21世紀教室

視覺筆記在教學中的應用

Visual Sketchnotes in Learning & Teaching

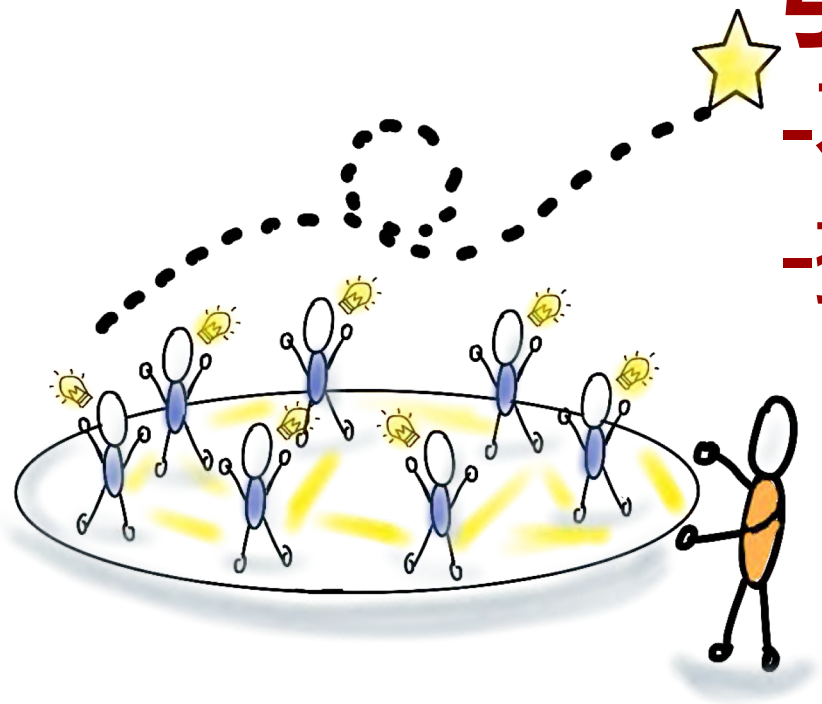
德蘭中學

科學科主任及STEM 聯絡員

香港翻轉教育協會科學科召集人

蕭煒炘老師

在教學上，什麼是視覺引導?



引導者(Facilitator)

-不再是單向教授知識

-提升教室的互動

-老師與學生間

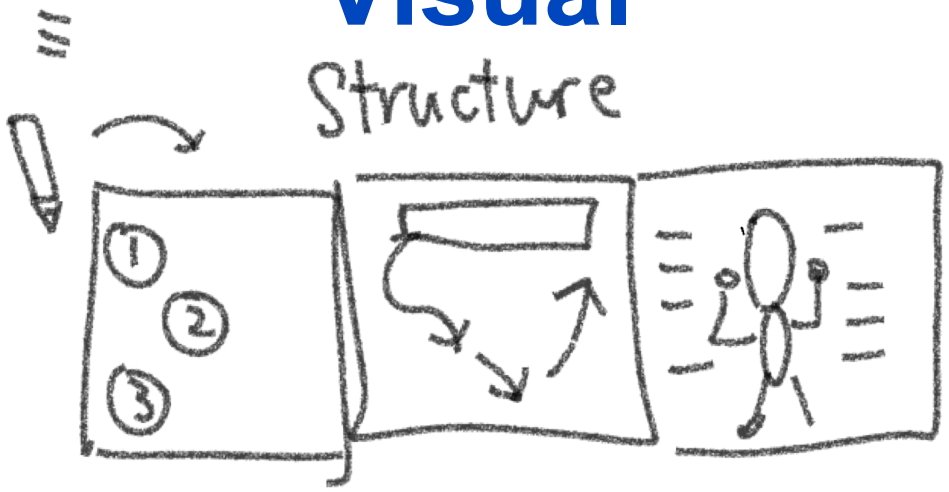
-學生與學生間

以視覺化的方式引導學生思考

提升教室的互動

在教學上，如何運用是視覺引導?

視覺
Visual



引導
Facilitation

以視覺化的方式去引導學生

更清楚了解知識內容

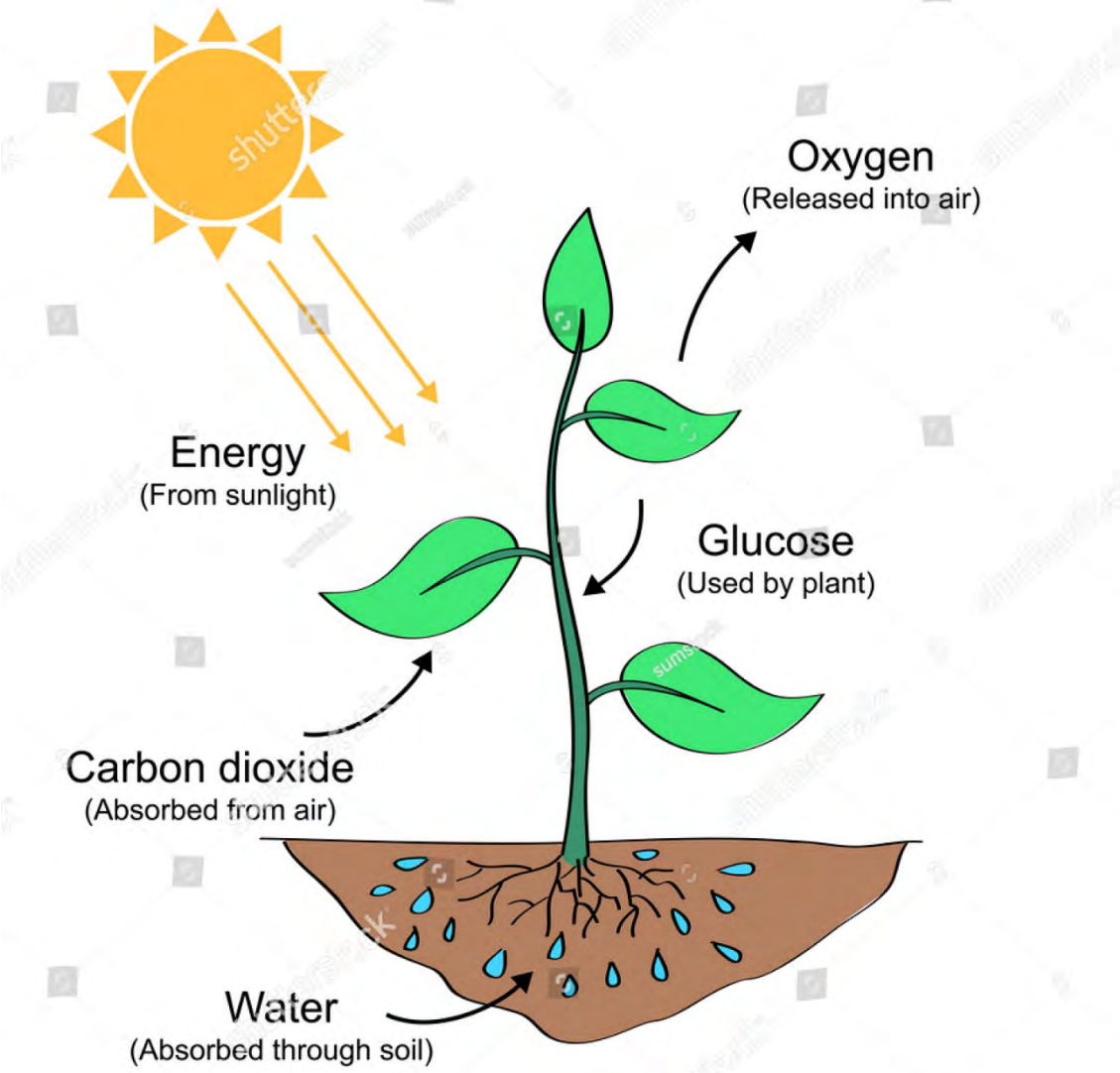
PHOTOSYNTHESIS is…??

