

# 怎樣設計多元評估的科學科課？

## --培養創意的學習和評估方法



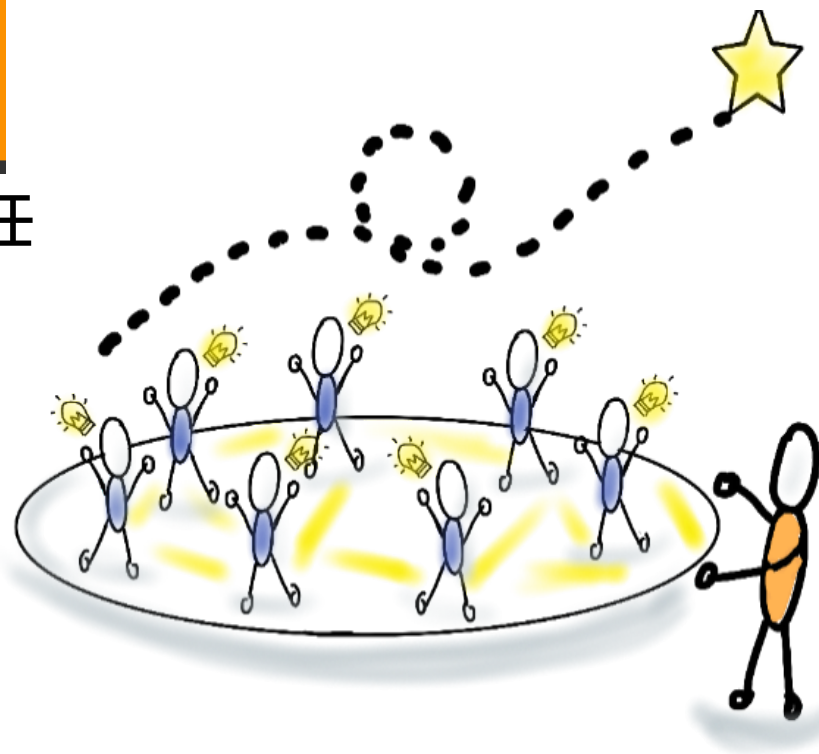
蕭煒炘老師

德蘭中學

理科及**STEM**/推廣電子學習統籌主任

香港翻轉教學協會

科學科召集人

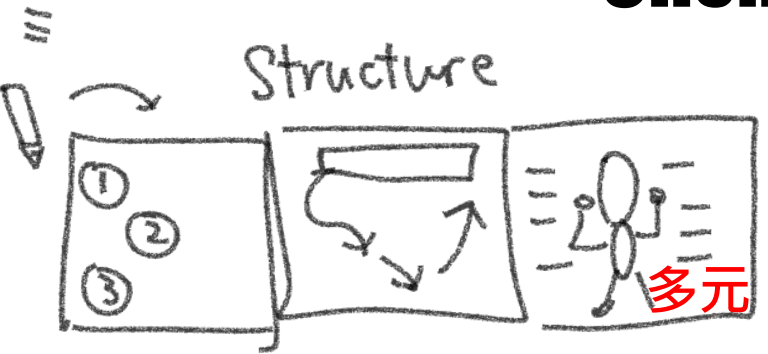


德蘭中學  
St. Teresa Secondary School



FLiPEdu  
- HONG KONG -

# Science Chemistry



視覺化教學

**Making Learning  
Visible**

*Teaching  
is a work  
of heart.*



自主學習

**Motivating every students**



翻轉+創新教學

**Flipped Learning  
+ Creative approach**

怎樣設計**多元**評估的科學科課？

--**培養創意**的學習和評估方法



According to a [recent World Economic Forum report](#), the **TOP skills in the lead-up to 2025** :



**2025年  
最重要項人才技能  
TOP Skills in  
2025**







Fig.1  
How has remote learning affected '21st century skills'?. (2021). Retrieved 7 December 2021, from <https://www.cambridge.org/gb/education/blog/2021/05/20/how-has-remote-learning-affected-21st-century-skills/>

## Top 10 skills of 2025

-  Analytical thinking and innovation
-  Active learning and learning strategies
-  Complex problem-solving
-  Critical thinking and analysis
-  Creativity, originality and initiative
-  Leadership and social influence
-  Technology use, monitoring and control
-  Technology design and programming
-  Resilience, stress tolerance and flexibility
-  Reasoning, problem-solving and ideation

**Type of skill**

-  Problem-solving
-  Self-management
-  Working with people
-  Technology use and development

Advanced nations will expect these in future from human resources as the future supply chain skews toward regions south of Tropic of Cancer due to connectivity, leading to rate dilution and better bang for the dollar

### in 2020

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

### in 2015

1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity

### in 2030

1. Judgment & Decision Making
2. Fluency of ideas
3. Active Learning
4. Learning Strategies
5. Originality
6. System Evaluation
7. Deductive Reasoning
8. Complex Problem Solving
9. Systems Analysis
10. Monitoring

*Your next job move could be easier (or more difficult) than you think --depending on self-development, skills you acquire and trainings you seek, other than "degree and years of experience"*

## in 2030

1. Judgment & Decision Making
2. Fluency of ideas
3. Active Learning
4. Learning Strategies
5. Originality
6. System Evaluation
7. Deductive Reasoning
8. Complex Problem Solving
9. Systems Analysis
10. Monitoring

## **TOP skills in the lead-up to 2025 :**

**1.分析思維及創新能力**

**Analytical thinking and innovation**

**2.主動學習及學習策略**

**Active Learning and Learning Strategies**

## **TOP skills in the lead-up to 2030 :**

**1.判斷力及決策力**

**Judgement and Decision making**

**2.意念/思維流暢度**

**Fluency of ideas**

**3.主動學習**

**Active Learning**

# 2022 Skills Outlook

## Growing

- 1 Analytical thinking and innovation
- 2 Active learning and learning strategies
- 3 Creativity, originality and initiative
- 4 Technology design and programming
- 5 Critical thinking and analysis
- 6 Complex problem-solving
- 7 Leadership and social influence
- 8 Emotional intelligence
- 9 Reasoning, problem-solving and ideation
- 10 Systems analysis and evaluation

## Declining

- 1 Manual dexterity, endurance and precision
- 2 Memory, verbal, auditory and spatial abilities
- 3 Management of financial, material resources
- 4 Technology installation and maintenance
- 5 Reading, writing, math and active listening
- 6 Management of personnel
- 7 Quality control and safety awareness
- 8 Coordination and time management
- 9 Visual, auditory and speech abilities
- 10 Technology use, monitoring and control

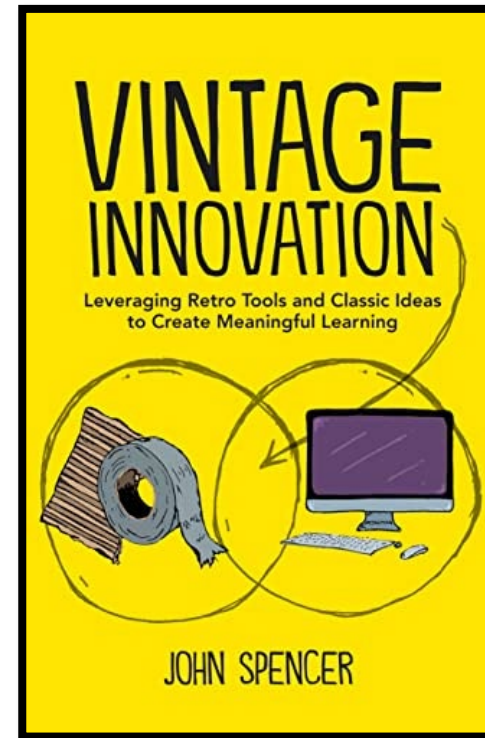
COMMITTED TO  
IMPROVING THE STATE  
OF THE WORLD

WORLD  
ECONOMIC  
FORUM

COMMITTED TO  
IMPROVING THE STATE  
OF THE WORLD

If we want to  
prepare students  
for the FUTURE,  
**we need to**  
**empower them**  
**in the PRESENT.**

-John Spencer





# EMPOWER?

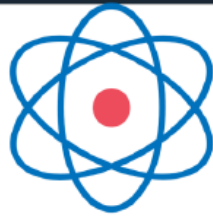


**HOW?**

理科老師  
2023 vs 2003

推廣科學素養

Promoting Scientific Literacy in classroom



**Science Process Skills**

**Nature of Science**

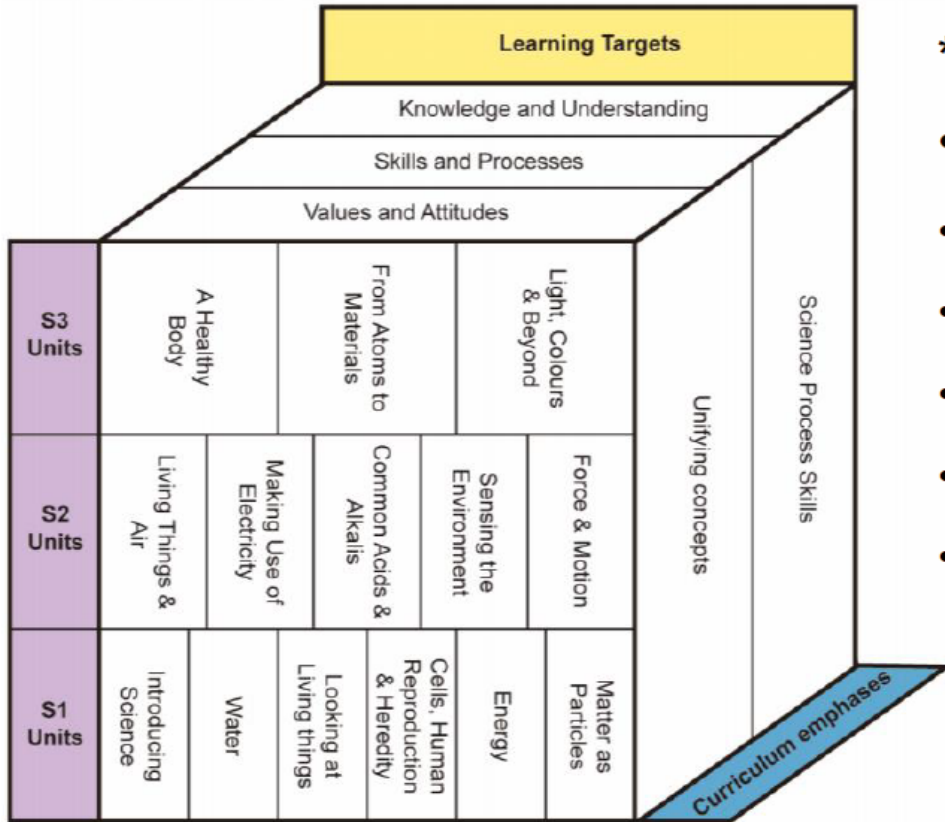
# 1. Science curriculum guide( EDB updated 2017)



## **Science Education**

Science education provides learning experiences for students to develop scientific literacy with a firm foundation on science, realise the relationship between science, technology, engineering and mathematics, master the integration and application of knowledge and skills within and across KLAs, and develop positive values and attitudes for personal development and for contributing to a scientific and technological world.

# 1.Science curriculum guide(updated 2017)



## \*Science Process Skills

- Observing
- Classifying
- Designing investigations
- Conducting practical
- Inferring
- Communicating

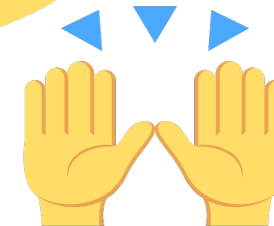
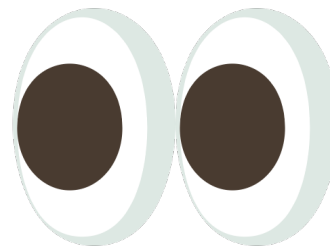
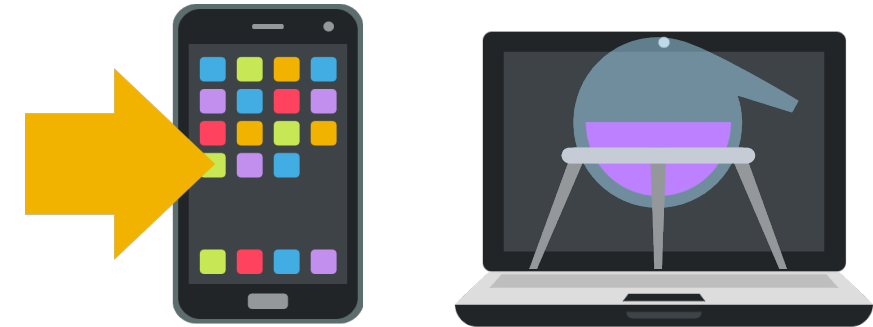
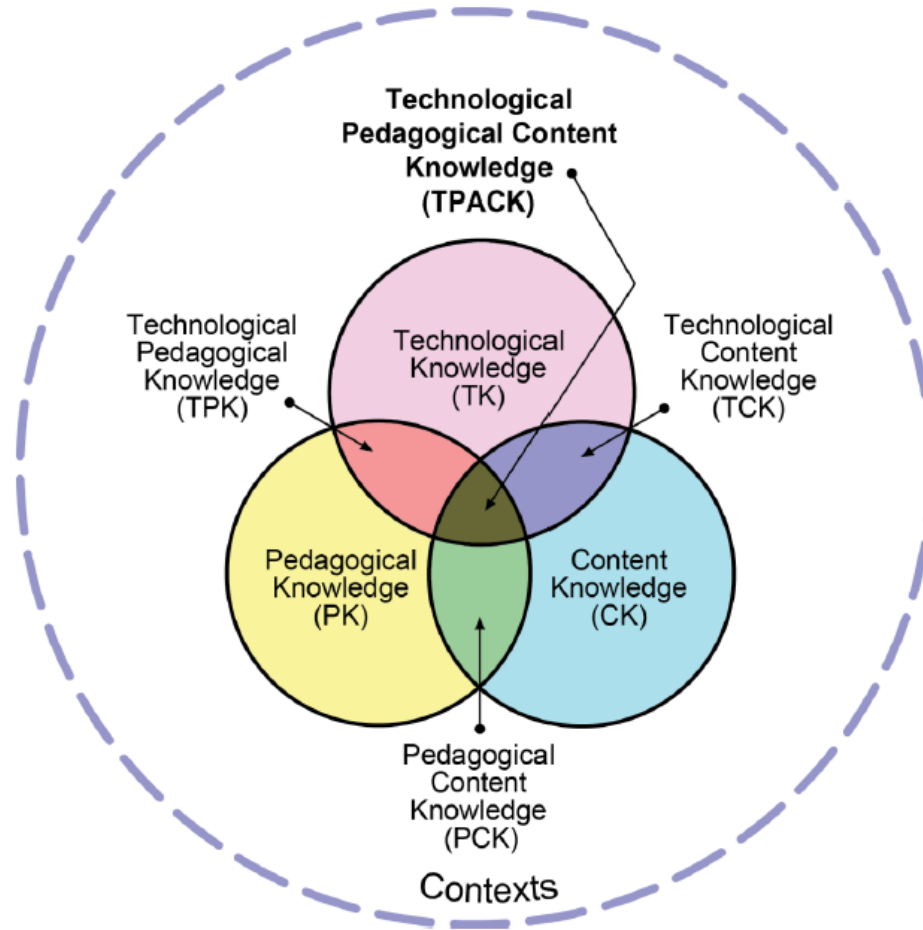


