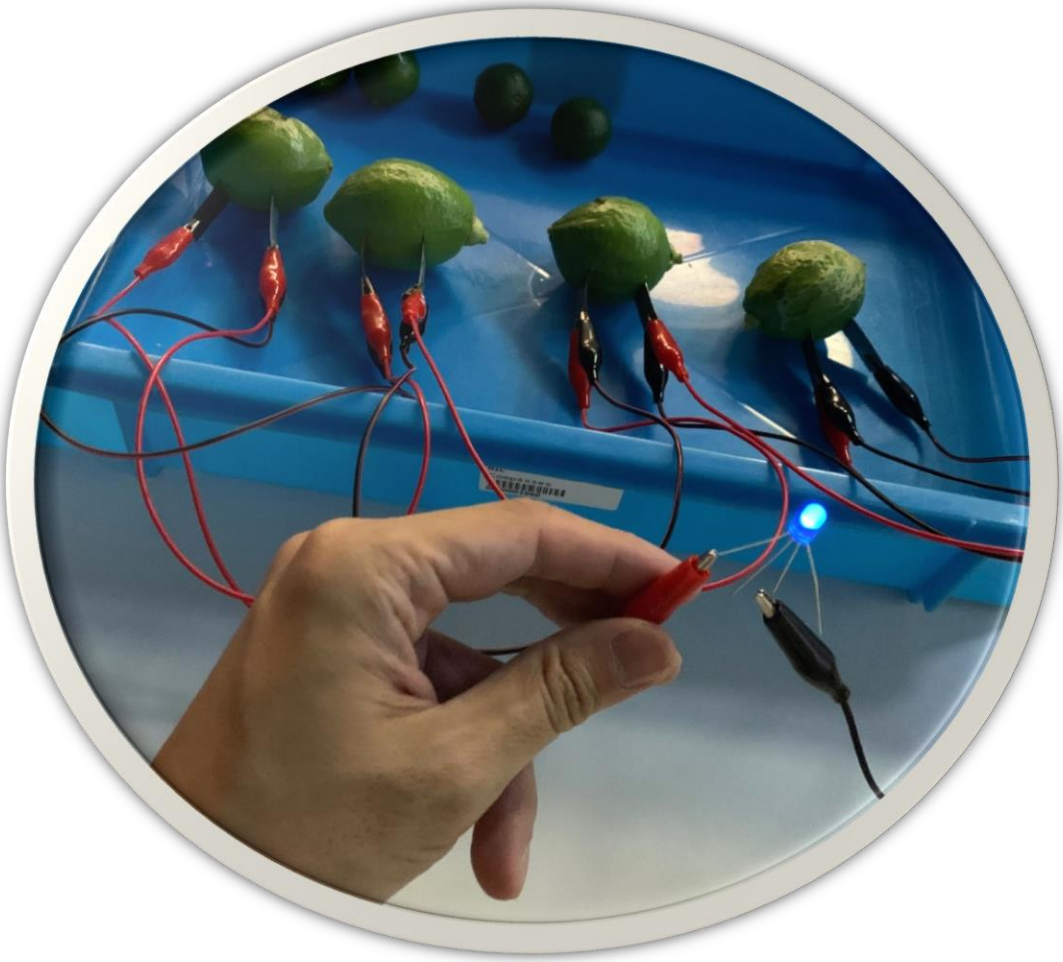
Stewards Pooi Kei Primary School X QTN-T EDUHK

2023-2024

J.5 STREAM Project (SCIENCE)