Photosynthesis is a process used by plants and other organisms to convert light energy into chemical energy that can later be released to fuel the organisms' activities. This chemical energy is stored in carbohydrate molecules, such as sugars, which are synthesized from carbon dioxide and water – hence the name *photosynthesis*, from the Greek φῶς, *phōs*, "light", and σύνθεσις, *synthesis*, "putting together".[1][2][3] In most cases, oxygen is also released as a waste product. Most plants, most algae, and cyanobacteria perform photosynthesis; such organisms are called photoautotrophs. Photosynthesis is largely responsible for producing and maintaining the oxygen content of the Earth's atmosphere, and supplies all of the organic compounds and most of the energy necessary for life on Earth.[4]

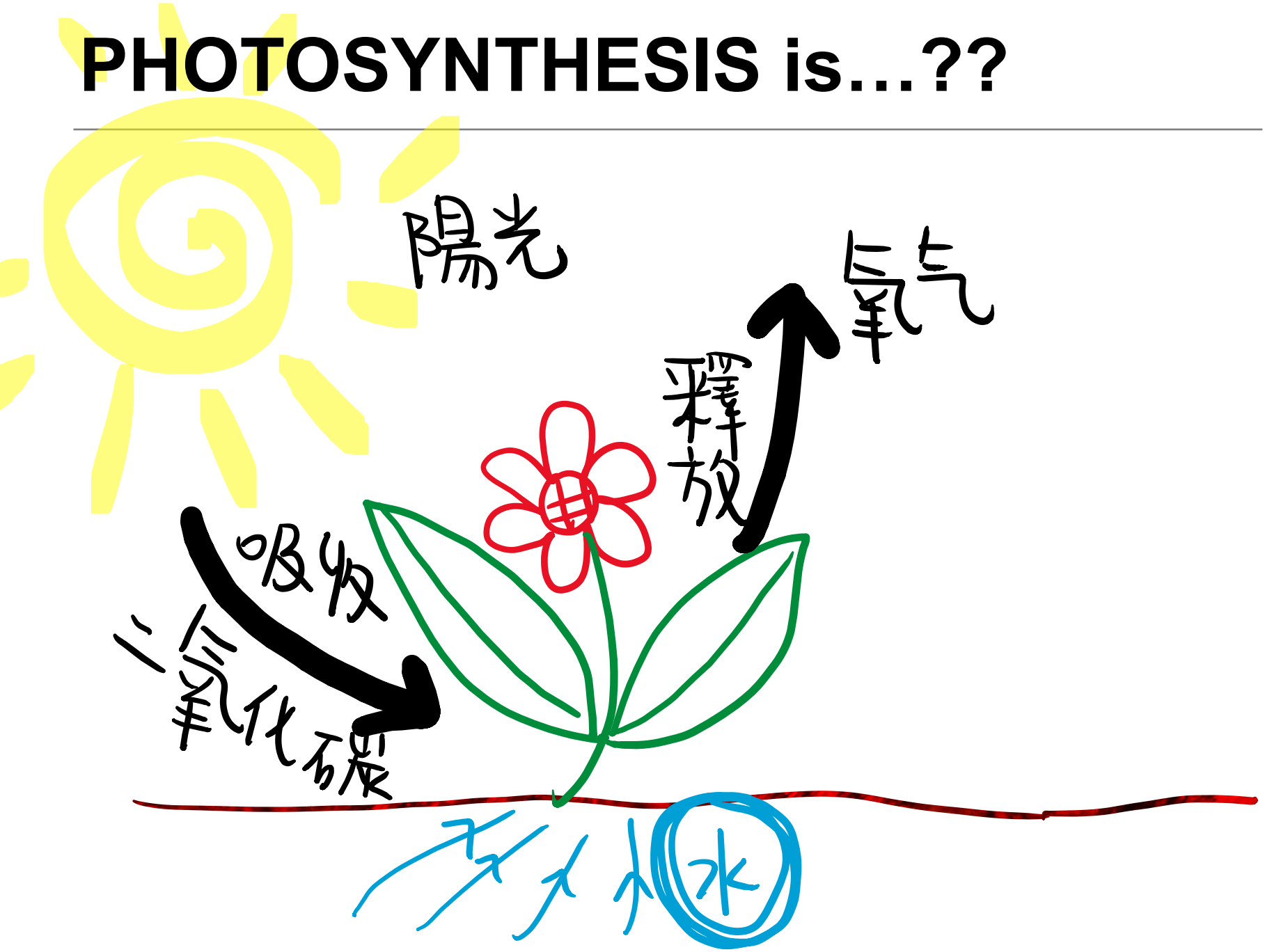
Although photosynthesis is performed differently by different species, the process always begins when energy from light is absorbed by proteins called reaction centres that contain green chlorophyll pigments. In plants, these proteins are held inside organelles called chloroplasts, which are most abundant in leaf cells, while in bacteria they are embedded in the plasma membrane. In these light-dependent reactions, some energy is used to strip electrons from suitable substances, such as water, producing oxygen gas. The hydrogen freed by the splitting of water is used in the creation of two further compounds that serve as short-term stores of energy, enabling its transfer to drive other reactions: these compounds are reduced nicotinamide adenine dinucleotide phosphate (NADPH) and adenosine triphosphate (ATP), the "energy currency" of cells.

In plants, algae and cyanobacteria, long-term energy storage in the form of sugars is produced by a subsequent sequence of light-independent reactions called the Calvin cycle; some bacteria use different mechanisms, such as the reverse Krebs cycle, to achieve the same end. In the Calvin cycle, atmospheric carbon dioxide is incorporated into already existing organic carbon compounds, such as ribulose bisphosphate (RuBP).[5] Using the ATP and NADPH produced by the light-dependent reactions, the

PHOTOSYNTHESIS is…??



PHOTOSYNTHESIS is…??



知識吸收?

文字?