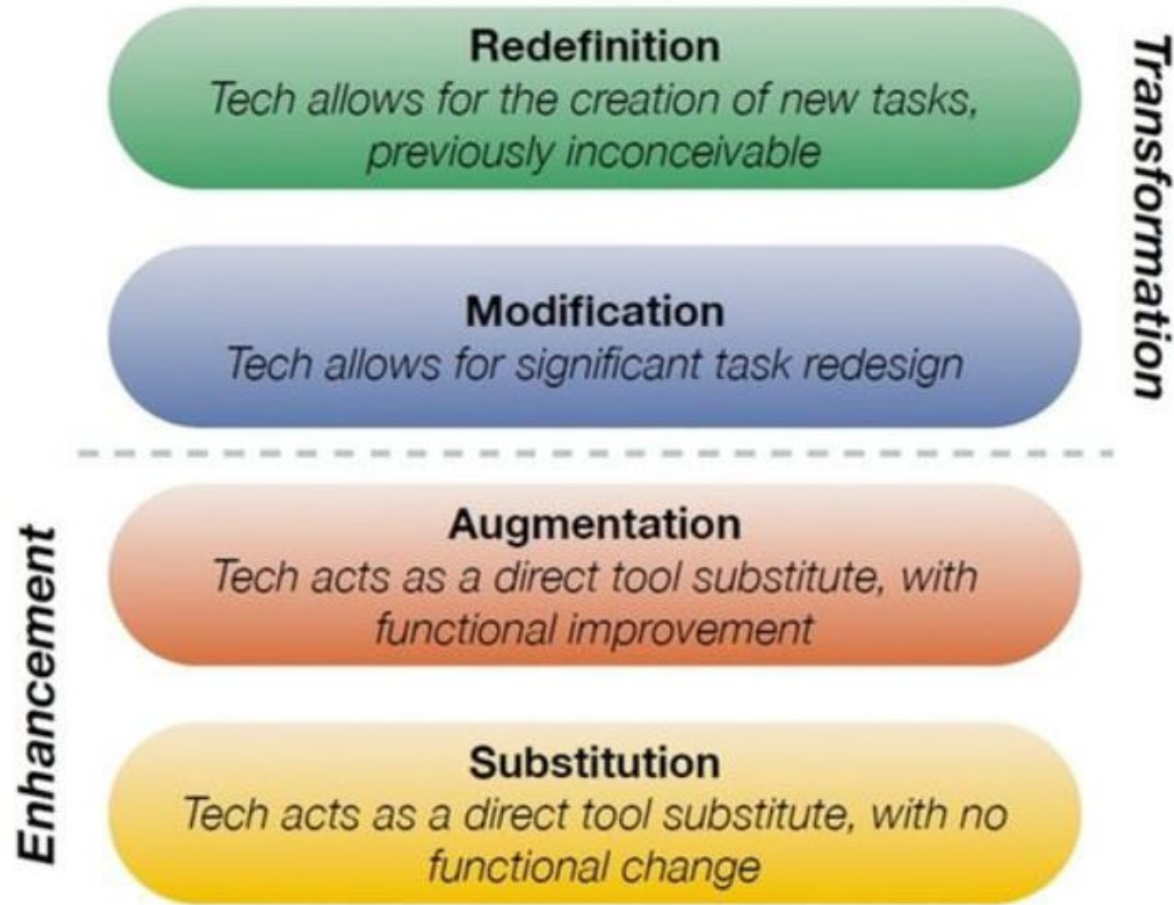
Figure 2 Diagrammatic Representation of the Science (S1-3) Curriculum Framework



## 2.TPACK and Science Teaching

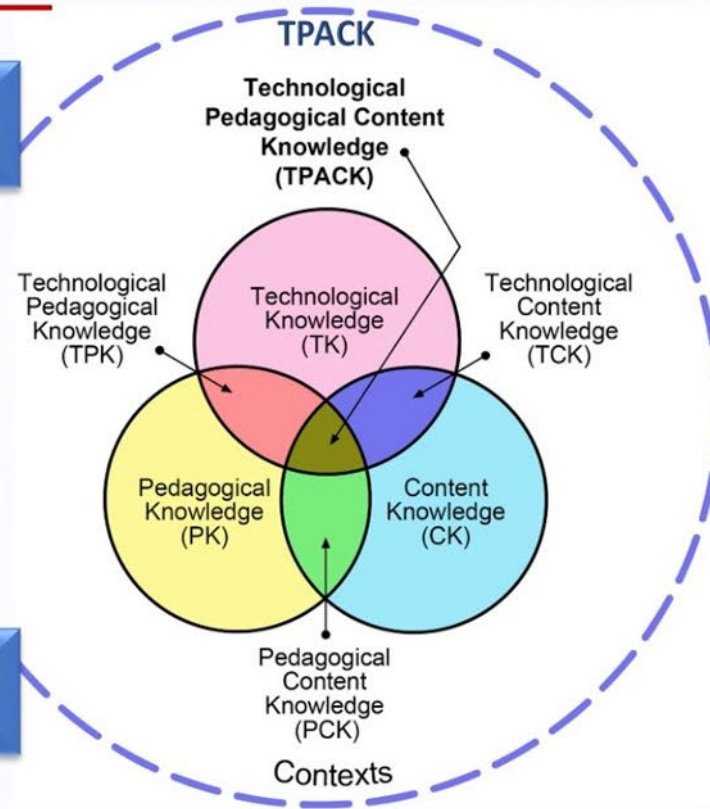
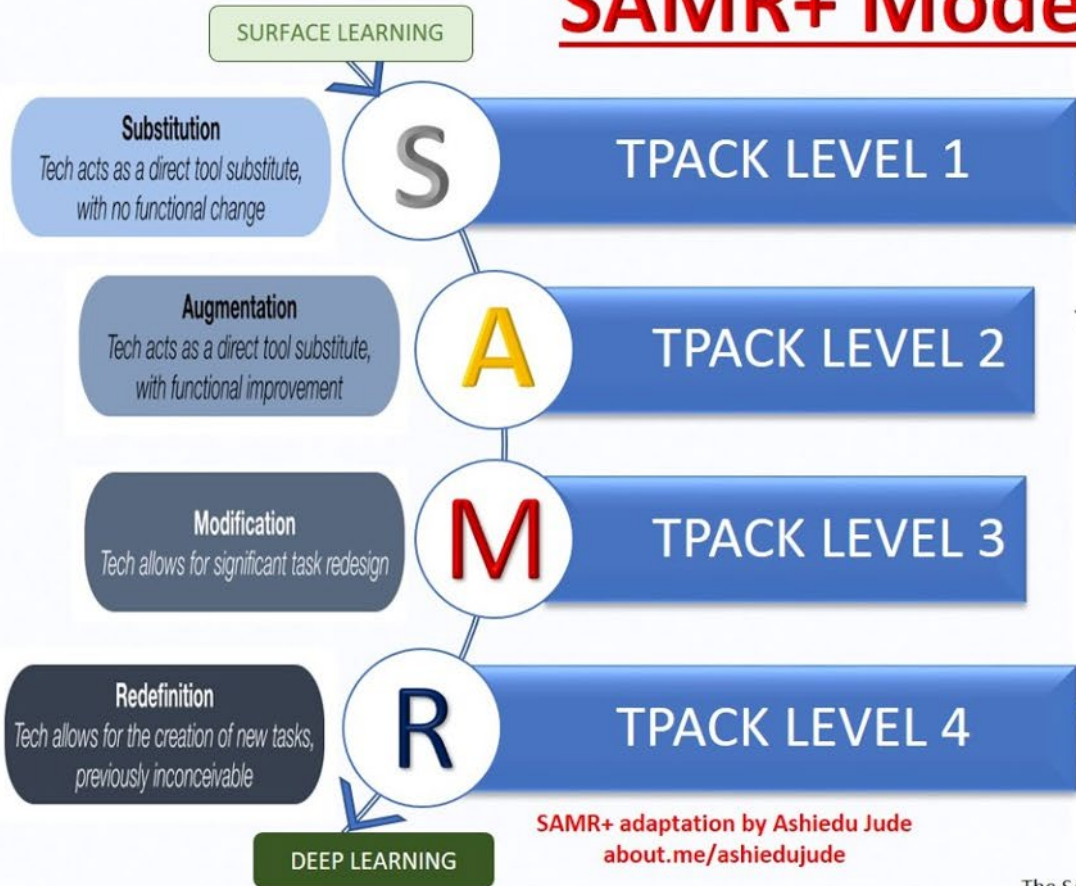


### 3. SAMR model



# 4. SAMR X TPACK

## SAMR+ Model

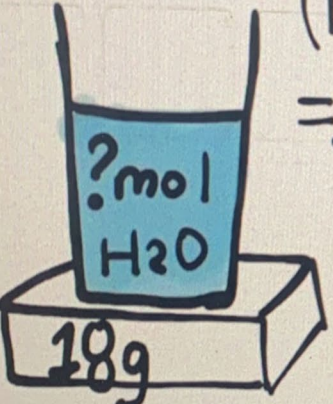


The SAMR model provides hierarchical structure for the learning outcomes. While the TPACK model provides the competence for teachers to integrate technology, pedagogy and content skills within the SAMR hierarchy.

<https://youtu.be/SC5ARwUkVQg>

# 新常態下的教育現場

Molar mass  
of water ( $H_2O$ )  
( $1 \times 2 + 16$ )  
 $= 18 \text{ g mol}^{-1}$

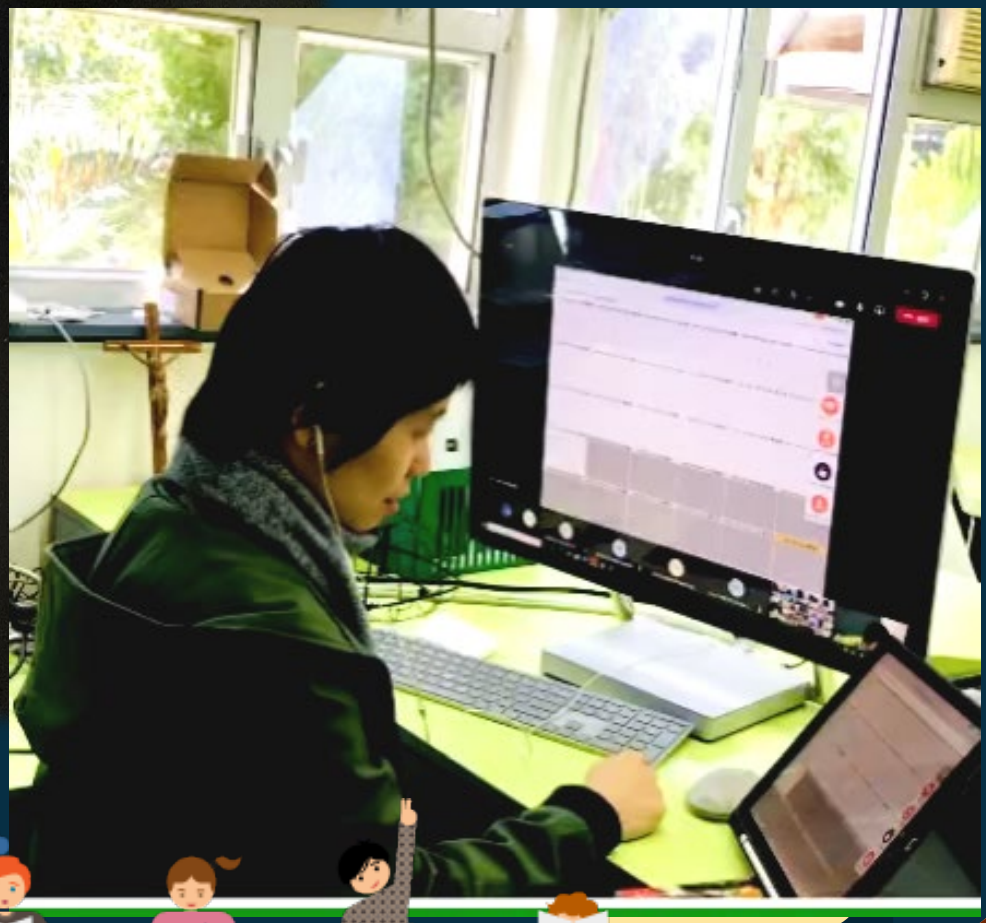


1 mol  
of water

Handwritten Chinese characters: 下 (bottom), 上 (top), 一 (one)