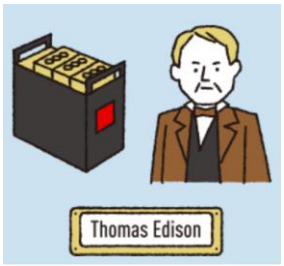
Fruit Battery

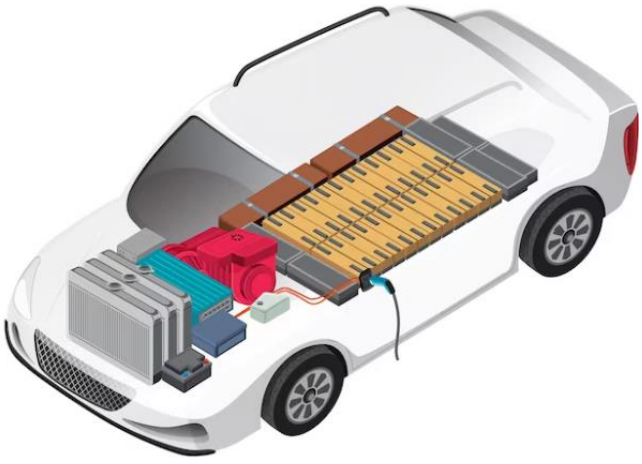


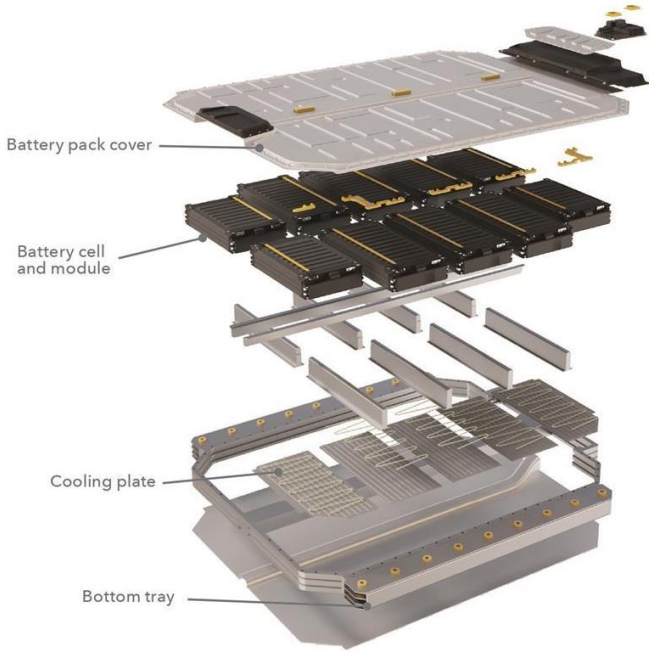
Name: _____ **Class:** _____

Reading

Read the following articles about batteries.

Title	QR Code
<History of batteries> From Panasonic Energy Co., Ltd  	
<Batteries are a key part of the energy transition. Here's why> From World Economic Forum	





Uses of Batteries

- as a portable temporary source of electrical energy
- as an energy storage (store the energy produced by sustainable energy sources, e.g. solar power, wind power)

As we know, fruits provide energy! Can we make use of the fruits to generate electricity? We want to investigate the fruit battery.

Video to watch	QR code
<This battery is made from 3,000 LEMONS - Guinness World Records> By Guinness	
<Fruit-Power Battery> By Sick Science	

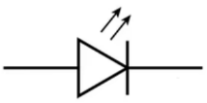
Prerequisite (Fair test)

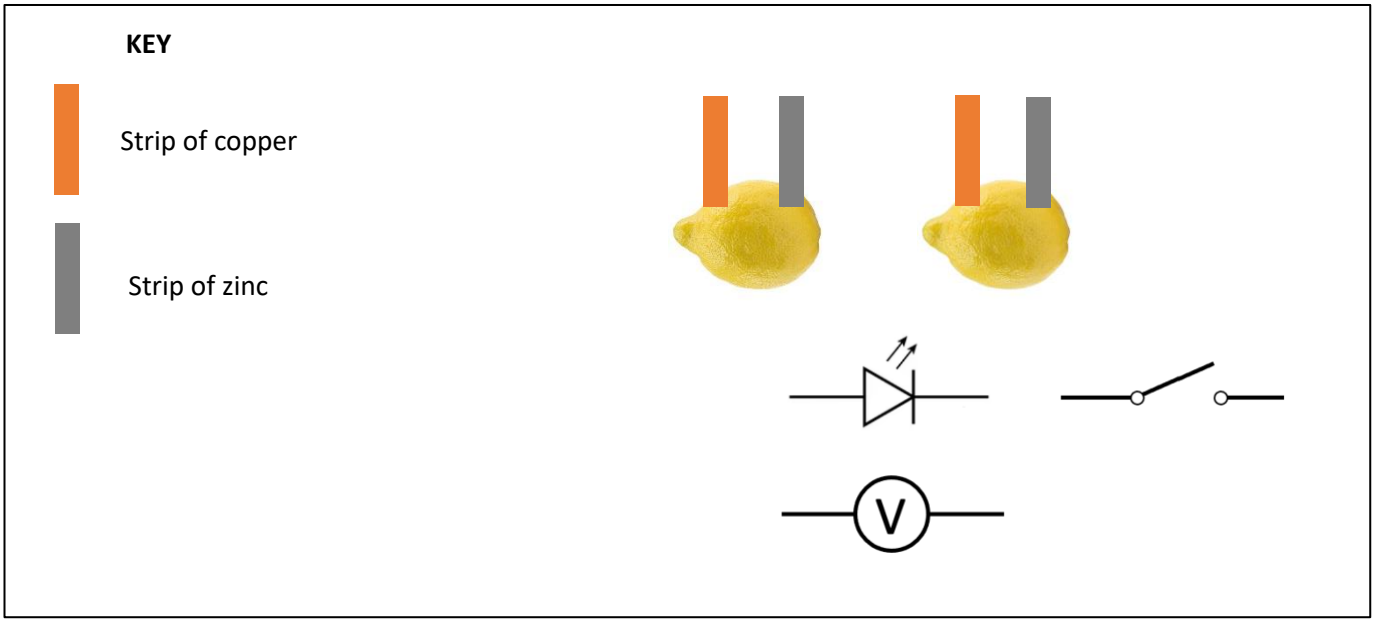
Put a "✓" in appropriate box(es) for making a fruit battery in a fair test.

