

Name \_\_\_\_\_

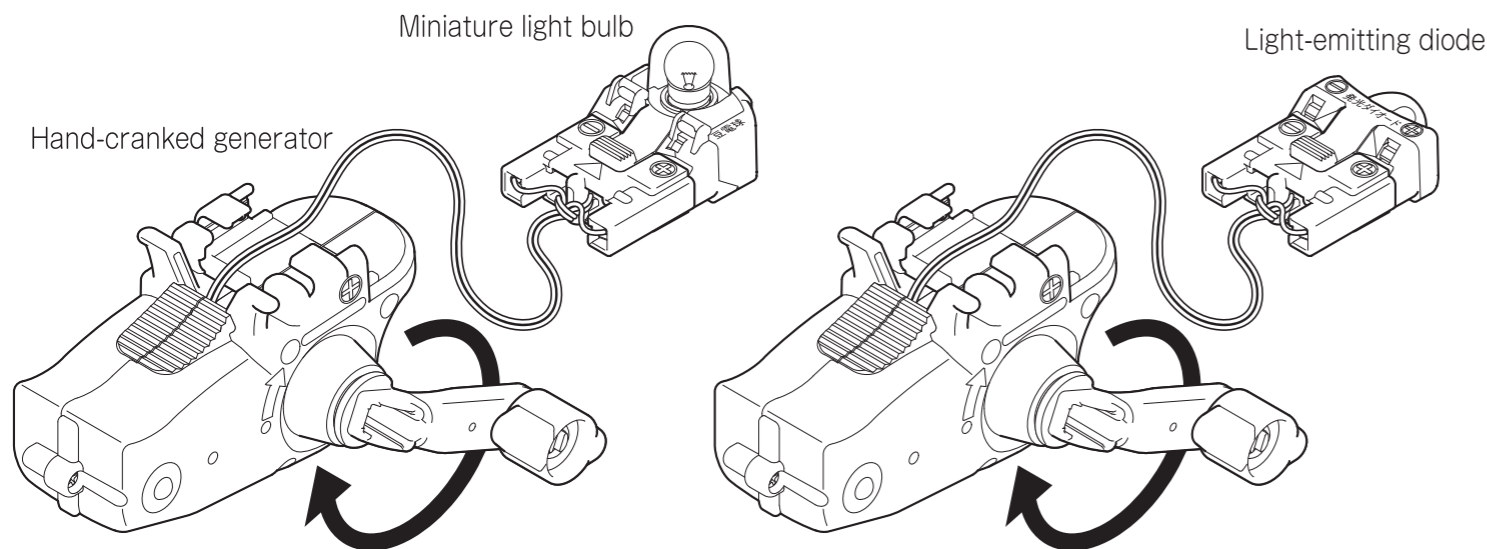
Let's make electricity.

## 1 Experiment 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 Turn the handle quickly and examine if there is a difference in the brightness of the miniature light bulb.
- 3 Find out what happens to the miniature light bulb when you turn the handle in the opposite direction.