課堂太多  
單向教學

內容太抽象





後疫時代  
新常態

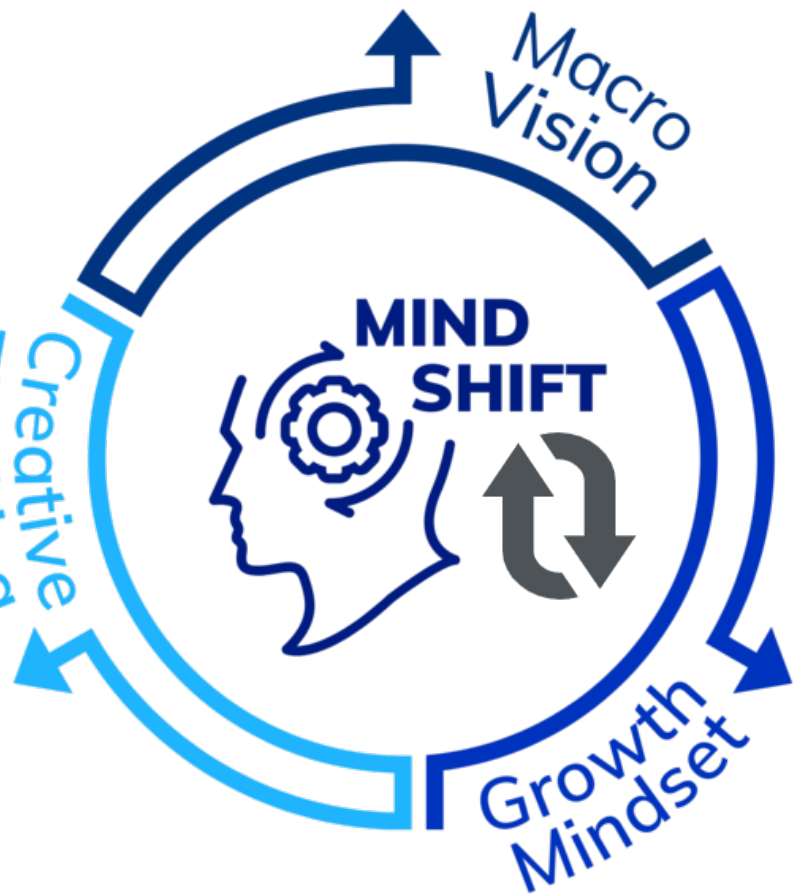


為未來而教

創新/創意  
思維



Creative  
Thinking



不斷學習



IF WE WANT STUDENTS  
TO **INNOVATE** IN  
THE FUTURE, WE NEED  
THEM TO OWN THE  
PROCESS **NOW.**

-John Spencer

學生主導學習

Take Ownership  
of their learning

||

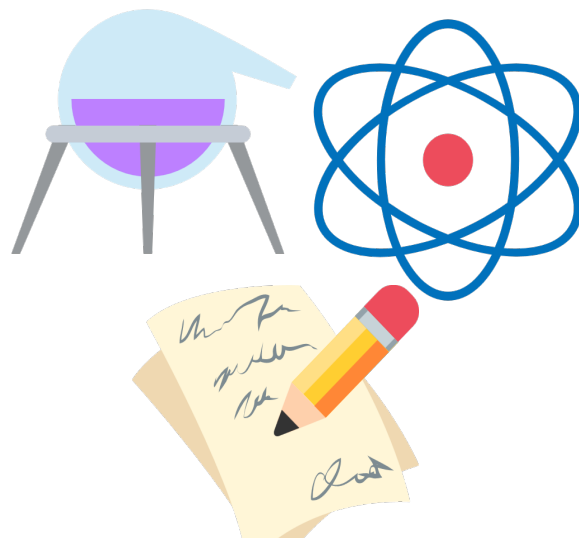
信念 → 設計

Believe → Design



# 如何推動**多元化**學習 及評估學生的學習表現?

理科  
知識+技能+態度  
**A.S.K**



多元化方式  
進展性評估  
(e.g. STEAM活動)

科本[英文]生字/定義  
讀寫能力  
**Rac/Lac**

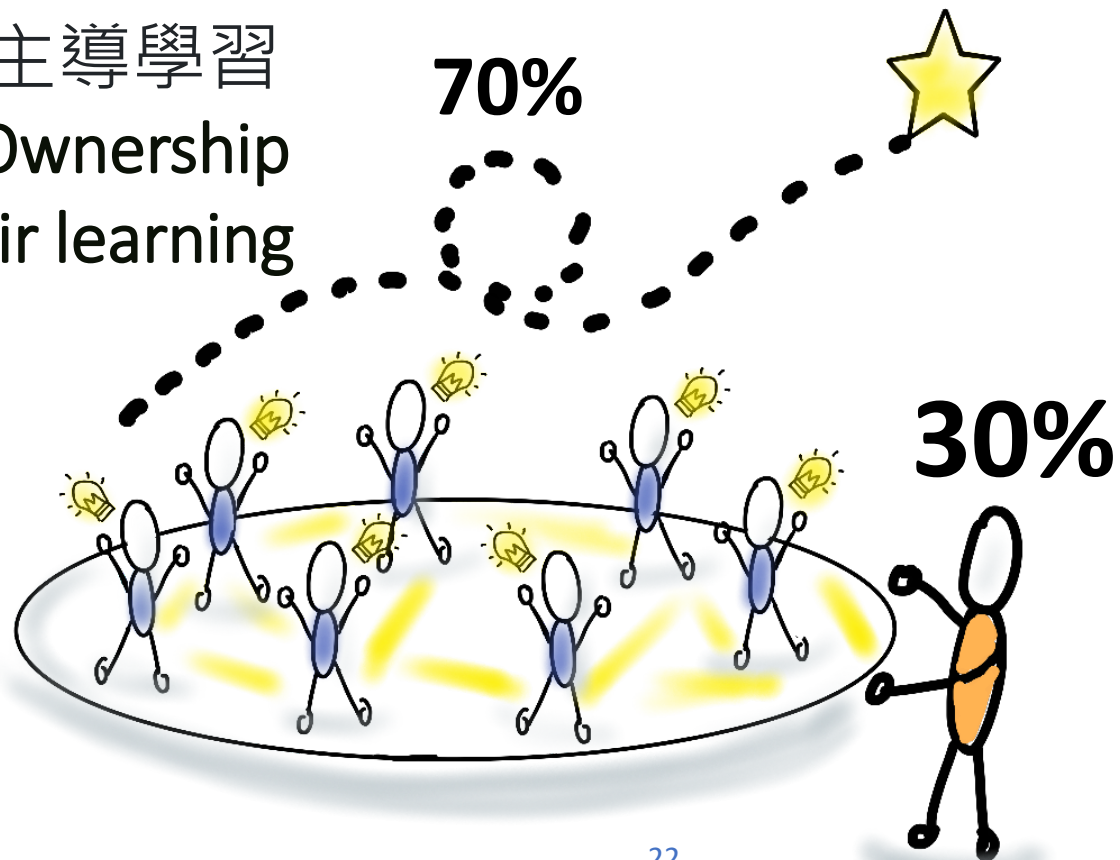
推動**多元化**學習

如何從教學中協助學生**建構知識**及  
**評估**學生的學習表現？



學生主導學習  
Take Ownership  
of their learning

70%



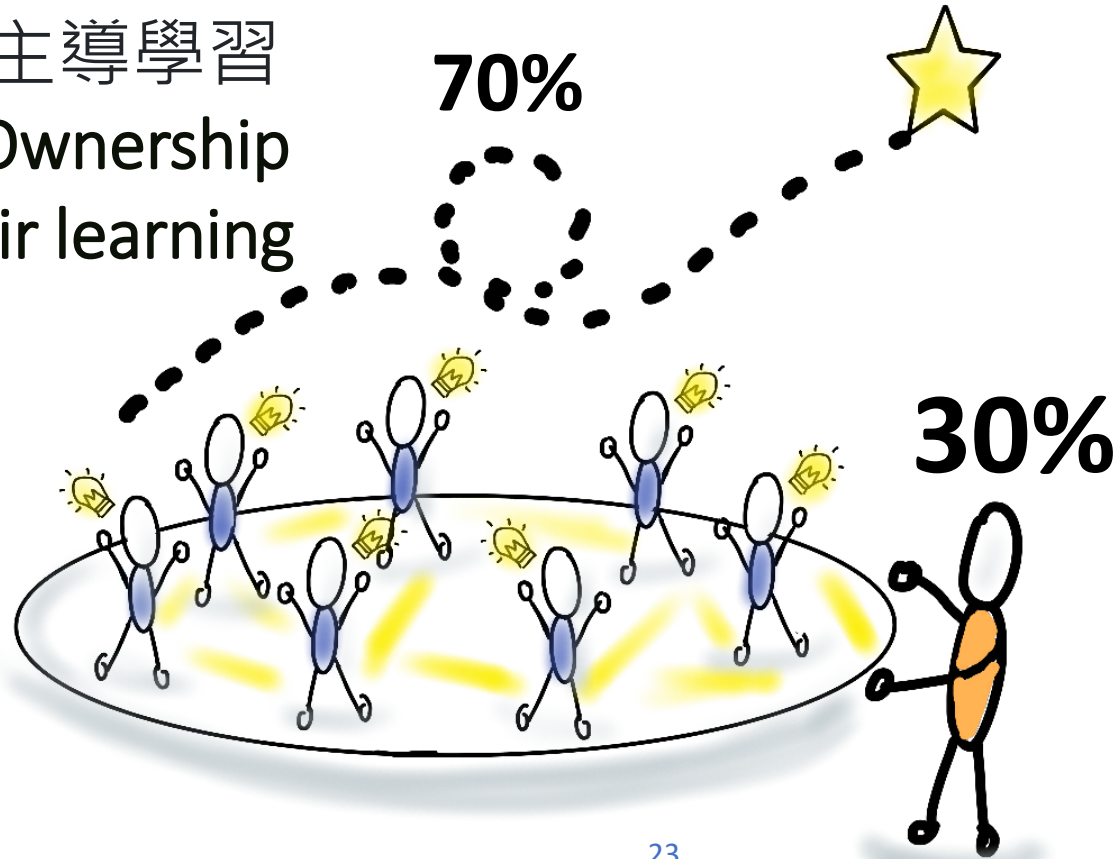
30%

22

老師作為引導者 (Facilitator)  
→ 不再是單向教授知識

學生主導學習  
Take Ownership  
of their learning

70%



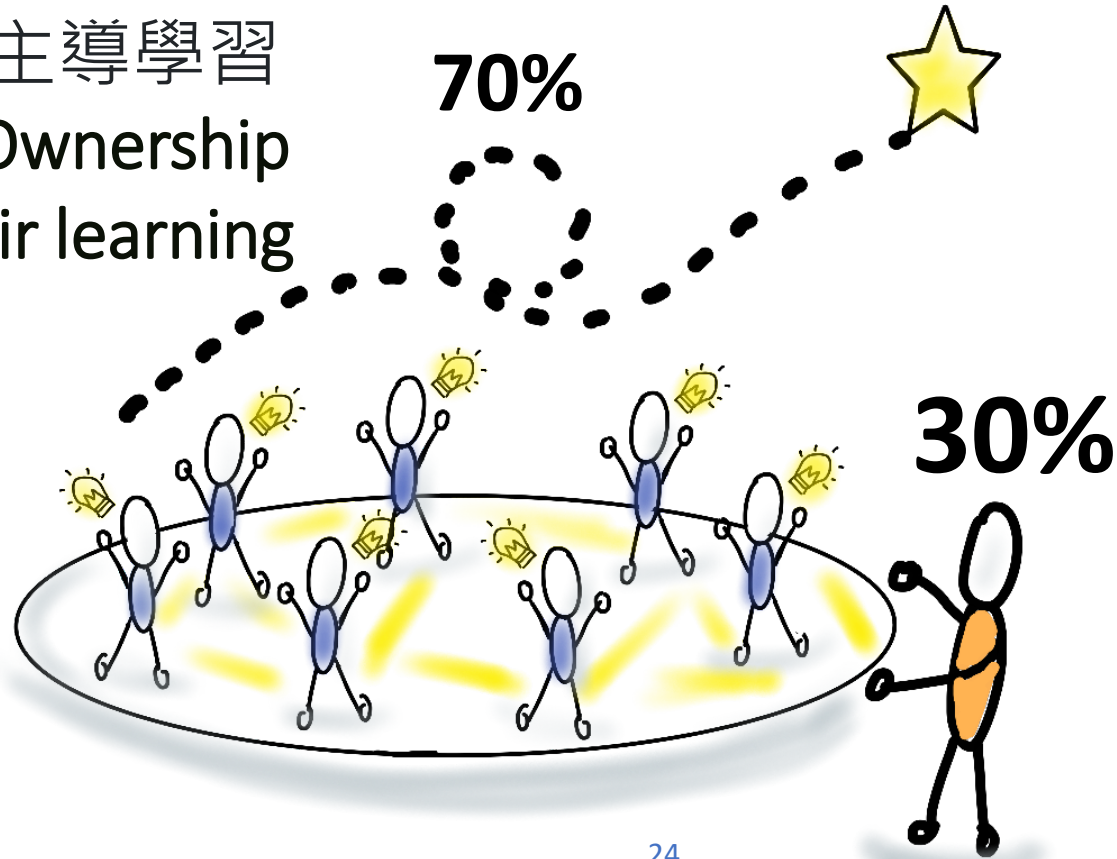
! ?  
HOW ?