Independent variable (**unique** factor to be changed)		Type of fruit
		Type of the wire
		Type of the voltmeter/multimeter
		Type of metal combination used
Controlled variable (factor(s) remains unchanged)		Type of fruit
		Type of the wire
		Type of the voltmeter/multimeter
		Type of metal combination used
Dependent variable (factor to be measured)		Light up or not light up of the LED
		Voltage generated
		Taste of fruit

Prerequisite (Experimental set-up)

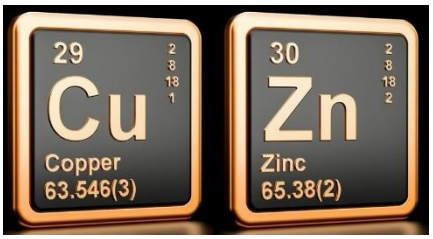
Draw a circuit diagram to show how to measure the voltage generated by lemons with the connection of the LED.

Open switch	Voltmeter	LED
		



Equipments / Experimental set-up

- Fruits/Vegetables (e.g. lemons, apples, potatoes……)
- Electrical components (LED, Voltmeter/Multimeter, wires)
- Strip of zinc (Zn), Strip of copper (Cu)



Part 1 Fruit batteries by using lemons

Access the performance of the fruit batteries using lemons and record the results.

Results:

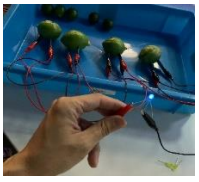
Number of lemons used	Does the bulb light up?	Voltage Generated (V)			
		1st	2nd	3rd	Average
1	(YES / NO)				
2	(YES / NO)				
3	(YES / NO)				
4	(YES / NO)				

Remarks: Round the result of average voltage up to 2 decimal place.

Conclusion:

The LED (can / cannot) be lighted up by the fruit battery using ____ lemons.

The average voltage generated is _____ V.



Part 2 Fruit batteries by using other kinds of fruits or vegetables

Access the performance of the fruit batteries using different kinds of fruits or vegetables and record the results.

A. Fruit / Vegetable used: _____

Number of _____ used	Does the bulb light up?	Voltage Generated (V)			
		1st	2nd	3rd	Average
1	(YES / NO)				
2	(YES / NO)				
3	(YES / NO)				
4	(YES / NO)				

