		

★ Write the words in brackets ( ) about power generation.

- If you generate electricity slowly, you generate ( ) electricity, and if you generate electricity quickly, you generate ( ) electricity.
- If we generate electricity in the opposite direction, the flow of electricity will be ( ).

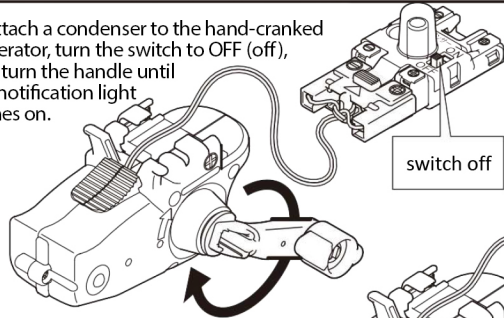
★ Let's summarize what we have learned about power generation.

Can the electricity we make be stored and used?

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

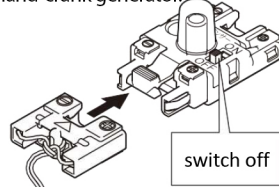
Energy Storage Experiment:  
Store electricity in a condenser

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.

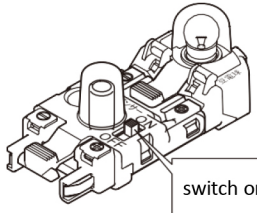
2) When the notification light comes on properly, remove the capacitor from the hand-crank generator.



(The Use of stored electricity)

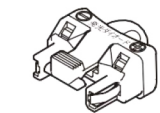
3) Attach a light bulb to a condenser that stores electricity, and turn the switch on to see what happens. In the same way, investigate light-emitting diodes, motors, and buzzers.

☆ What happened to the light-emitting diode?

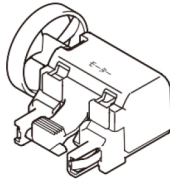


switch on

☆What happened to the miniature light bulb?



☆What happened to motor?



☆What happened to buzzer?



☆ 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 ( ).
- When I put the motor on, the electricity turned into ( ).
- When I turned on the buzzer, the electricity turned into a ( ).

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.

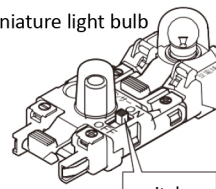
☆Let's summarize the results of the experiment below

	lighting time	Electricity stored
miniature light bulb		
light-emitting diode		

	lighting time
miniature light bulb	
light emitting diode	

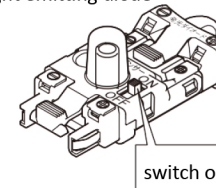
Electric current strength
Amps
Amps

miniature light bulb



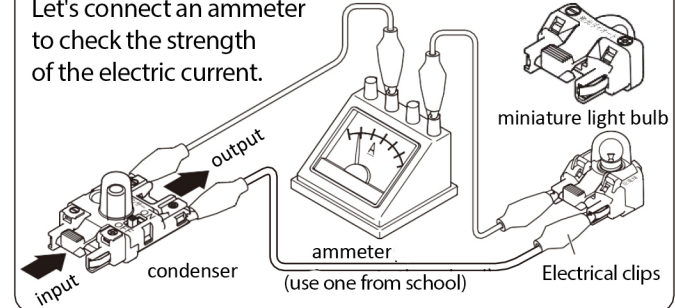
switch on

light emitting diode

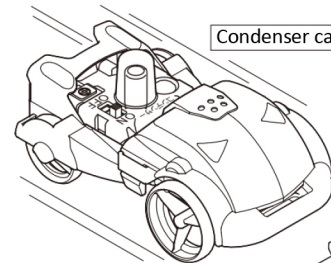


switch on

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

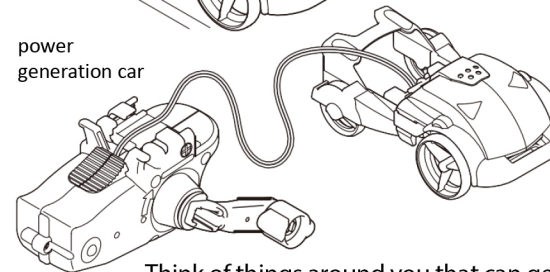


Let's make something that uses electricity!

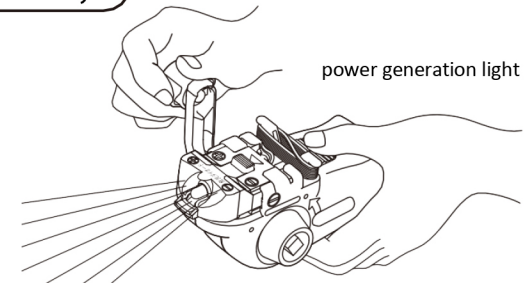


Condenser car

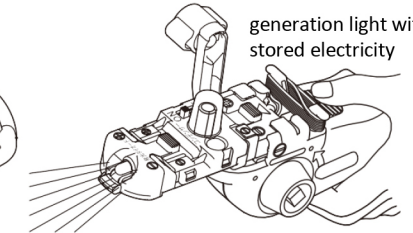
power  
generation car



power generation light



generation light with  
stored electricity



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