23

老師作為引導者 (Facilitator)  
→ 不再是單向教授知識

學生主導學習  
Take Ownership  
of their learning

70%



以視覺化的方式  
引導學生思考

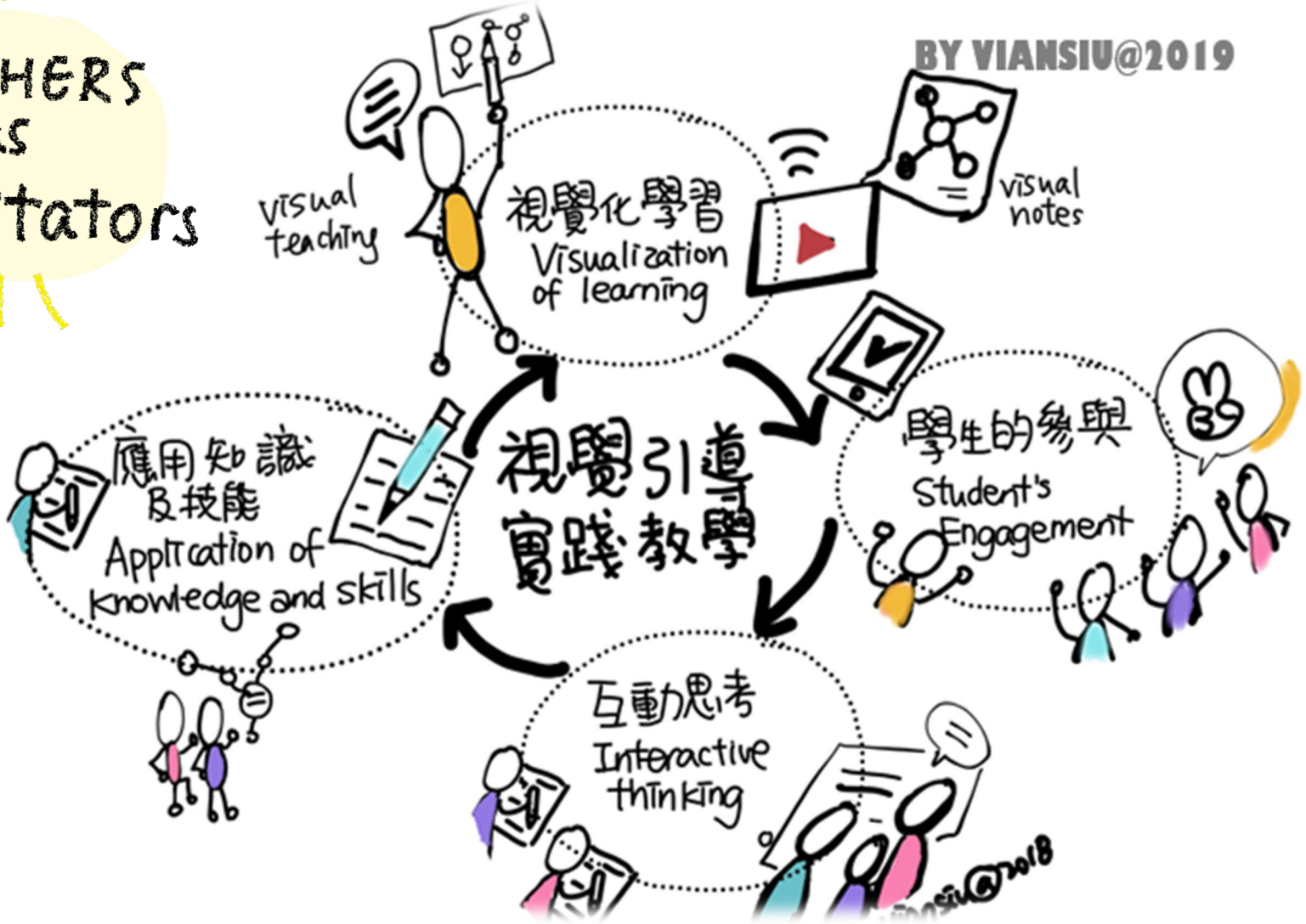
24

老師作為引導者 (Facilitator)  
→ 不再是單向教授知識



# 學與教的設計 Learning and Teaching Design

TEACHERS  
as  
Facilitators



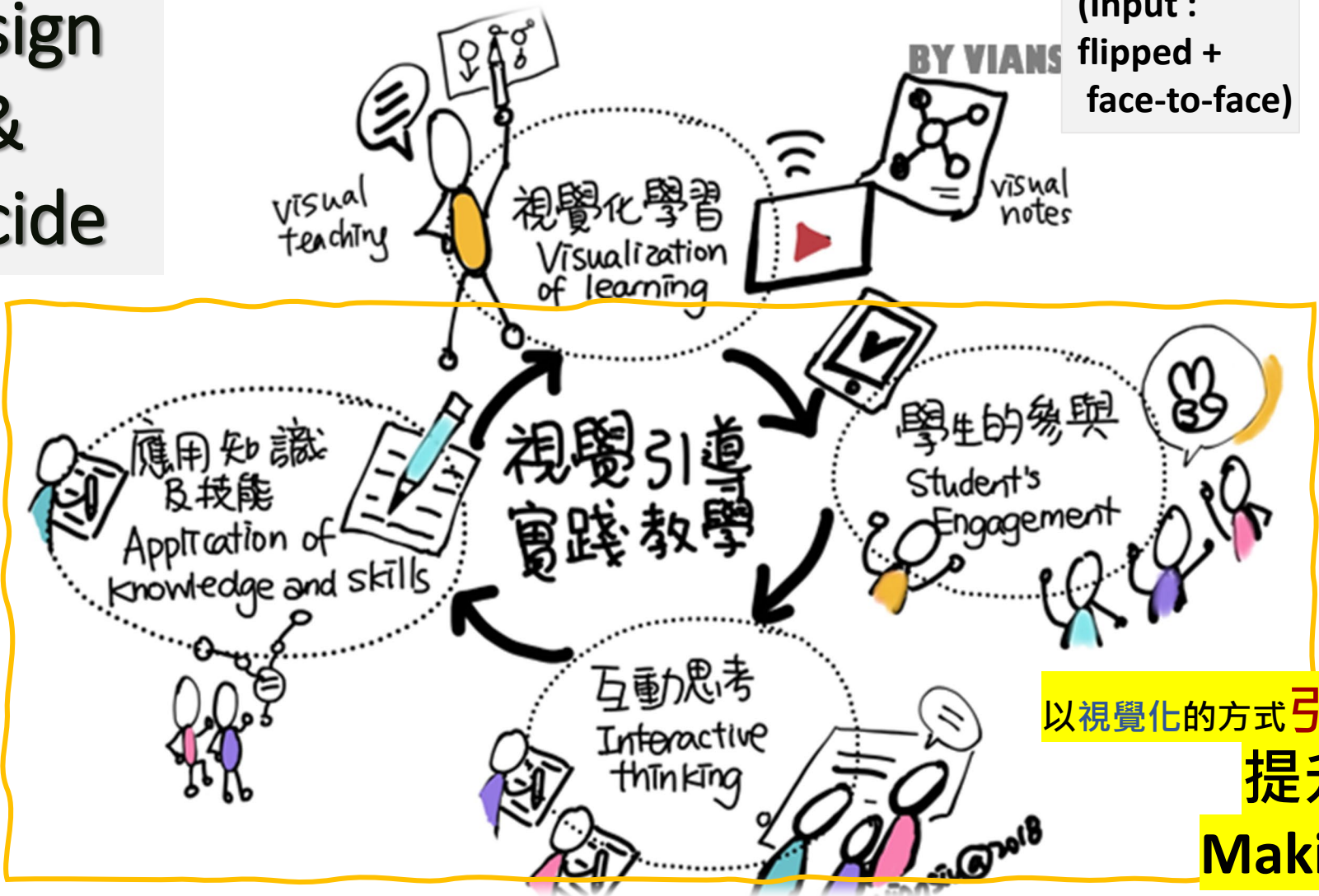
- Ownership of learning
- Voice & Choice & Active participation
- Engaging Thinking

# 學與教的設計 Learning and Teaching Design

Design  
&  
Decide

30%

(Input :  
flipped +  
face-to-face)



70%

(Output :  
games, WS,  
takenote projects)

以視覺化的方式引導學生思考  
提升教室的互動  
Making Learning Visible

推動**多元化**學習

從教學中協助學生**建構知識**  
及**評估**學生的學習表現

\*有效運用**科技及電子資源**

1. **設計** + 配合課題活動
2. **選擇** 合適電子資源/工具
3. **評估** 學習表現的工具



# 為了什麼評估學生學習表現?

**測試**  
教學方式



啟動  
**學生學習動機**

**了解學生**對  
知識點掌握/理解

**照顧**  
學生學習多樣性

如何推動**多元化**學習

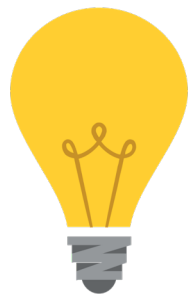
選擇合適線上(評估)**工具**

評估學習表現的**設計**



# 1. 設計 + 配合課題活動

以科學科為例



- 量性與質性  
評估學生學習表現

基本教學重點

實時互動

學習筆記

傳統操練(功課)

創意功課/回饋

線上/傳統測試

面授? 線上?

# 2. 選擇合適電子資源 + 工具

測試學生  
對知識點  
理解

啟動學生  
學習動機

掌握學生  
學習表現

Design and Make

Book:  1A  1B  2A  2B  3C

Reset Show

The following are the latest updated resources

Book 1A

Select	Description	Download	File size
<input type="checkbox"/>			



多元教學  
資源

## 2. 選擇合適電子

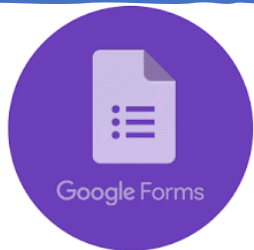
資源/工具

測試學生  
對知識點  
理解

啟動學生  
學習動機

掌握學生  
學習表現

# 量性評估學習表現的工具



形式: MC/填圖/TF/有標準答案

目標: 評估基礎知識

- 了解/考核學生對課題理解情況

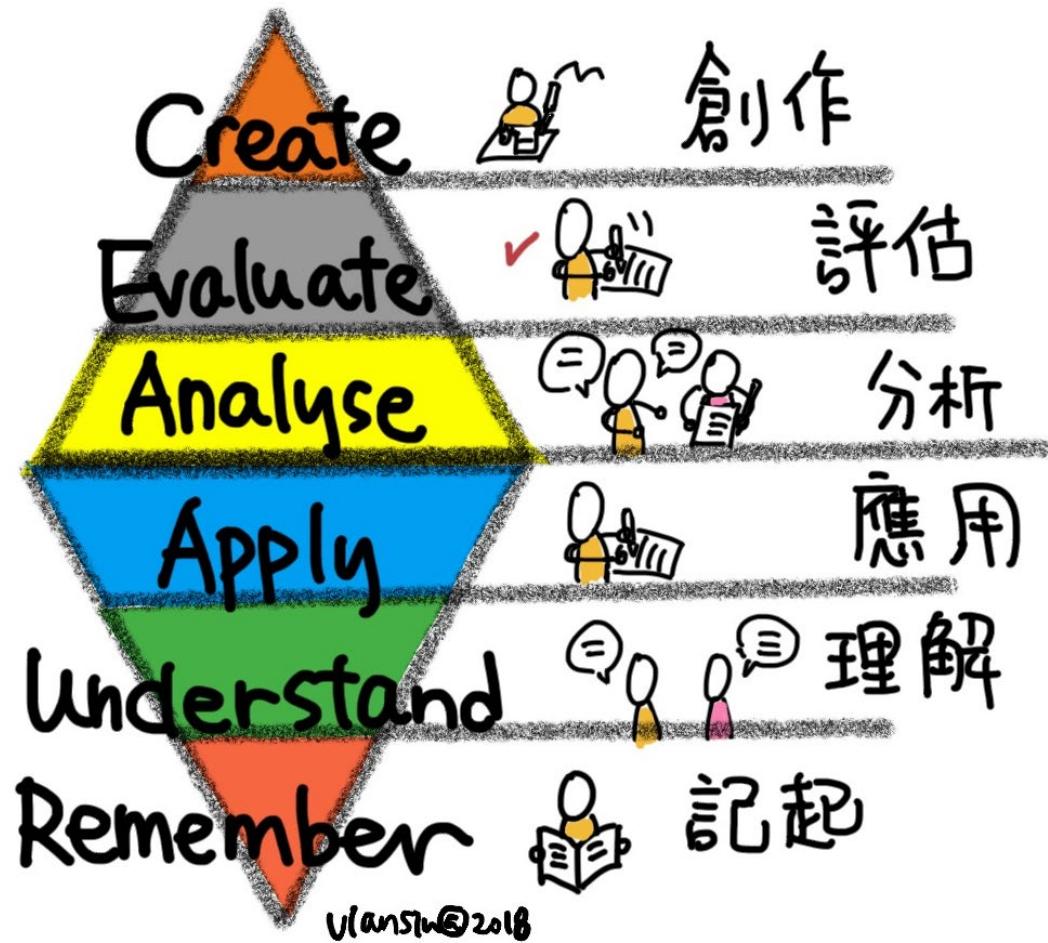
功能:

- 即時聯繫學生
- 直接・簡單
- 自動批改
- 數據收集

Kendle, A., & Northcote, M. (2000). The struggle for balance in the use of quantitative and qualitative online assessment tasks.



# Bloom's Taxonomy Flipped



## 2. 選擇合適電子 資源/工具

測試學生  
對知識點  
理解

啟動學生  
學習動機

掌握學生  
學習表現

### 質性評估學習表現的工具



LOILONOTE  
SCHOOL



形式:開放式問題/任務  
個人選擇

目標:

- 評估個別學生對內容的理解
- 鼓勵創意回饋

功能:

- 可供空間讓學生展示所學
- 多功能/易用/創意
- 老師可批改/回饋
- 同儕交流

Kendle, A., & Northcote, M. (2000). The struggle for balance in the use of quantitative and qualitative online assessment tasks.

# 持續性評估設計

## 以科學科為例

基本教學重點

實時互動

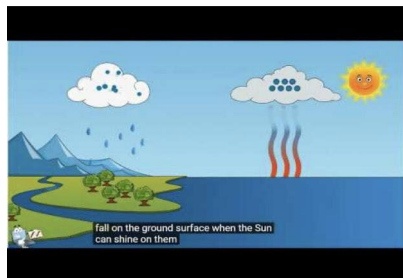
學習筆記

傳統操練(功課)

創意功課/回饋

線上/傳統測試

eaching part of the water cycle. (請各位同學要看教學影片!! 重點係學!!!! 唔止係完成功課!!!)



Which of the following is NOT a process in the water cycle? \*

- boiling
- transportation
- condensation
- evaporation

What is the process that occurs when water changes from a liquid to a gas, caused by heat energy from the sun?