B. Fruit / Vegetable used: _____

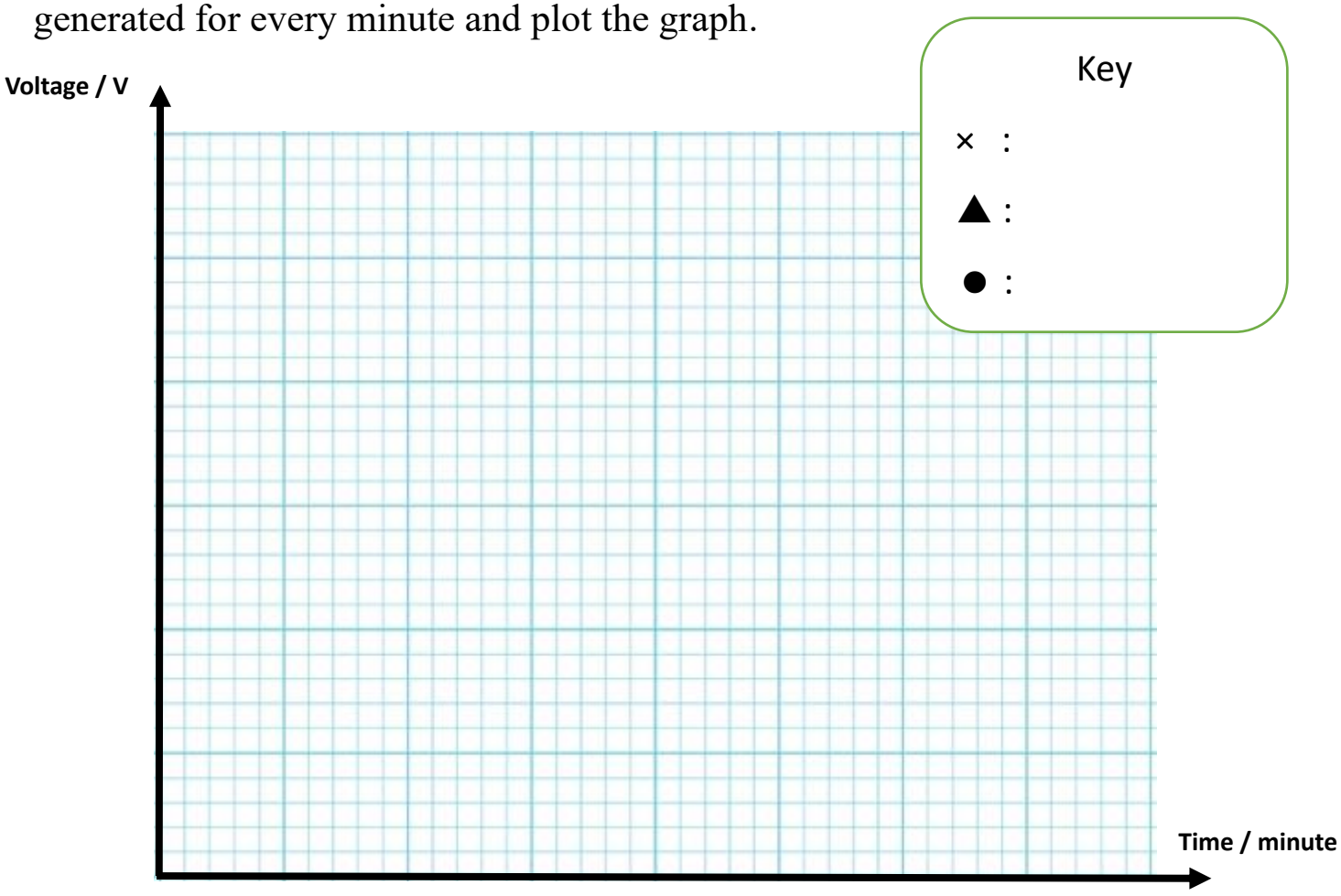
Number of _____ used	Does the bulb light up?	Voltage Generated (V)			
		1st	2nd	3rd	Average
1	(YES / NO)				
2	(YES / NO)				
3	(YES / NO)				
4	(YES / NO)				

Summarize the results with other groups and compare the results

Fruit or vegetables used	Minimum number needed to light up the LED	Average voltage generated to light up the LED (V)
	(1 / 2 / 3 / 4 / 5)	
	(1 / 2 / 3 / 4 / 5)	
	(1 / 2 / 3 / 4 / 5)	
	(1 / 2 / 3 / 4 / 5)	

Part 3 Life span of the fruit battery (Googlespreadsheet / Excel)

Connect 4 fruits/vegetables of same type with a LED, record the voltage generated for every minute and plot the graph.



Discussions

1. Which fruit or vegetable can generate the highest voltage? Suggest a possible explanation why this fruit or vegetable can generate the highest voltage (think about the taste, liquidity, texture, etc)

_____

_____

_____

2. What are the precautions / errors of the experiment? How can you improve the experiment?

_____

_____

Evaluation

	Items	Rating
Self-evaluation	Understand on how a closed-circuit work.	☆ ☆ ☆ ☆ ☆
	Understand on how a fruit battery work.	☆ ☆ ☆ ☆ ☆
Peer's evaluation	Degree of participation in the group activity.	☆ ☆ ☆ ☆ ☆
Parent's evaluation	Understand on how a closed-circuit work.	☆ ☆ ☆ ☆ ☆
	Understand on how a fruit battery work.	☆ ☆ ☆ ☆ ☆
Teacher's evaluation	Comments:	