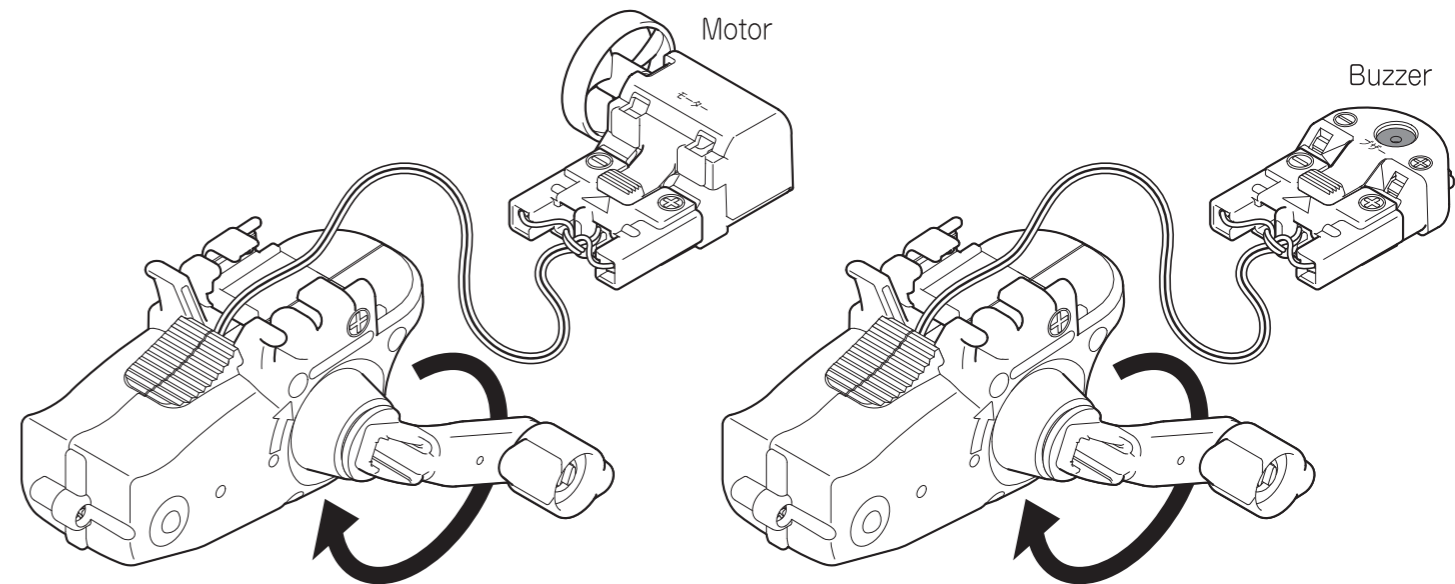
- 4 Replace the light bulb with a light-emitting diode and try turning the handle in the same way. Compare the difference as compared to turning the handle when the light bulb is attached (if it is difficult to see the difference, switch the diode and light bulb several times). If you turn the handle quickly, examine if there is a difference in the brightness of the light-emitting diode.
- 5 Find out if the light-emitting diode shines differently when the handle is turned quickly.
- 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 light bulb	Light emitting diodes
Response to turning	Felt heavier as compared to when nothing is attached	Felt lighter as compared to when the miniature light bulb is attached
When turning slowly	Glow a little	Glow a little
When turning quickly	Glowing brightly	Glowing brightly
When turning in the opposite direction	No change in brightness	It doesn't glow

- 7 Switch to a motor and try turning the handle in the same way. Compare the difference as compared to turning the handle when the light bulb is attached.
- 8 Turn the handle quickly 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 quickly 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	Felt heavier as compared to when the miniature light bulb is attached	
When turning slowly	Turn slowly	Makes a small sound
When turning fast	Spin quickly	Makes a loud sound
When turned in the opposite direction	Turn in the opposite direction	No sound

☆ Write down what you have learnt about electricity generation in the brackets ( ).

- 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 like ( reverse ).

☆ Let's summarize what we have learnt about power generation.

<Example>

The electricity generated can be used to light up a miniature 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.

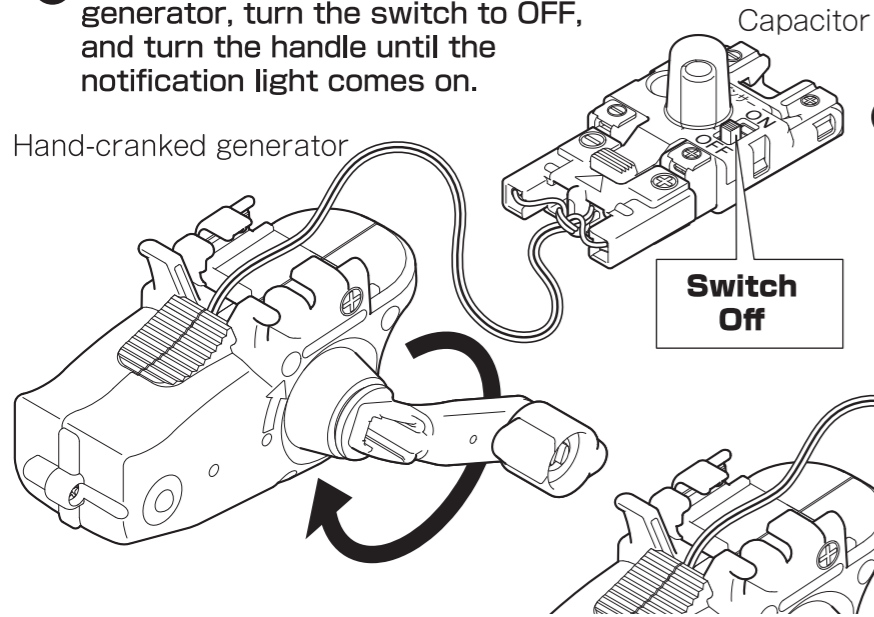
## Can we store and use the electricity we have made?