Short answer text

Which of the following is NOT a process in the water cycle? \*

- boiling
- transportation
- condensation
- evaporation

What is the process that occurs when water changes from a liquid to a gas, caused by heat energy from the sun? \*

Short answer text

# 設計配合課題活動

## 線上持續性評估設計

## 以科學科為例

基本教學  
重點

實時  
互動

學習  
筆記

傳統  
操練(功課)

創意  
功課/回饋

線上/  
傳統測試

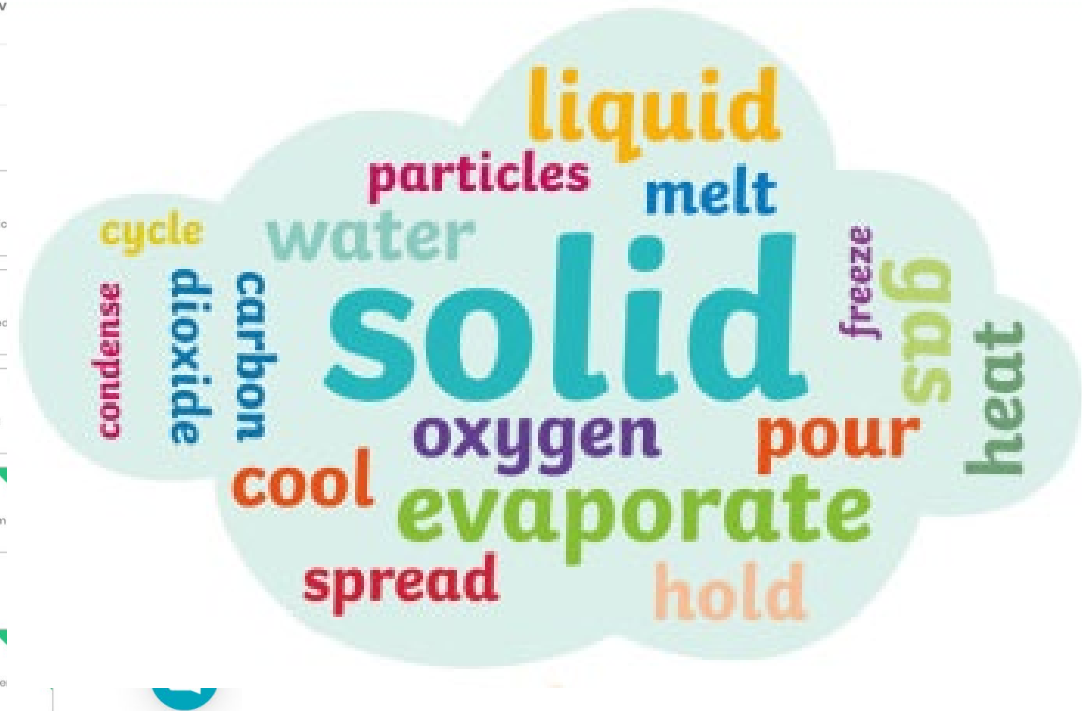


Mentimeter

Word Cloud

Picture Cloud

The screenshot shows the Mentimeter web interface. The browser address bar displays 'mentimeter.com'. The page title is 'First Lesson Science - Mentimeter'. The main content area shows a presentation slide with the question 'What is science?' and a sub-question 'What did you learn in the summer bridging...'. The interface includes a navigation menu with options like 'Templates', 'Theme', 'Configure', and 'Help'. A list of question types is visible, including Multiple Choice, Image Choice, Scales, Open Endac, Ranking, 2 x 2 Grid, Q&A, and Quick Form. The 'Ranking' option is highlighted with a 'New' badge. The 'Quiz Competition' section includes 'Select Answer' and 'Type Answer' options.



基本教學重點

實時互動

學習筆記

傳統操練(功課)

創意功課/回饋

線上/傳統測試



## The Water Cycle

7.1k favorites 99.2k plays 929.5k players

A public kahoot

5th grade water cycle kahoot

 kldrbauch  
Created 4 years ago

1- Quiz  
When water is heated in the ocean and turns into water vapor



2- Quiz  
When water vapor is cooled and forms

3- Quiz  
After condensation the water droplets

1- Quiz  
When water is heated in the ocean and turns into water vapor

2- Quiz  
When water vapor is cooled and forms droplets-

3- Quiz  
After condensation the water droplets fall to the Earth in different forms of-



Mentimeter



基本教學重點

實時互動

學習筆記

傳統操練(功課)

創意功課/回饋

線上/傳統測試

## Chapter 1 Introducing science Pre-lesson worksheet 3

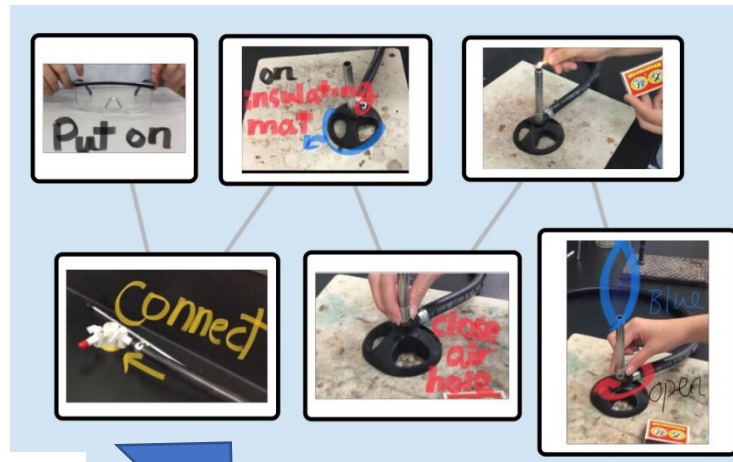
1.How to light a Bunsen Burner?

<https://www.youtube.com/watch?v=2SCMWfaA5y0>



a)What is the use of a heat-proof mat / insulating mat?

b)What happens if the gas tap is turned on without a burning match?



# Lighting up Bunsen Burner



Ch 1 how to light a Bunsen Burner (2017-1A2)



<https://youtu.be/tEtmxVhLhsc>

<https://youtu.be/AoX3aOIOQ78>

# 持續性評估設計

# 以科學科為例

基本教學重點

實時互動

學習筆記

傳統操練(功課)

創意功課/回饋

線上/傳統測試



Name of the process: **Precipitation**

too much water vapour join together

too heavy

rain, snow or hail

Definition: When the clouds get heavy enough, water droplets fall back to the ground in the form of rain, snow or hail.

Name of the process: **Evaporation**

water vapour

heat up water

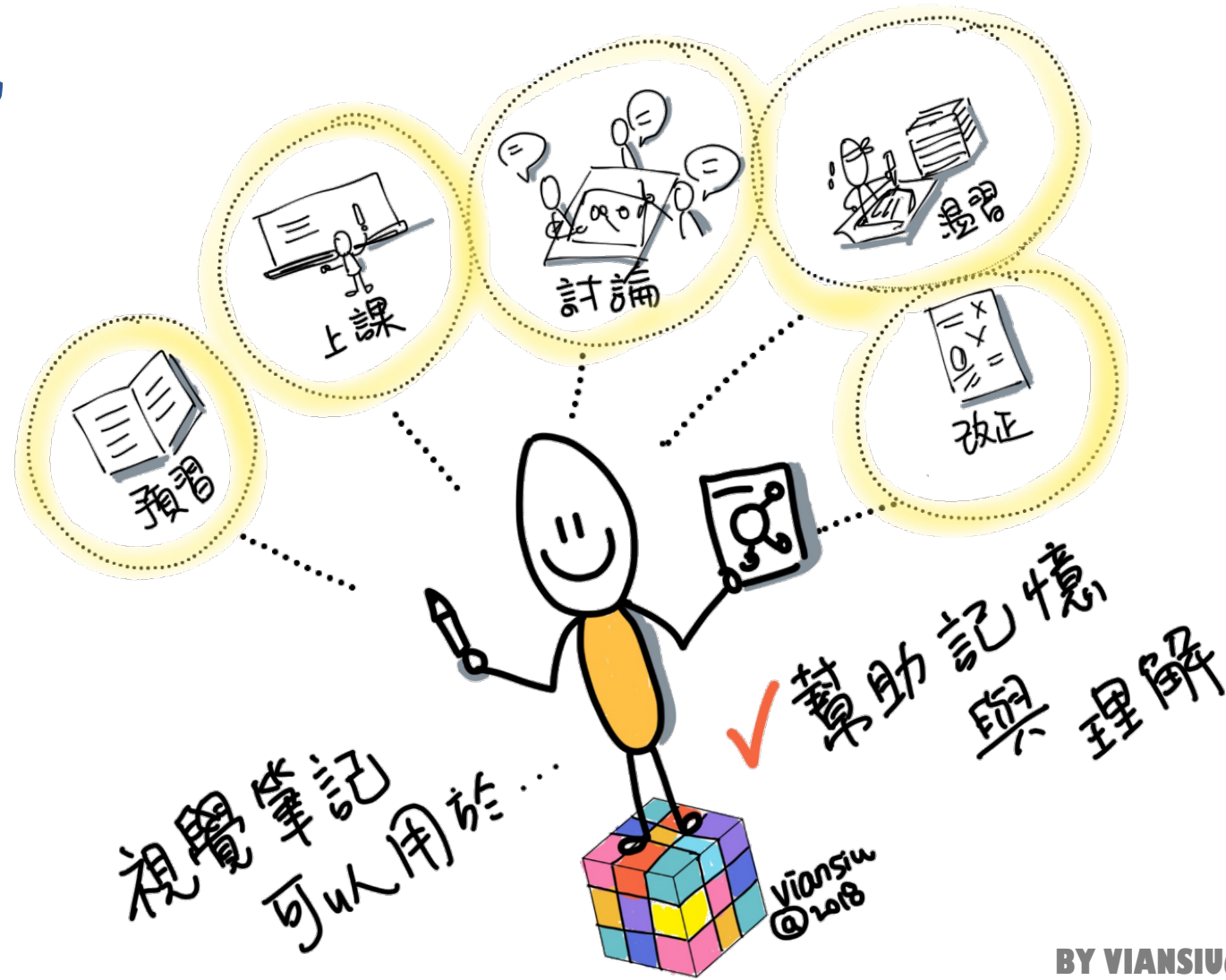
Ocean

evaporation

Definition: When the sun heat up the water. The water absorbs heat energy and becomes water vapour and rise to the sky

New word	Draw a picture	Definition (A(24))
Water cycle		There is no beginning or end to this cycle. The way water circulates in nature is called water cycle.
Evaporation		When the sun heats up the water in Oceans, rivers or on the land, the water absorbs heat energy and becomes water vapour and rises up to the sky.
Transportation		The clouds are carried by wind to other places in the sky.
Condensation		The water vapour cools down and forms water droplets. Water droplets join together to form clouds in the sky.
Precipitation (or raining)		When the clouds get heavy enough, water droplets fall back to the ground in the form of rain, snow or hail.

# 學生在學習過程中如何運用 視覺筆記

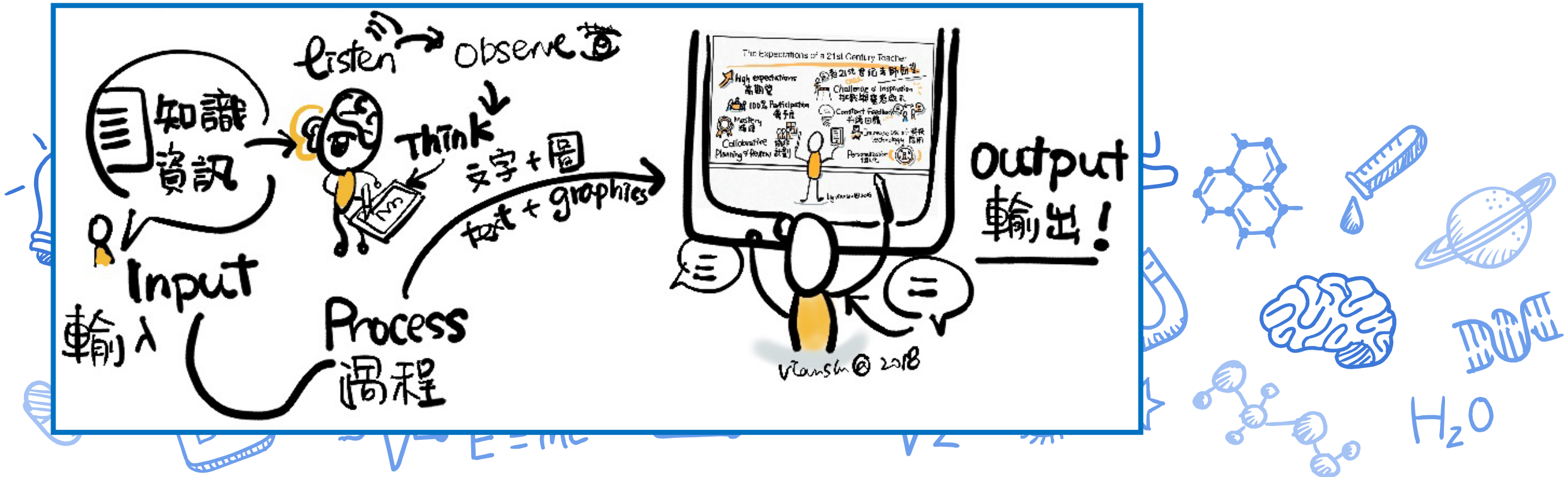




# 視覺學習筆記 Visual-sketch Notes



## 學習策略 Learning Strategies



# 學生的視覺筆記-課堂回顧

## Visual Lesson View

Describes the qualities and work of scientists

**Curious**  
Curious and Creative Mind  
For discovering and creating new things

**Discover**  
Discover

**Eyes**  
To look and discover

**Ears**  
To listen to the ideas and help solve problems

**Mouth**  
To share your ideas and help solve problems

**Tools**  
To help you succeed

**Hands**  
To do experiment and writing your ideas

**Feet**  
To discover and explore the world

1/3/16

react to stimuli

can move

need air

grow

can reproduce

can excrete

need food

the 7 characteristics of living things

this is living thing

F1 Science Ch 3 The story of the Sperm and the Egg

need extra

I see u

Sperms swim through the vagina

LOVE

fertilization

Become baby

Lesson Review 11/3/16

solution

sugar (solute) + water (solvent) → sugar (solution)