- **Photosynthesis** is a process used by plants and other organisms to convert light energy into chemical energy that can later be released to fuel the organisms' activities. This chemical energy is stored in carbohydrate molecules, such as sugars, which are synthesized from carbon dioxide and water – hence the name *photosynthesis*, from the Greek φῶς, *phōs*, "light", and σύνθεσις, *synthesis*, "putting together".[1][2][3] In most cases, oxygen is also released as a waste product. Most plants, most algae, and cyanobacteria perform photosynthesis; such organisms are called photoautotrophs. Photosynthesis is largely responsible for producing and maintaining the oxygen content of the Earth's atmosphere, and supplies all of the organic compounds and most of the energy necessary for life on Earth.[4]

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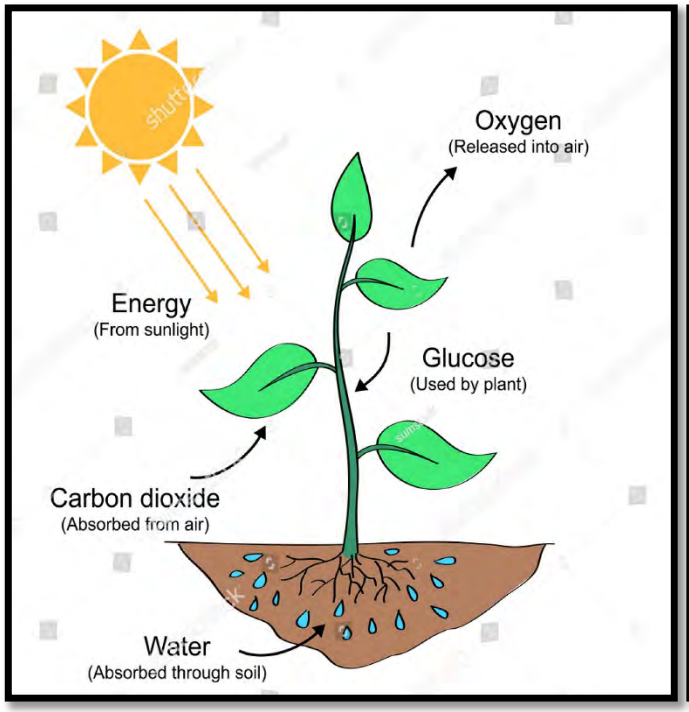
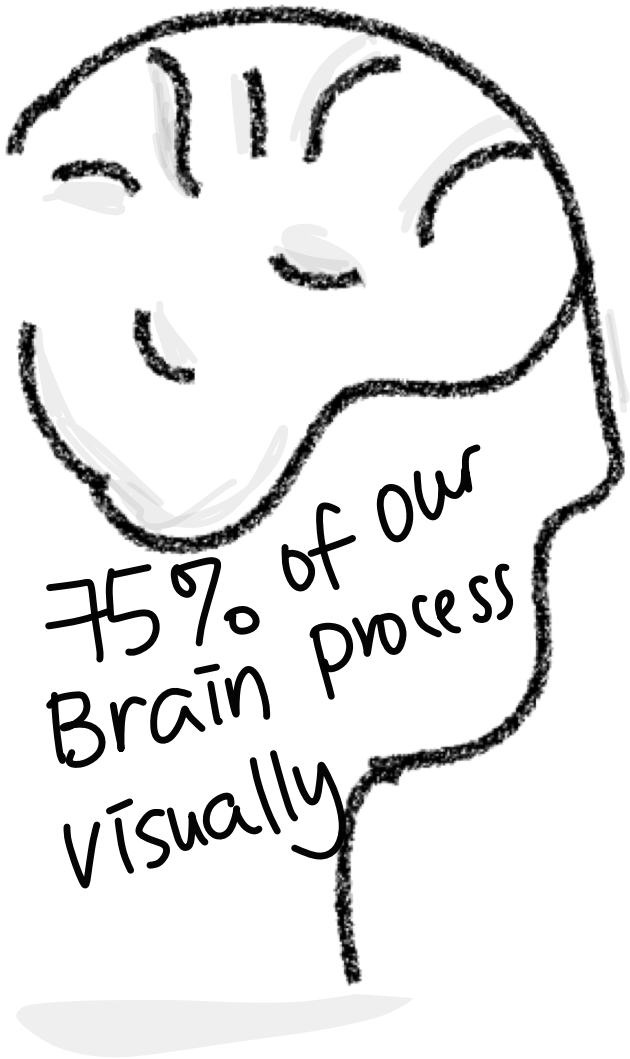
圖像?



圖像引導?

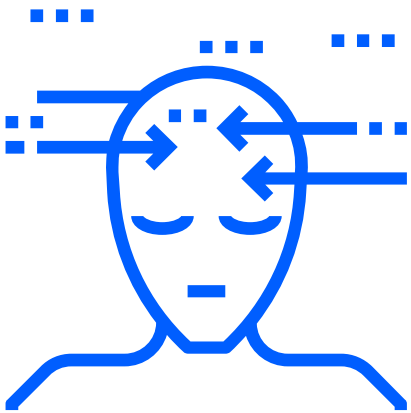
為什麼是要用視覺筆記?



1. 腦袋的75%
是用來處理視覺圖像

為什麼是要用視覺筆記?

2. 左右腦並用
有效啟動
全腦思維



為什麼是要用視覺筆記?