### Experiment 2 Use a capacitor to store electricity

Energy storage experiment

#### Store electricity in the capacitor

- 1 Attach the capacitor to the hand-cranked generator, turn the switch to OFF, and turn the handle until the notification light comes on.



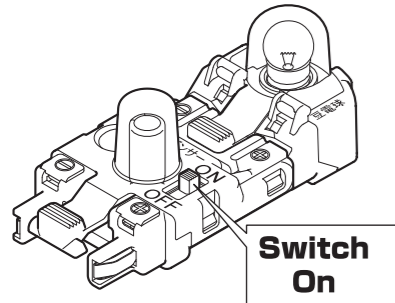
- ☆Write down how did the handle feel as the electricity built up.

It felt lighter.

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

#### Application of stored electricity

- 3 Find out what happens when you attach the miniature light bulb to the capacitor, and turn on the switch. In the same way, find out what happens when you attach the light-emitting diode, motor, and buzzer.



Switch On

- ☆What happened to the miniature light bulb?

It glowed.

- ☆What happened to the light-emitting diode?

It glowed.

- ☆What happened to the motor?

It spins.

- ☆What happened to the buzzer?

A sound was made.

- ☆Write down the changes caused by the electricity in the brackets ( ).

- When the miniature light bulb/light-emitting diode were attached, the electricity causes ( light ).
- When the motor is attached, the electricity causes ( movement ).
- When the buzzer is attached, the electricity causes a ( sound ).

## Compare miniature light bulbs and light-emitting diodes

- 4 Store electricity using method described in 1. Compare the time taken for the miniature light bulb/light-emitting diode to light up.

- ☆Let's summarize the results of the experiment below.

	Time taken to light up
Miniature light bulb	Write down the time you have measured.
Light-emitting diode	Write down the time you have measured.

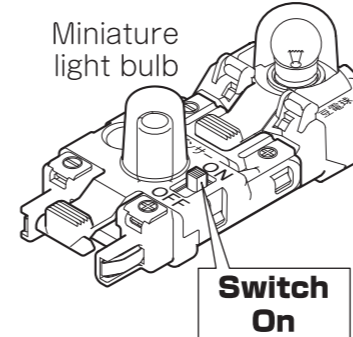
Electric current strength

Write down the current strength you have measured.

Amps

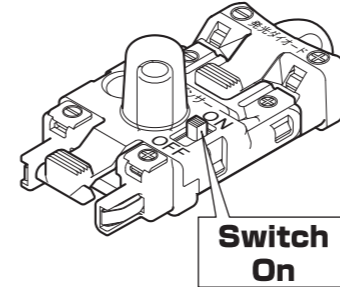
Write down the current strength you have measured.