**Soluble eg:** ✓  
salt solution  
chalk powder solution

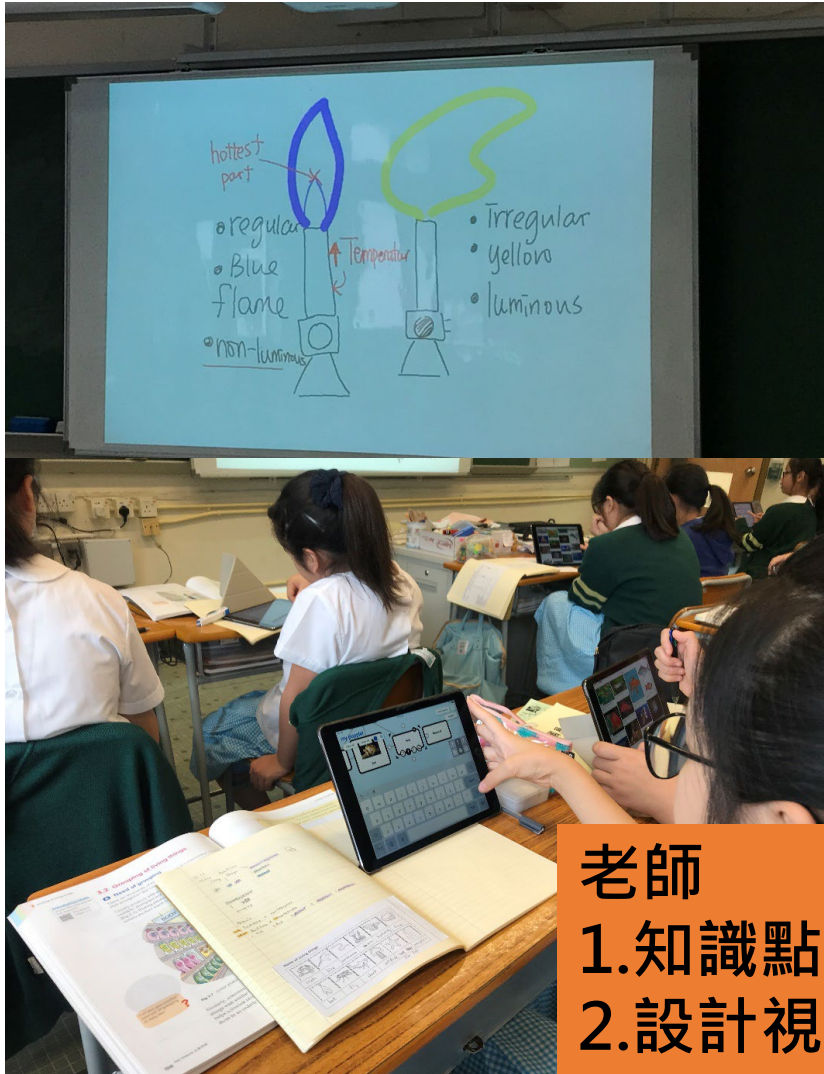
**Insoluble eg:** ✗  
oil + water  
petrol + water

**Dissolving ≠ Melting** ✓

Need three things to 溶解  
- solvent  
- solute  
- solution ✓

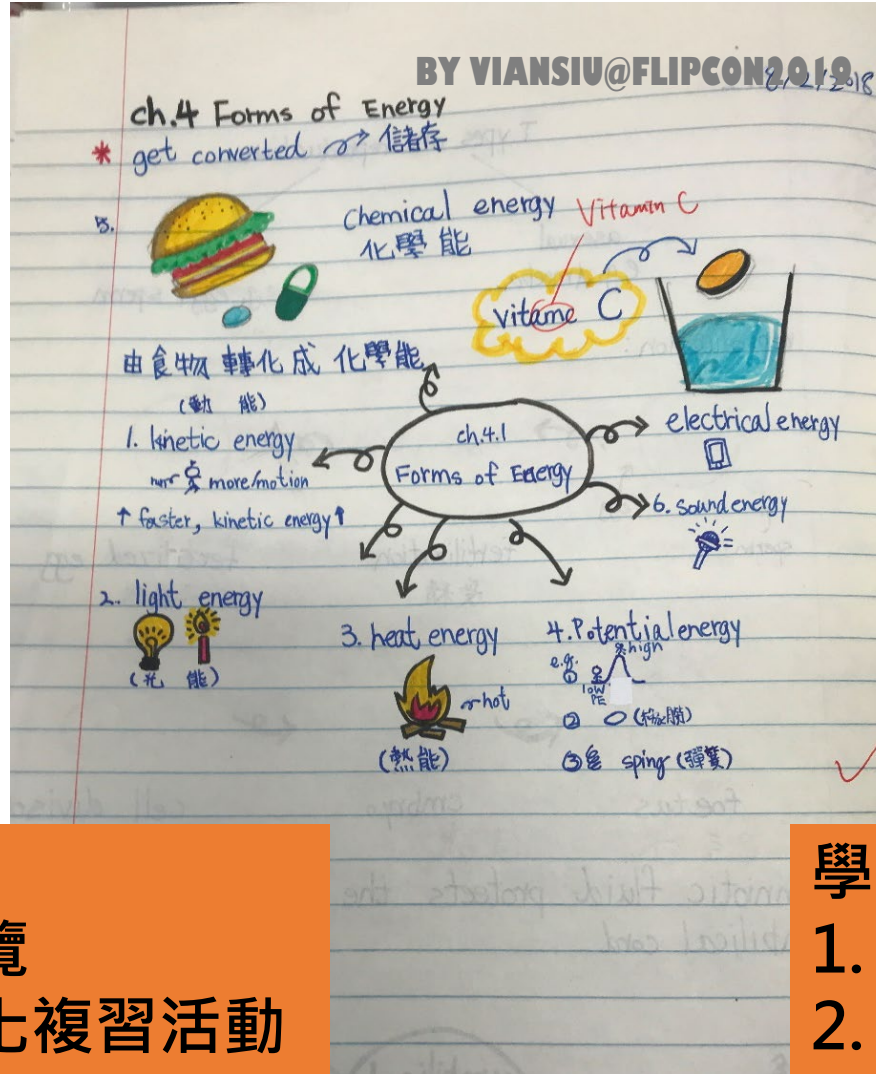
Need one things of 融冰  
B ice  
↓  
water  
↓  
gas ✓

# 視覺筆記在教學中的應用-科學科



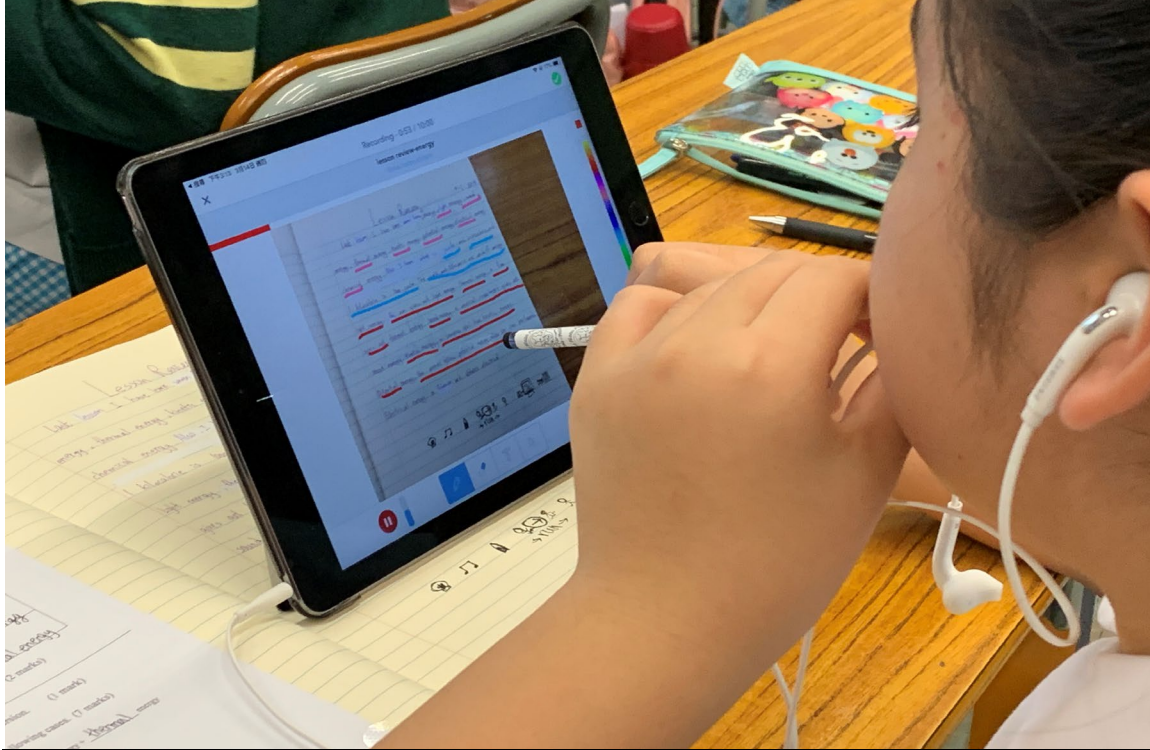
老師

1. 知識點博覽
2. 設計視覺化複習活動



學生

1. 製作視覺化筆記
2. 課堂回顧



## Simple chemical cell VISUAL notes

### Ch 29 Simple chemical cell Video note

► Example 1:

Observations:

- Zn metal becomes thinner.
- Cathodes gas bubbles evolve at the copper electrode.
- $[H^+] \downarrow \rightarrow$  pH value  $\uparrow$

no matter / breaker/breakers.

Reaction between Zn and dilute  $H_2SO_4(aq)$ .

$e^-$  flow from Zn to Cu through the electric wire.

Zn electrode:  $Zn(s) \rightarrow Zn^{2+}(aq) + 2e^-$

Cu electrode:  $2H^+(aq) + 2e^- \rightarrow H_2(g)$

Overall ionic eqn:  $Zn(s) + 2H^+(aq) \rightarrow H_2(g) + Zn^{2+}(aq)$

### ► Example 2:

Ag, Cu  $\rightarrow$  not reactive

$\rightarrow$  both Ag, Cu will not react with acid.

在此裝置任何都不會有反應

- Result: No Reaction.  
(both Ag and Cu will not react with dilute  $H_2SO_4(aq)$ )

### ► Example 3:

Observations:

- Zn metal becomes thinner.
- Cu metal becomes thicker.
- The blue colour of copper(II) nitrate solution (fades out)

From reactivity series, Zn is more reactive than Cu.

$e^-$  flow from Zn to Cu through the electric wire.

Zn electrode:  $Zn(s) \rightarrow Zn^{2+}(aq) + 2e^-$

Cu electrode:  $Cu^{2+}(aq) + 2e^- \rightarrow Cu(s)$

Overall ionic eqn:  $Zn(s) + Cu^{2+}(aq) \rightarrow Zn^{2+}(aq) + Cu(s)$  [displacement reaction]

$\therefore$  **Two half-cells**  
 $\rightarrow$  **not same!**

### Summary:

Simple chemical cell  
 $\rightarrow$  reaction between metal and electrolyte  
 $\rightarrow$  convert chemical energy into electrical energy through wire.

### One breaker

$\rightarrow$  metal may react with electrolyte directly

Half cell  $\rightarrow$  avoid side reactions

Will metal react with electrolyte?

\* No reaction if metal don't react with electrolyte. ✓



# APPS with drawing

draw it!



The screenshot shows a digital workspace with several whiteboard-style cards. The cards contain chemistry equations and diagrams. One card is titled "Post Session Report" and includes a drawing of a molecular structure. Another card shows a drawing of a hexagonal lattice structure with the text "Weak Van der Waal's force" written below it. The equations include:

$$\text{NaCl(aq)} + \text{AgNO}_3\text{(aq)} \rightarrow \text{AgCl(s)} + \text{NaNO}_3\text{(aq)}$$
$$\text{Zn(s)} + 2\text{HNO}_3\text{(aq)} \rightarrow \text{Zn(NO}_3)_2\text{(aq)} + \text{H}_2\text{(g)}$$


The screenshot shows three digital beakers on a pink background. Each beaker has the word "Beaker" written above it. The first beaker contains a simple black outline of a beaker with a red checkmark below it. The second beaker contains a similar black outline with a red checkmark below it. The third beaker contains a black outline of a beaker with the word "WOOD" written inside in red, with a red checkmark below it.

# 持續性評估設計

# 以科學科為例

基本教學重點

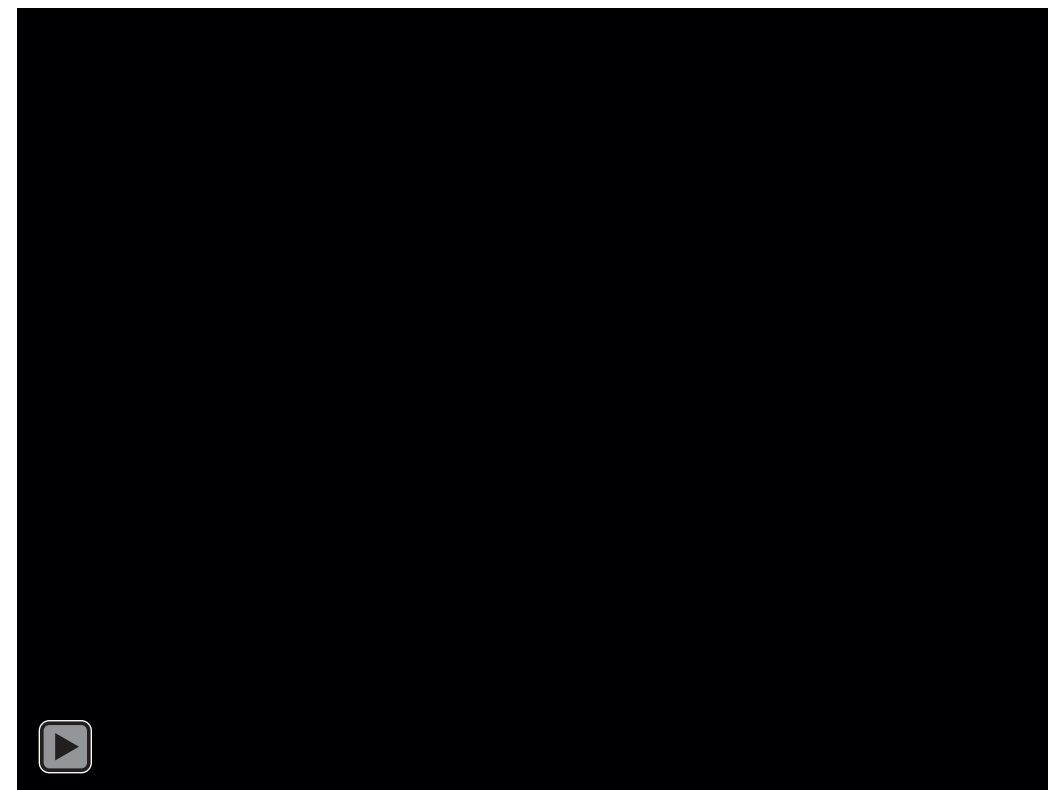
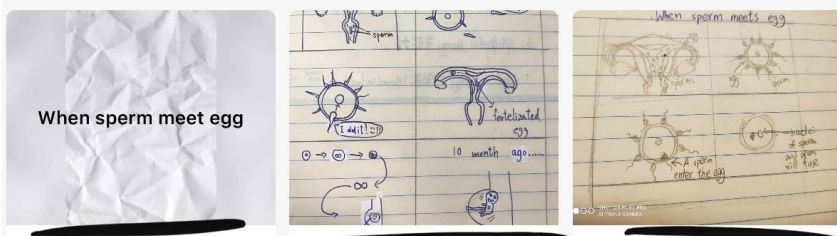
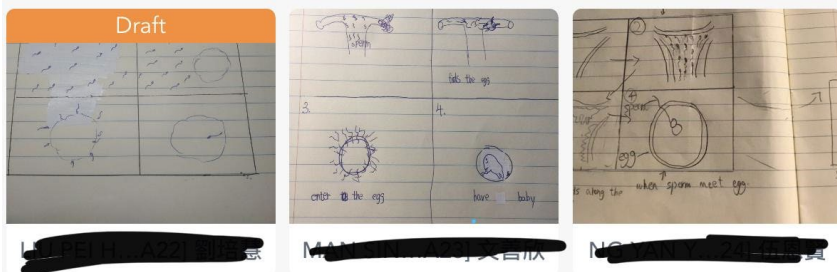
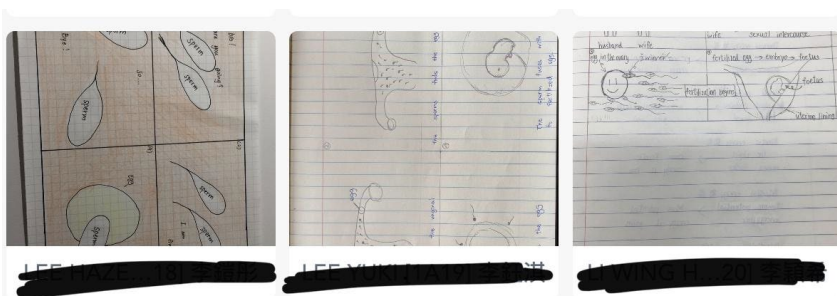
實時互動