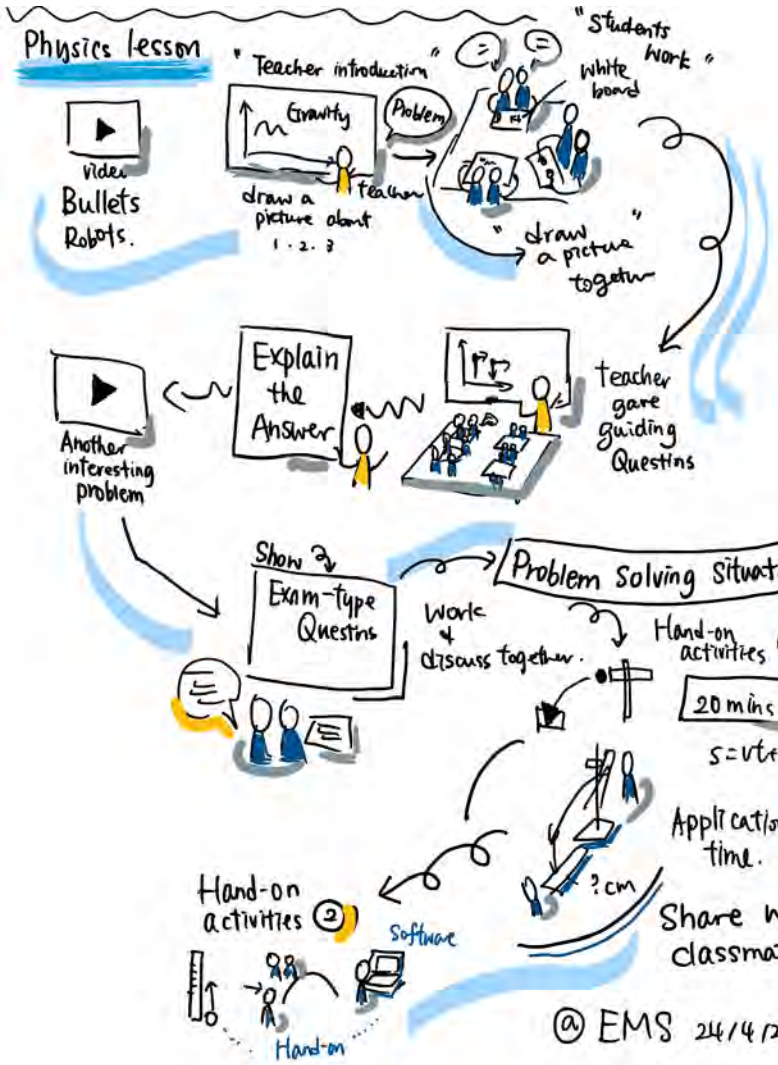
3. 提升記憶與理解

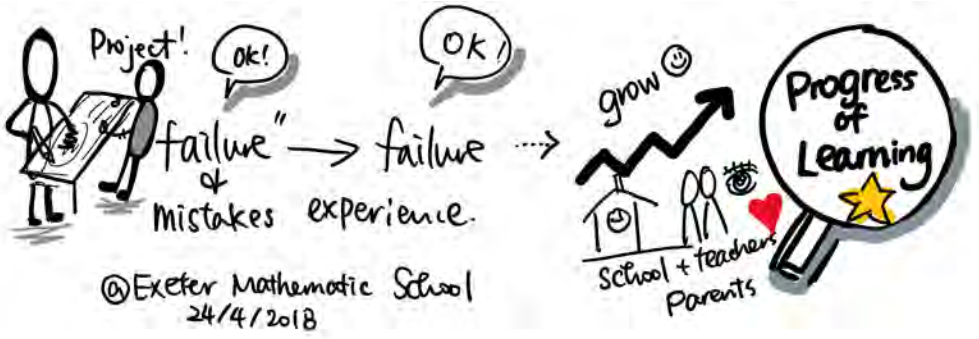
知識澄清, 強化重點

老師在教學過程中如何運用
視覺引導

學生在學習過程中如何運用
視覺筆記

我的視覺”觀課記錄”-在英國中學的一個課堂





視覺筆記第一法則-不是藝術品!