Amps



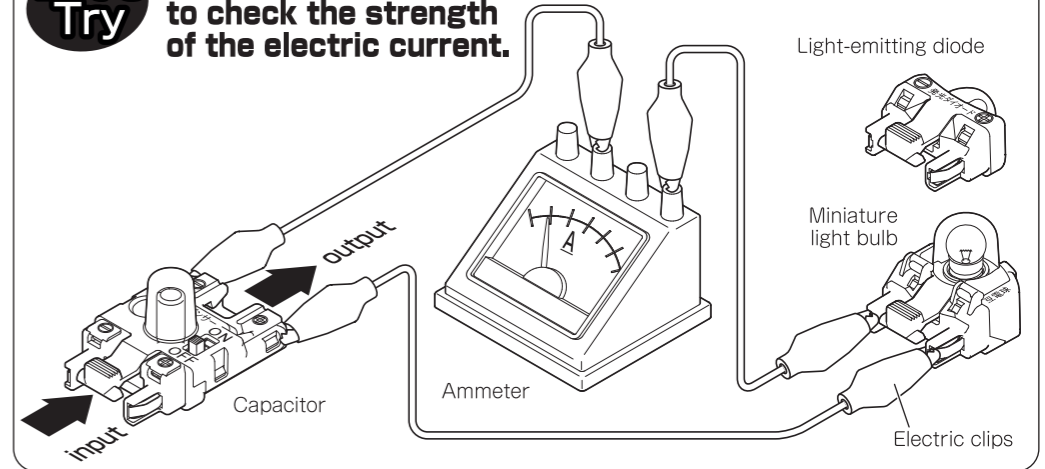
Switch On

Light-emitting diode

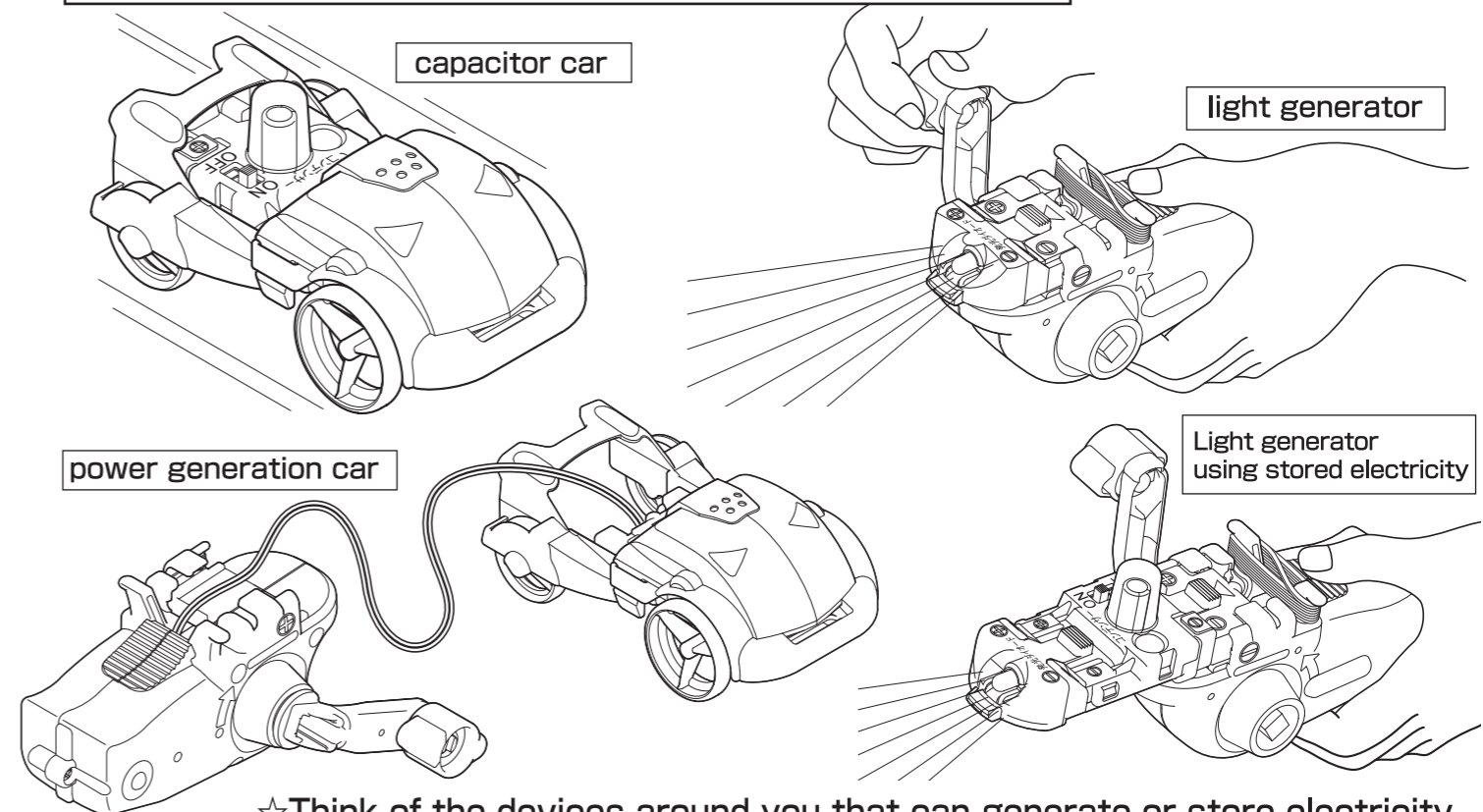


Switch On

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



## Try making devices that make use of electricity!



- ☆Think of the devices around you that can generate or store electricity.

<Example>

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