學習筆記

傳統操練(功課)

創意功課/回饋

線上/傳統測試



# 持續性評估設計

# 以科學科為例

基本教學重點

實時互動

學習筆記

傳統操練(功課)

創意功課/回饋

線上/傳統測試

LOILONOTE  
SCHOOL



Seesaw



Google Classroom

Chapter 2 Ex.1 (2.1-2.3) (total marks = 39) Date: \_\_\_\_\_ Marks: \_\_\_\_\_

A. True or false (5 marks)

1. Melting(融化) of ice and freezing of water take place at the same temperature.	_____
2. During the boiling of water, the temperature of water keeps changing.	_____
3. Condensation(凝結) of water vapour can take place at above 0°C.	_____
4. Water is kept cycling in Nature in liquid state.	_____
5. In a sugar solution(糖溶液), the solvent is sugar and the solute is water.	_____
6. Salt has different rates of dissolving at different temperatures.	_____
7. A sugar cube takes more time to dissolve than when it is crushed into powder.	_____
8. The higher the temperature, the lower the rate of evaporation of water.	_____

B. Fill in the Blanks (5 marks)

Water in the seas, rivers and on land absorb heat energy from the sun and becomes water vapour. This process is called \_\_\_\_\_. When the water vapour cools down in the higher sky, the water particles stick together to form \_\_\_\_\_. This process is called \_\_\_\_\_. Water droplets in the sky join together to form \_\_\_\_\_. As the water droplets gather and become heavy, they finally fall as \_\_\_\_\_.

C. Multiple Choice (8 marks)

1. Which of the following about the energy changes during the processes of change of state of water is INCORRECT?

Process	Energy absorbed(吸收) or released(釋放)
A. Boiling	Energy absorbed from the surroundings(環境)
B. Freezing	Energy released to the surroundings
C. Evaporation	Energy absorbed from the surroundings
D. Melting	Energy released to the surroundings

2. The diagram below shows the set-up to simulate the formation of rain.

Colourless liquid droplets are formed at the bottom of the metal dish after some time. Which process leads to the formation of the droplets?

A. Condensation	B. Freezing
C. Melting	D. Boiling

6. What are processes X and Y respectively?

A. <sup>X</sup> Evaporation	<sup>Y</sup> Freezing
B. <sup>X</sup> Evaporation	Condensation
C. Condensation	Raining
D. Condensation	Evaporation

7. Which of the following statements about the evaporation of water is correct?

A. Water changes from liquid water to water vapour.  
B. Evaporation of water happens at 100°C only.  
C. Water disappears(消失).  
D. Water evaporates faster when the temperature is lower.

8. Which of the following is the correct sequence of the processes involved in the water cycle?

(1) Condensation into water droplets  
(2) Formation of clouds  
(3) Evaporation of water  
(4) Falling as rain

A. (1), (2), (3), (4)    B. (2), (3), (1), (4)    C. (1), (2), (4), (3)    D. (4), (3), (2), (1)

Ch 2 ex 1 explanation

# 設計配合課題活動

## 線上持續性評估設計

## 以中一科學科為例 主題: Water Cycle

基本教學  
重點

實時  
互動

學習  
筆記

傳統  
操練(功課)

創意  
功課/回饋

線上/  
傳統測試



Chan Man Yiu + 19 • 18天  
2C 的科學學習日記  
貼上筆記、詞語抄寫、問題等等...

詞語讀寫 (5) Due 29/1

SCI HW 5  
PDF document  
padlet drive

評級

添加评论

詞語讀寫 (3) Due 15/1

opposing 對抗  
contact force 接觸力  
non-contact 非接觸力  
slides 滑竹  
arises 出現  
Air resistance 空氣阻力

Due 15/1

1. average speed 平均速度 average speed 平均速度  
average speed 平均速度 average speed 平均速度

2. distance 距離 distance 距離  
distance 距離 distance 距離

3. force 力 force 力  
force 力 force 力

詞語讀寫 (4) Due 22/1

2C22 王可儿

Due 22/1

1. air resistance 空氣阻力 air resistance 空氣阻力  
air resistance 空氣阻力 air resistance 空氣阻力

2. ball resistance 圓球阻力 ball resistance 圓球阻力  
ball resistance 圓球阻力 ball resistance 圓球阻力

3. wheel 輪 wheel 輪 wheel 輪 wheel 輪

4. lubricant 潤滑劑 lubricant 潤滑劑 lubricant 潤滑劑

筆記 (11/1-15/1)

姓名+學號

詞語讀寫 (1) Due 29/1

指引



Man Yiu + 19 • 18天  
2C 的科學學習日記  
貼上筆記、詞語抄寫、問題等等...

标记 查看原帖

5. contact force contact force contact force 接觸力

6. friction friction friction friction

7. sliding sliding sliding sliding sliding

8. surface surface surface surface

0:00 / 0:09



基本教學重點

實時互動

學習筆記

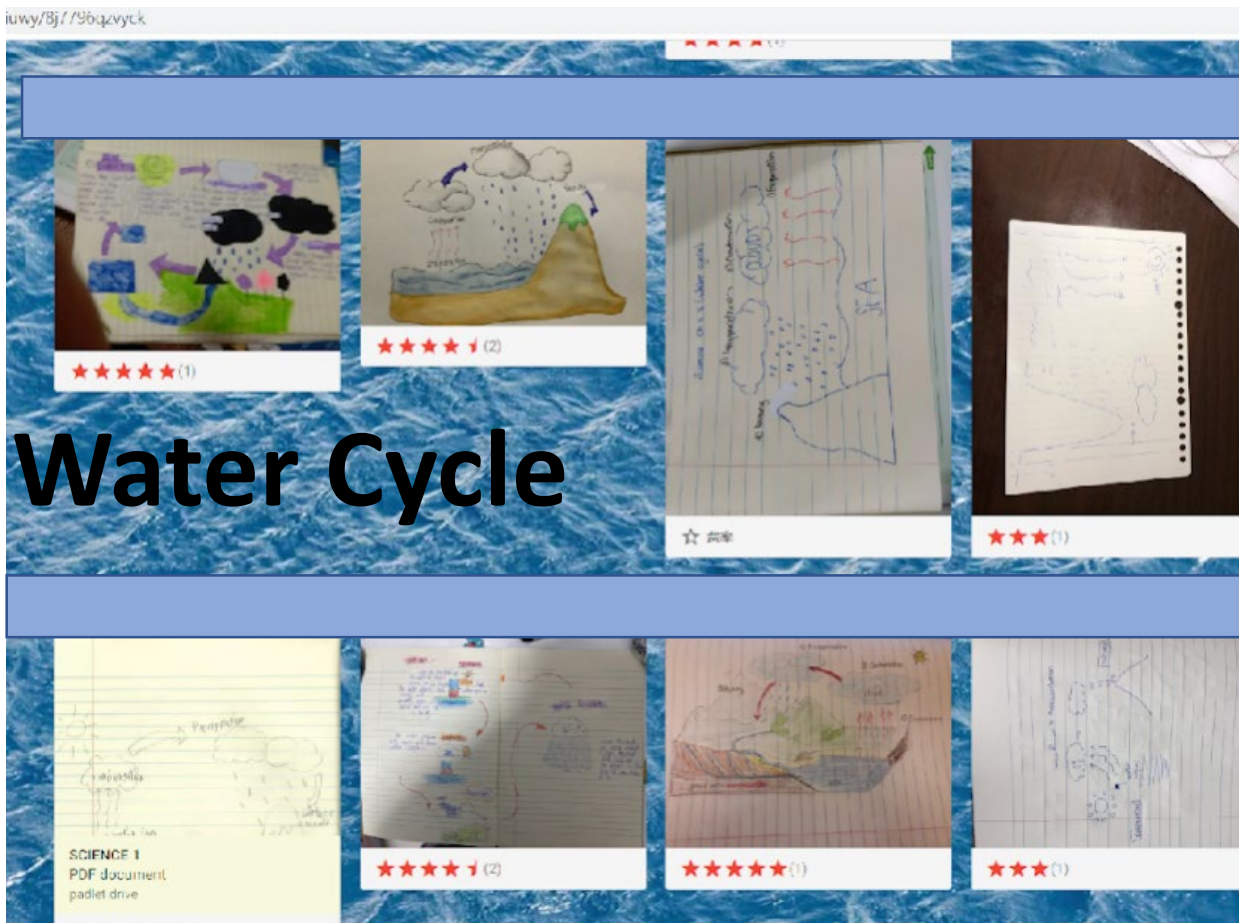
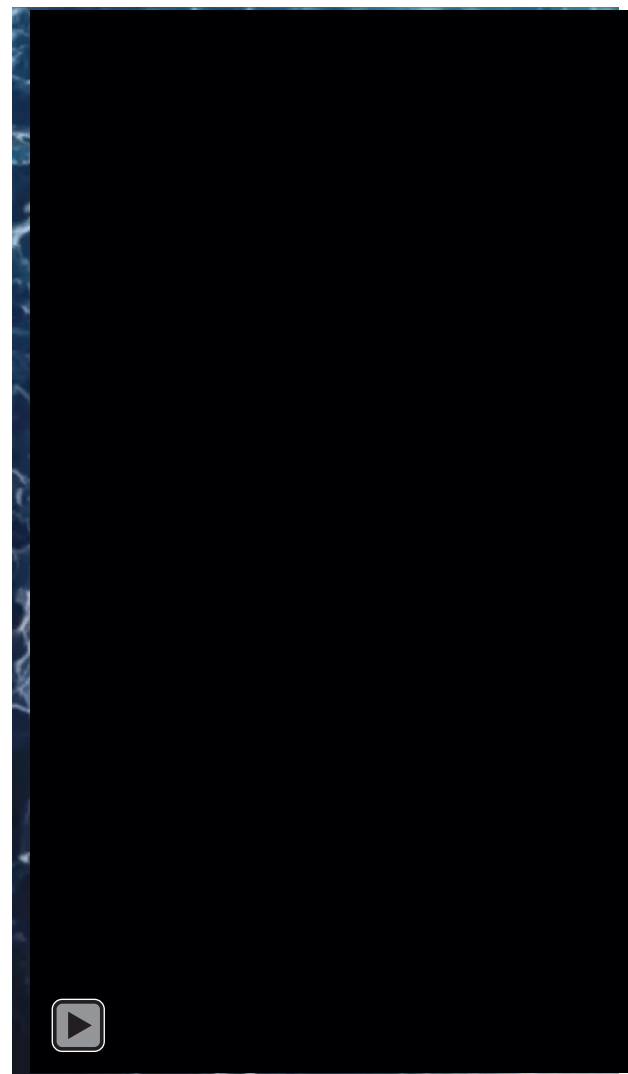
傳統操練(功課)

創意功課/回饋

線上/傳統測試



iuwy/Bj/796qzvycK

A screenshot of a Padlet board titled "Water Cycle" with a blue water background. It displays eight student-submitted drawings and diagrams of the water cycle, each with a star rating. The drawings include various representations of clouds, rain, mountains, and water bodies. The text "Water Cycle" is overlaid in large black font. At the bottom left, there is a text box that reads "SCIENCE 1 PDF document padlet drive".