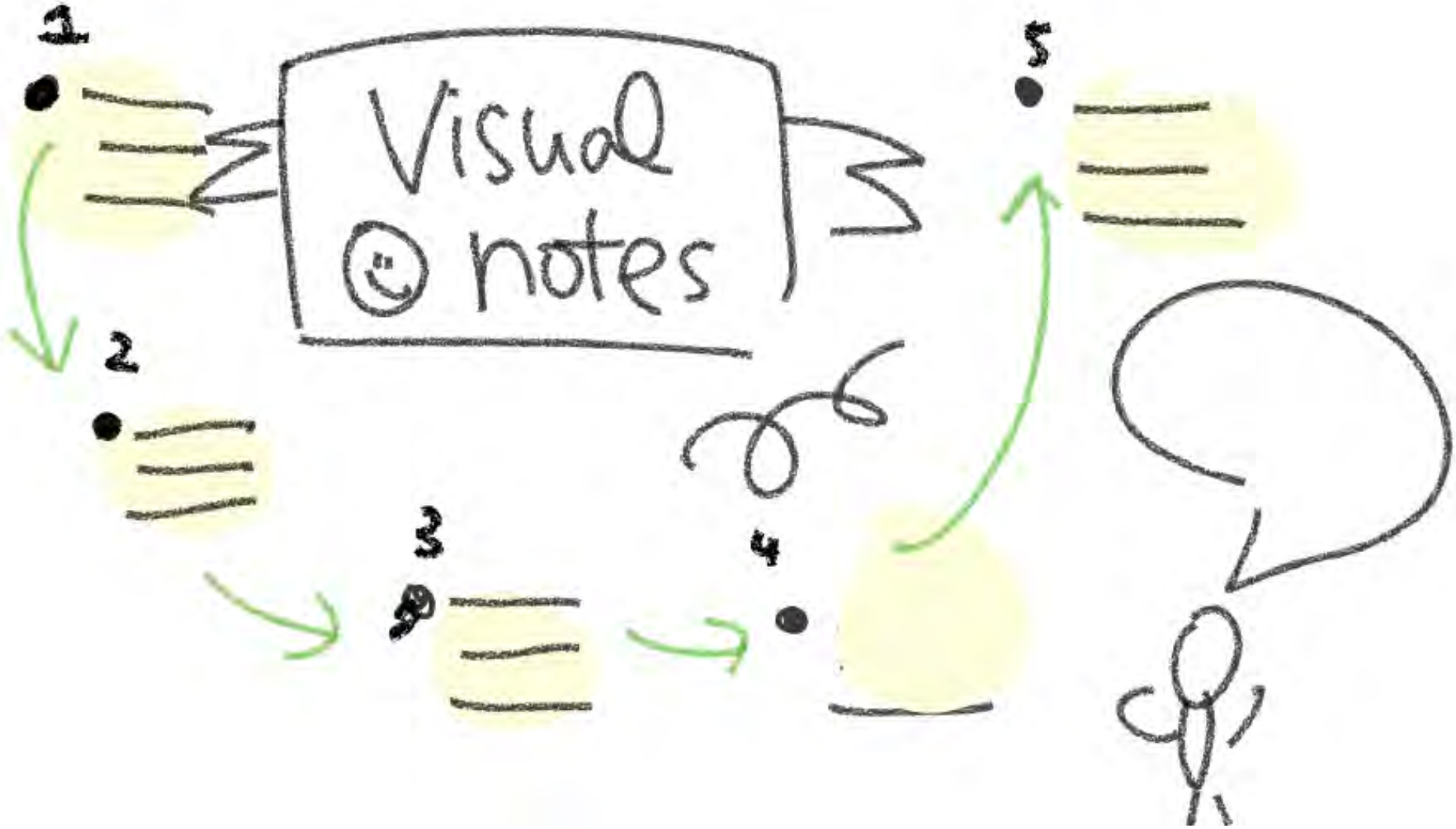
Basic Visual Elements

I DRAW TIME

Bullets

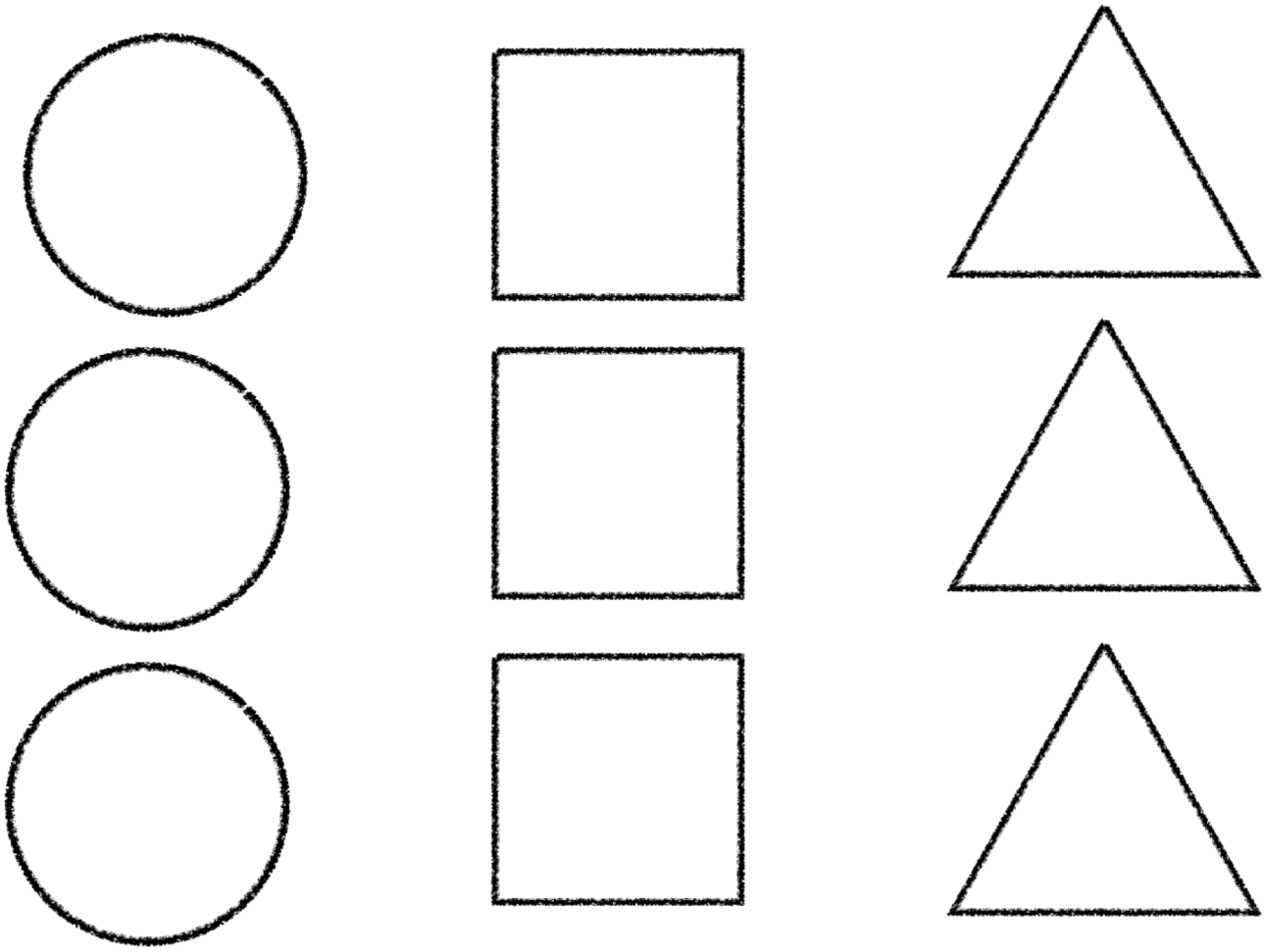
containers

line & arrows

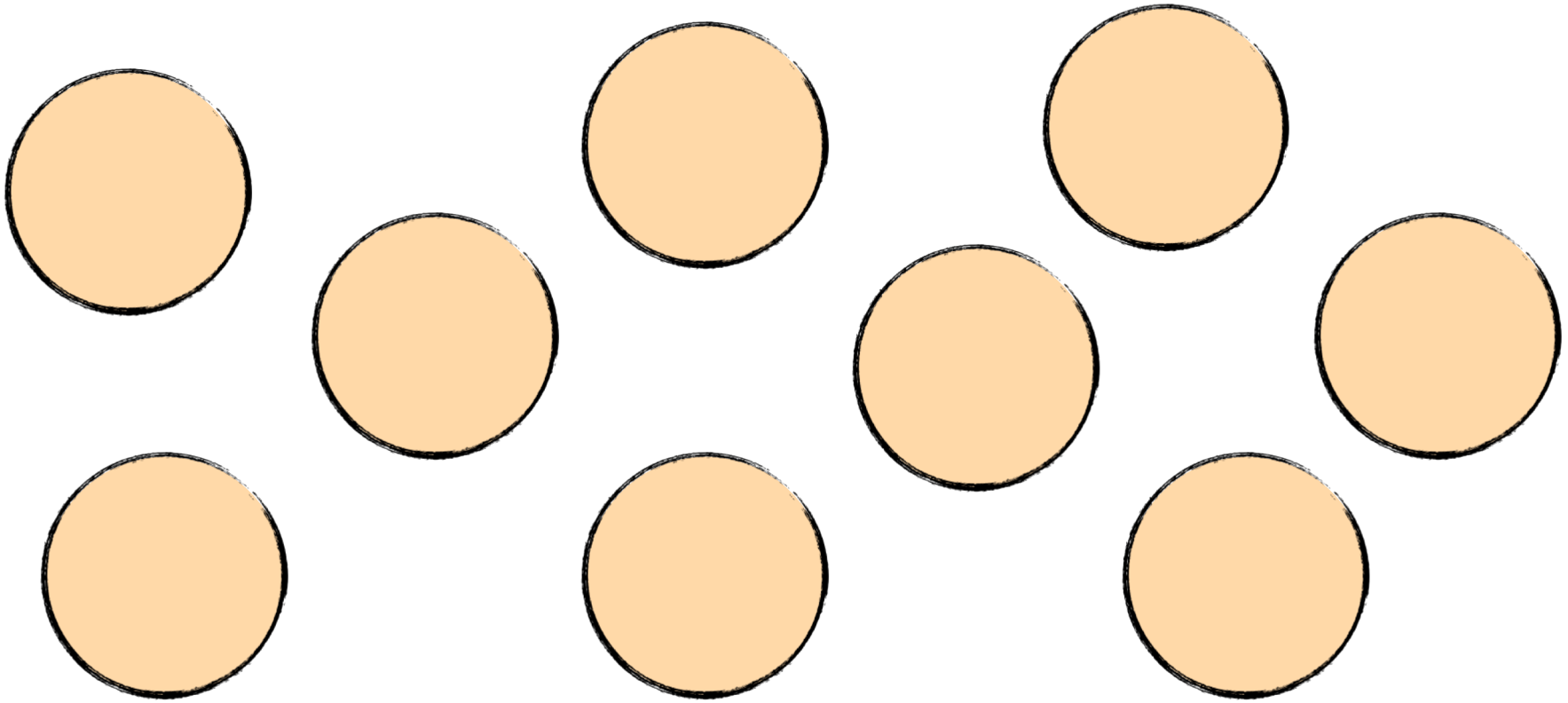

1
Visual
notes
2
3
4
5

視覺筆記第二法則-敢於動筆

Begin with Basic Shapes



Facial Expressions



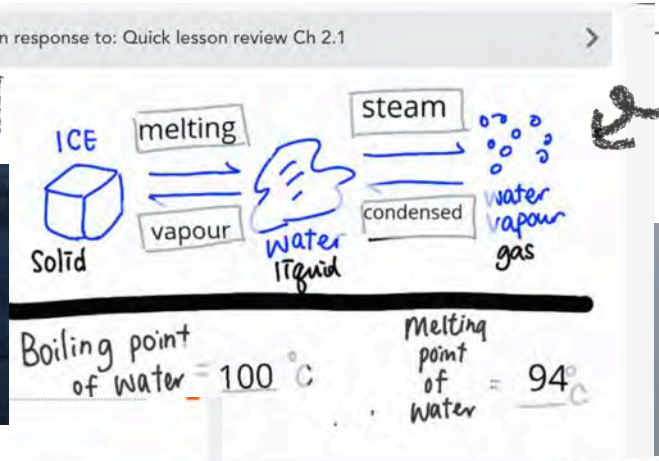
APPS with drawing

draw it!