基本教學重點

實時互動

學習筆記

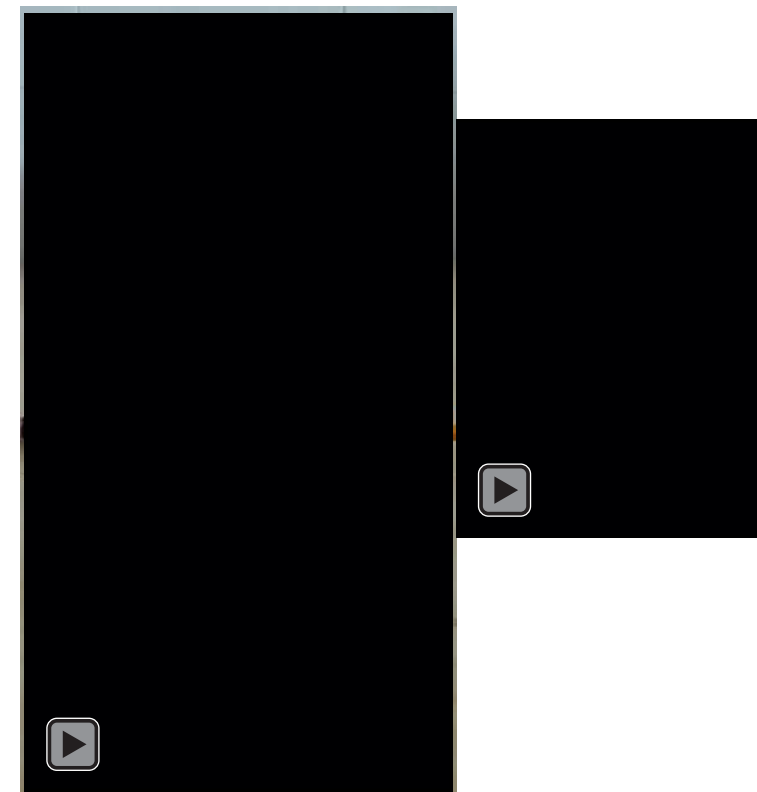
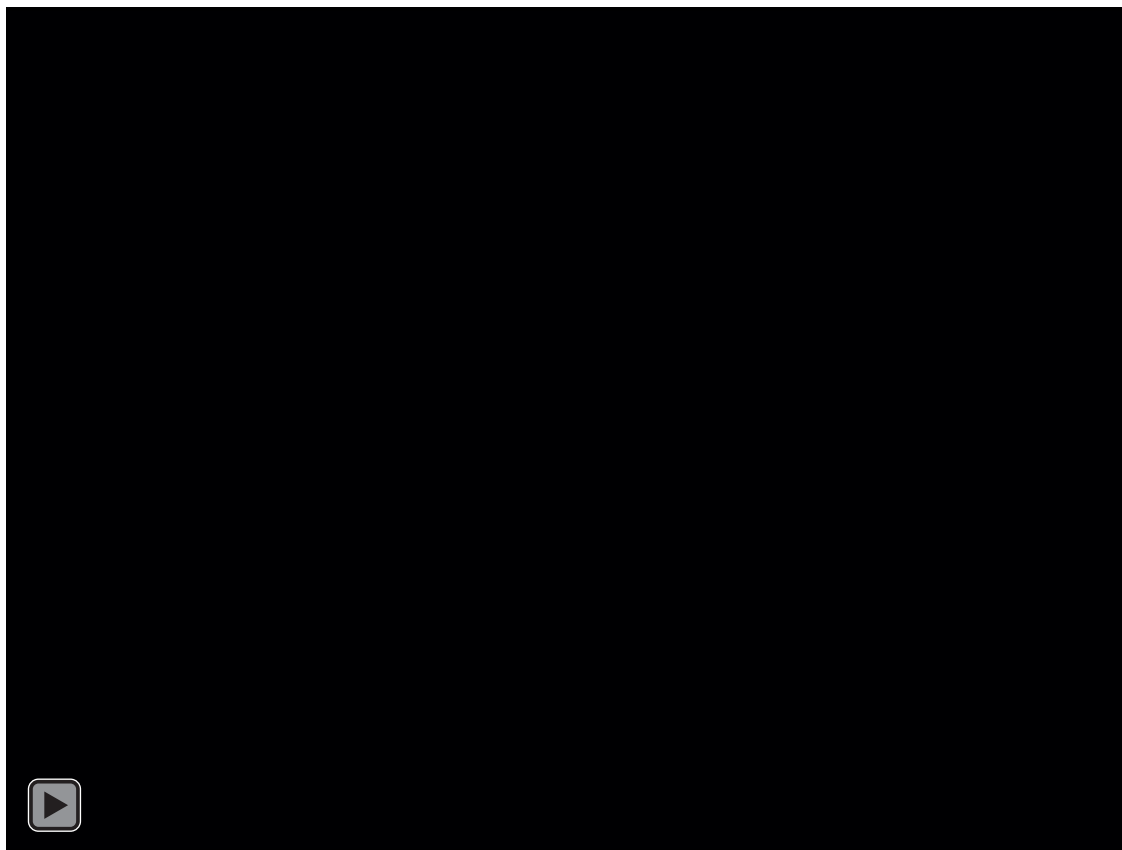
傳統操練(功課)

創意功課/回饋

線上/傳統測試



主題:能量



# 評估學習表現的工具

以中一科學科為例

基本教學重點

實時互動

學習筆記

傳統操練(功課)

創意功課/回饋

線上/傳統測試



Seesaw



Google Classroom



# 線上持續性評估設計

以中一科學科為例

基本教學重點

實時互動

學習筆記

傳統操練(功課)

創意功課/回饋

線上/傳統測試

The screenshot shows a Schoology interface for a 'quick revision' activity. It displays several student submissions of handwritten notes. The notes list chemical symbols and their corresponding element names: Ag=silver, Na=sodium, H=hydrogen, and K=potassium. The submissions are arranged in a grid, with some showing the student's name and the time of submission. The interface includes navigation buttons like 'Back', 'Share Answers', and 'Compare'.

Submissions/ Attempts	Latest Attempt	Final Score Gradebook Grade	
1/1	8/18/20 12:10pm	20/20 20/20	<a href="#">View Attempts</a>
1/1	8/18/20 12:35pm	19/20 19/20	<a href="#">View Attempts</a>
1/1	8/18/20 12:35pm	20/20 20/20	<a href="#">View Attempts</a>
1/1	8/18/20 12:33pm	20/20 20/20	<a href="#">View Attempts</a>
1/1	8/18/20 12:37pm	19/20 19/20	<a href="#">View Attempts</a>
2/2	8/18/20 1:08pm	18/20 18/20	<a href="#">View Attempts</a>
1/1	8/18/20 12:56pm	18/20 18/20	<a href="#">View Attempts</a>
	8/18/20 1:25pm	18/20 18/20	<a href="#">View Attempts</a>
	8/18/20 12:59pm	20/20 20/20	<a href="#">View Attempts</a>
	8/18/20 12:35pm	18/20 18/20	<a href="#">View Attempts</a>
	8/18/20 1:09pm	19/20 ---	<a href="#">View Attempts</a>



基本教學重點

實時互動

學習筆記

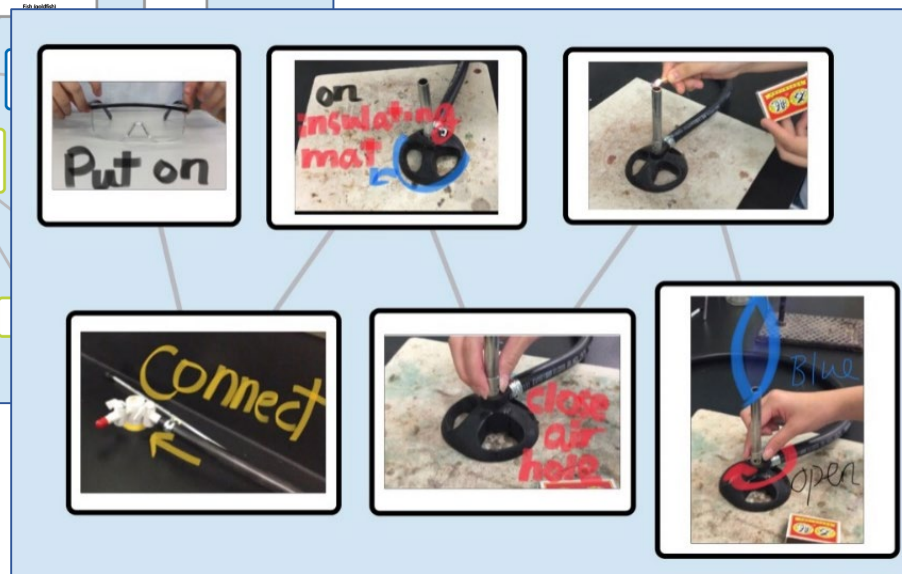
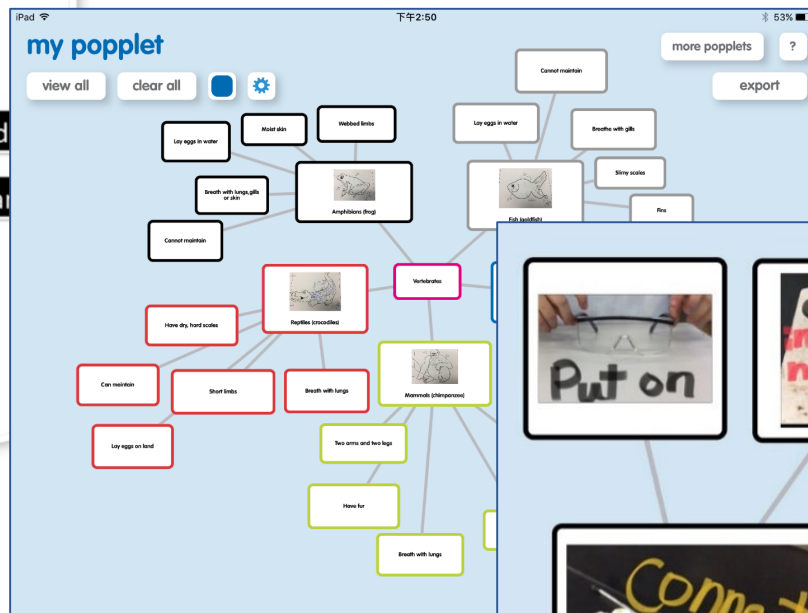
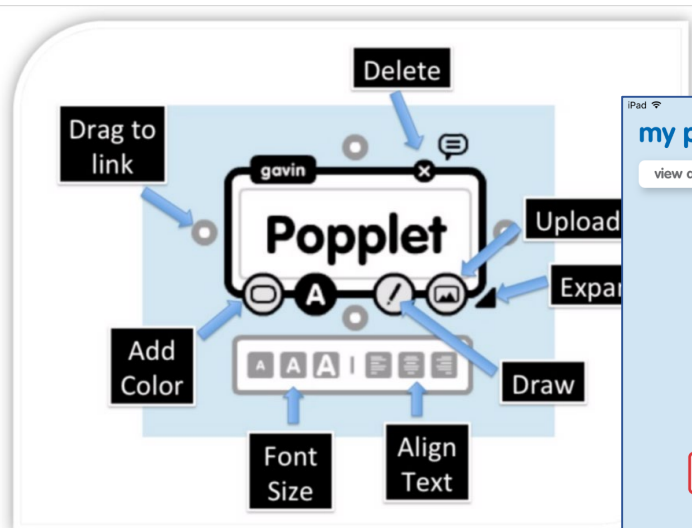
傳統操練(功課)

創意功課/回饋

線上/傳統測試



- 學習反思
- 閱書分享
- 實驗報告



# 能量的種類

## Forms of Energy

FI science Maker Lesson

科學 93 創客

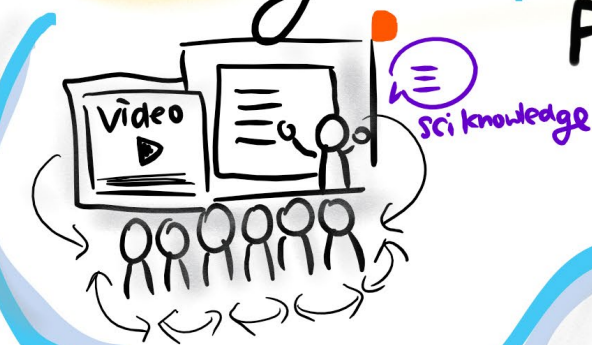
Making Toy

成果分享

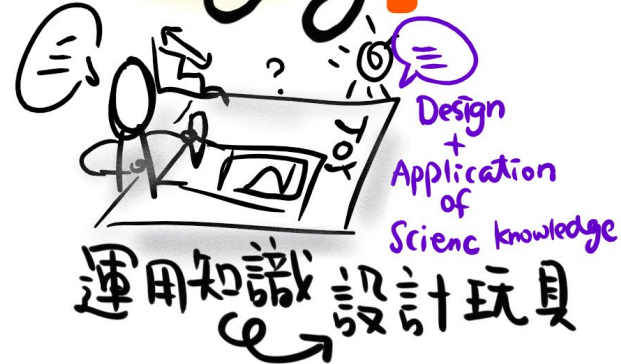
Sharing

短片學習

① Learning



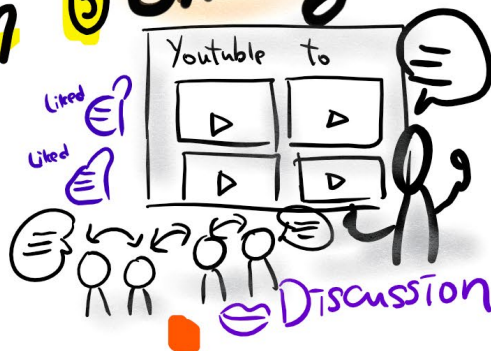
② Designing



③



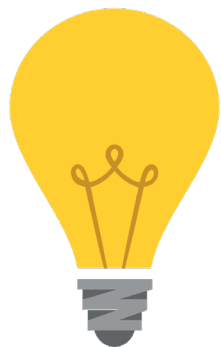
⑤



④ Making Video



# 反思



- 掌握學生的學習進度，並提供適切的回饋，以提升教學互動，
- 量性vs質性評估vs多元化
- 串連和緊扣

基本教學重點

實時互動

學習筆記

傳統操練(功課)

創意功課/回饋

線上/傳統測試

## 工具選擇與設計





-沒有一定的方式 → 引發自主學習，激發學生創意。

選擇合適電子資源/工具  
設計+配合課題活動  
評估學習表現的工具








# A Change in Society

Yesterday

- Memorizing A.B.C
- Contents 
- information search 
-   $1, 2 \int dx / dv$  Calculation
- Routine Cognition 



Today & Tomorrow

-  Knowledge Construction
-  21st century skills
-  Information processing
-  Computation calculation
- high-level Cognition 

Well-learning

Viansiu 2019

—Pasi Silander (Finland)

Vian Siu  
[viansiu@hotmail.com](mailto:viansiu@hotmail.com)