Nearpod

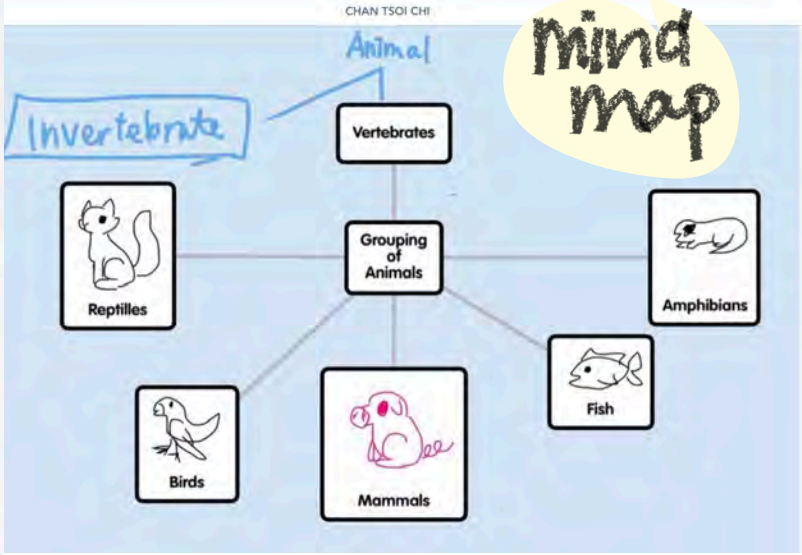
Seesaw

visual e-notebook

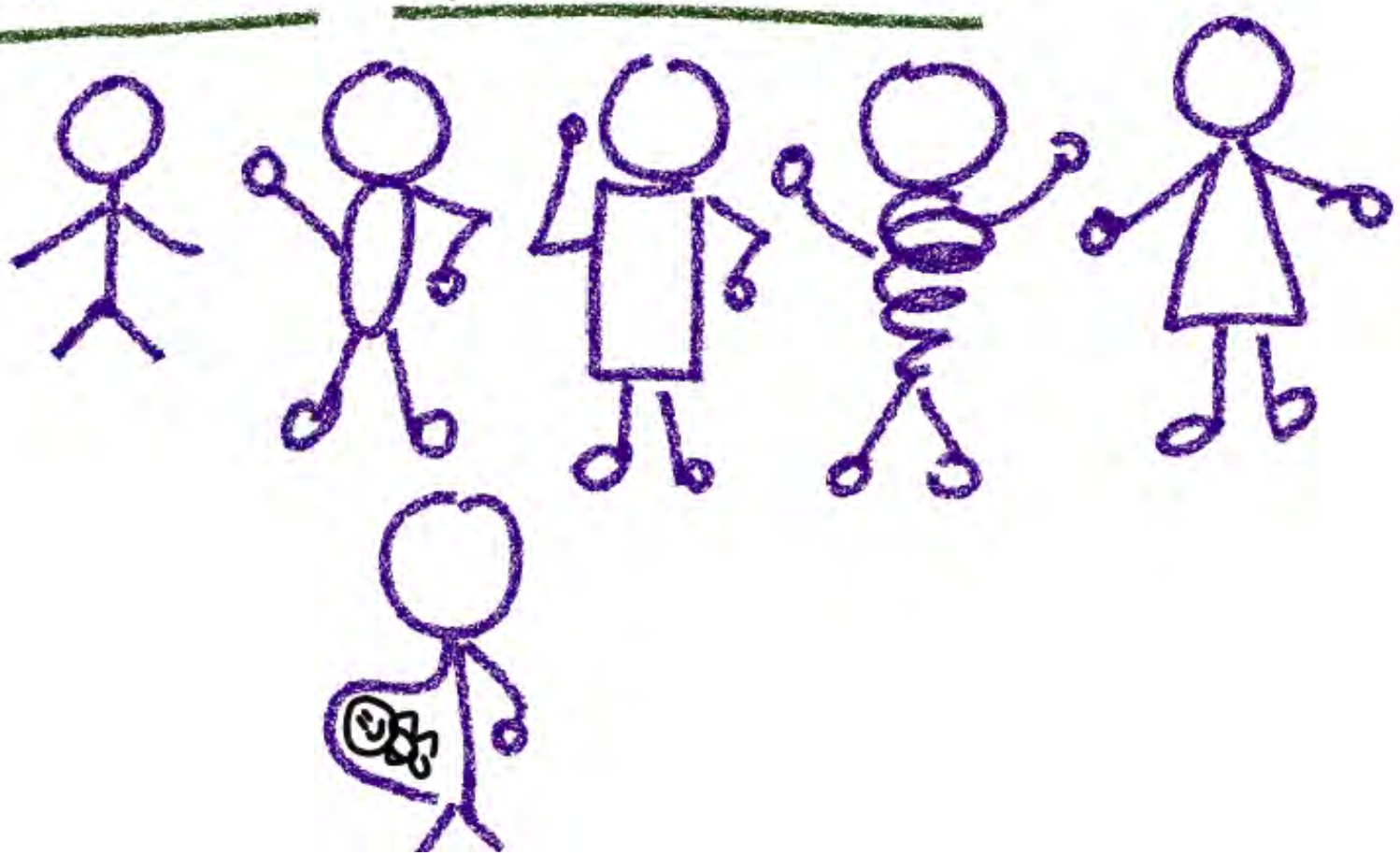


popplet

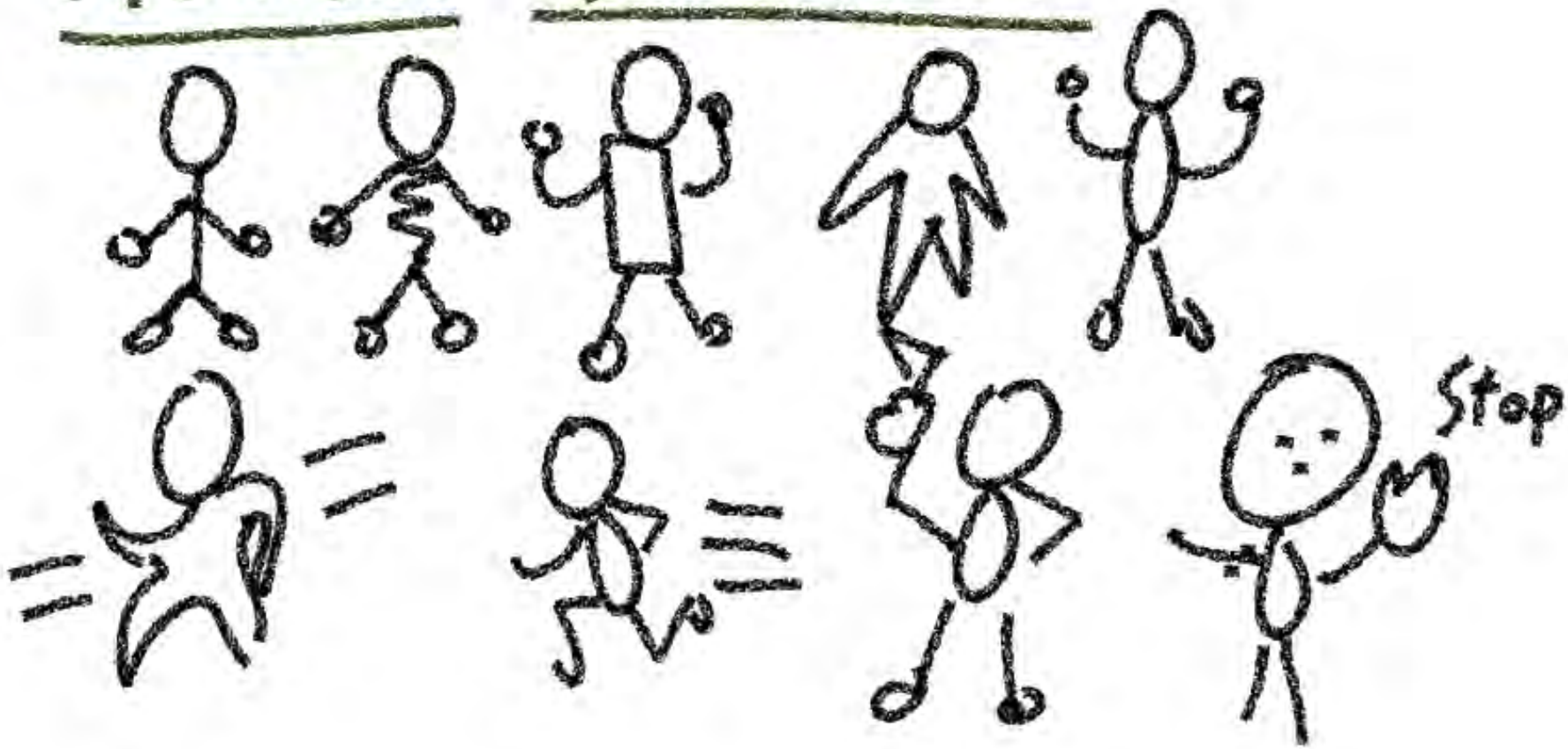
mind map

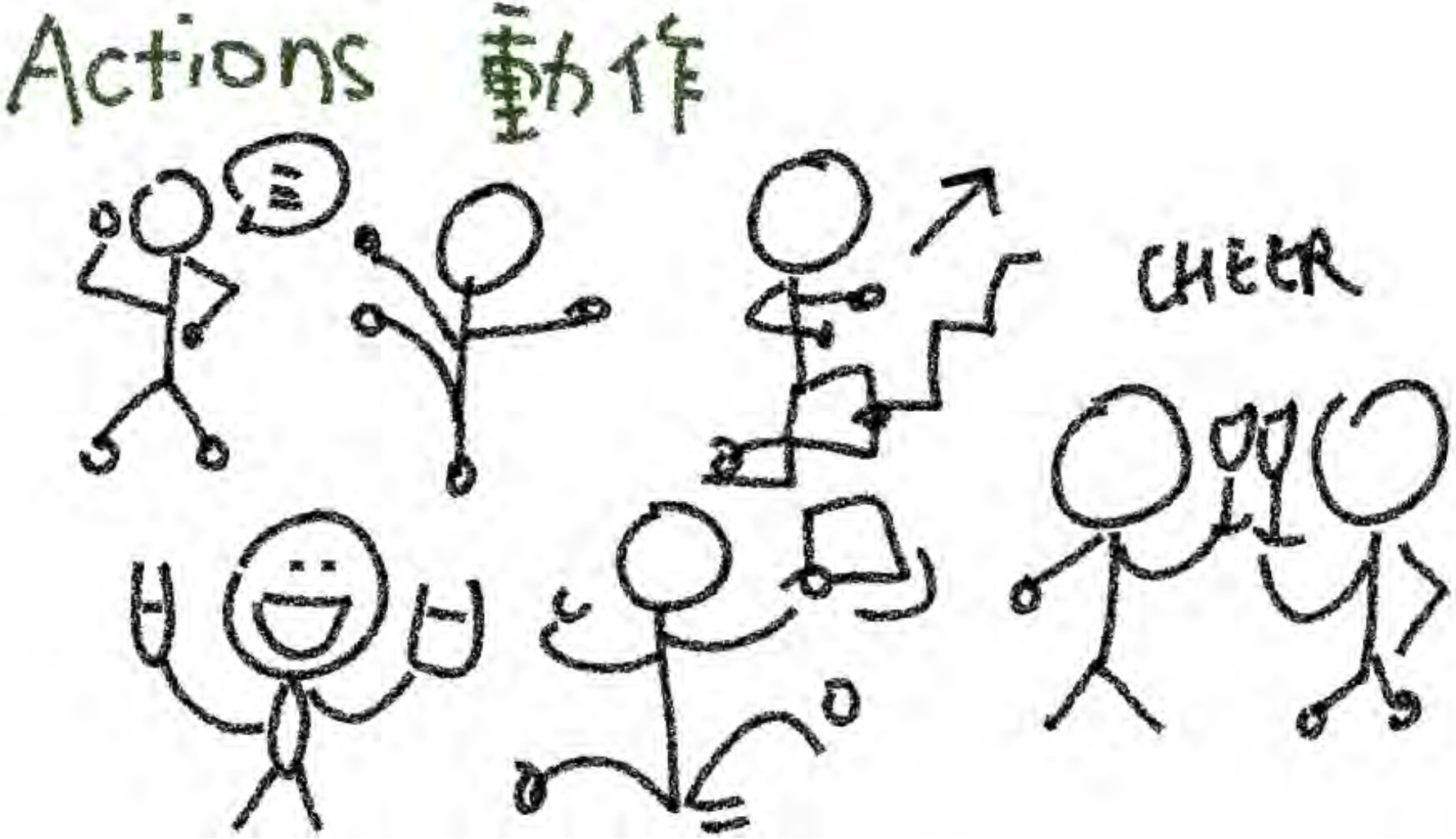


Human • 不同的人

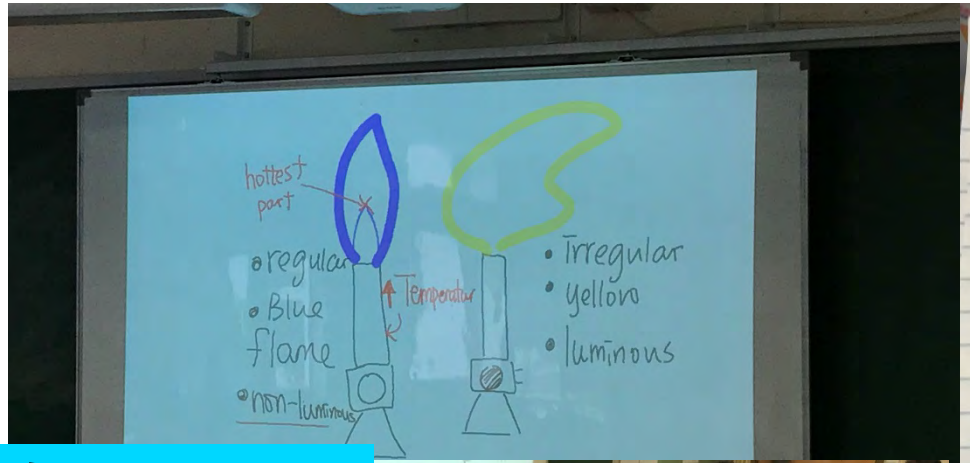


Human • 不同的人

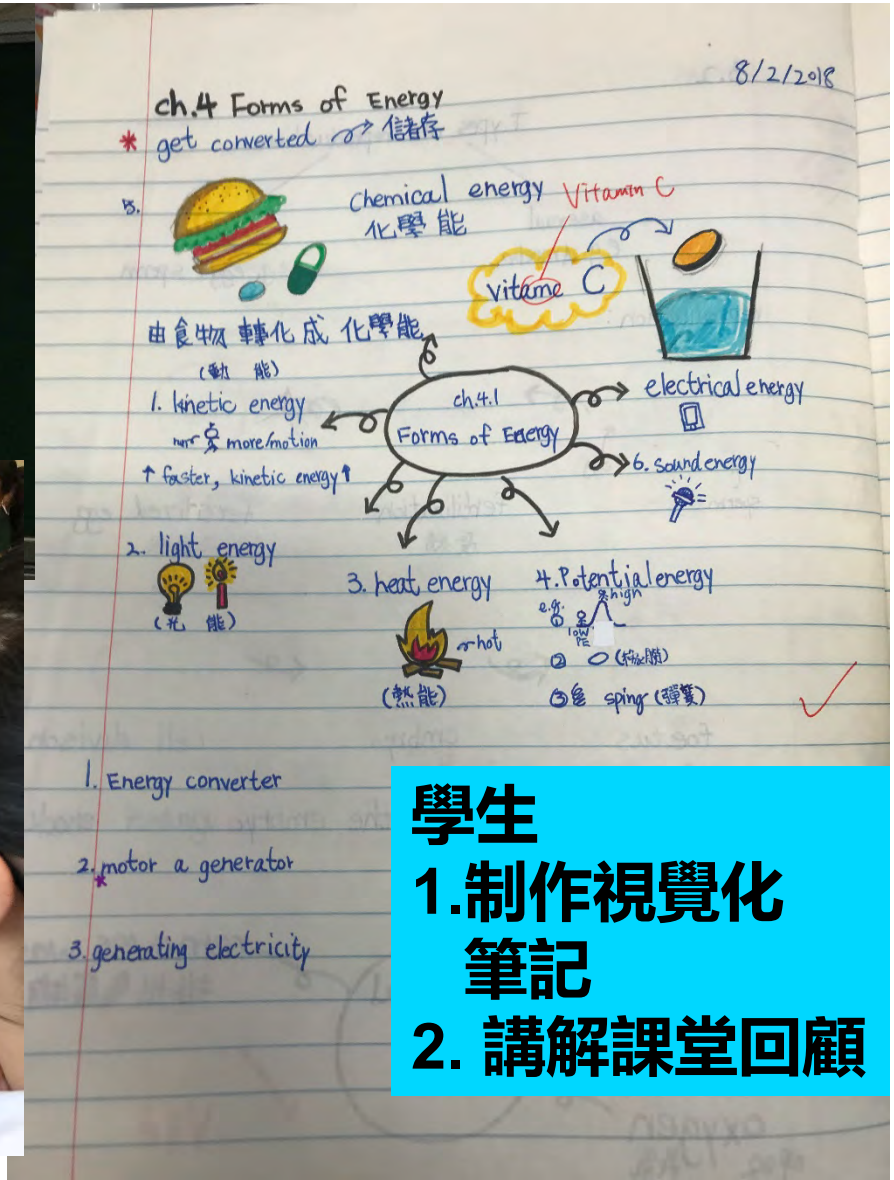



Actions 動作
CHEER

視覺筆記在教學中的應用-科學科

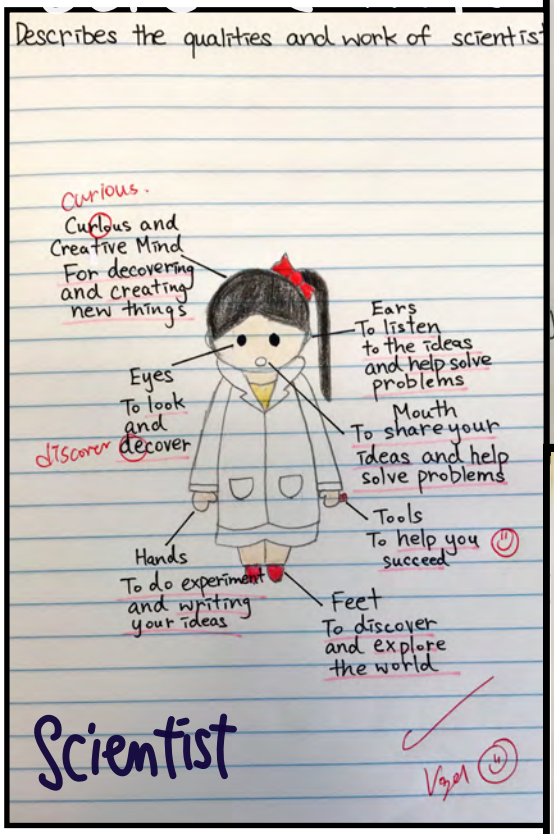


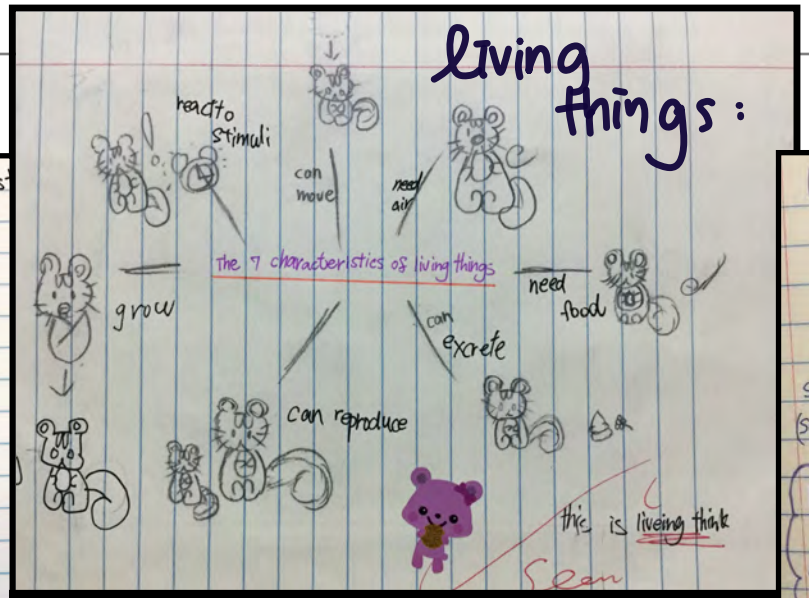
老師
1.知識點博覽
2.設計視覺化複習活動

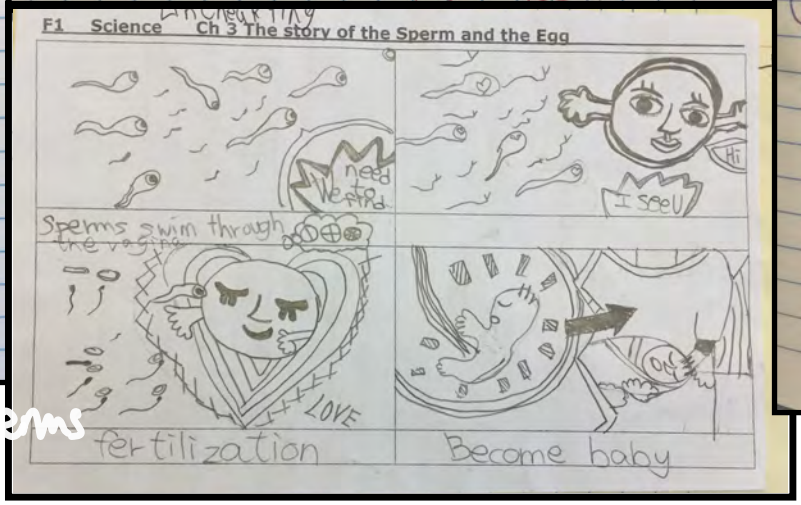


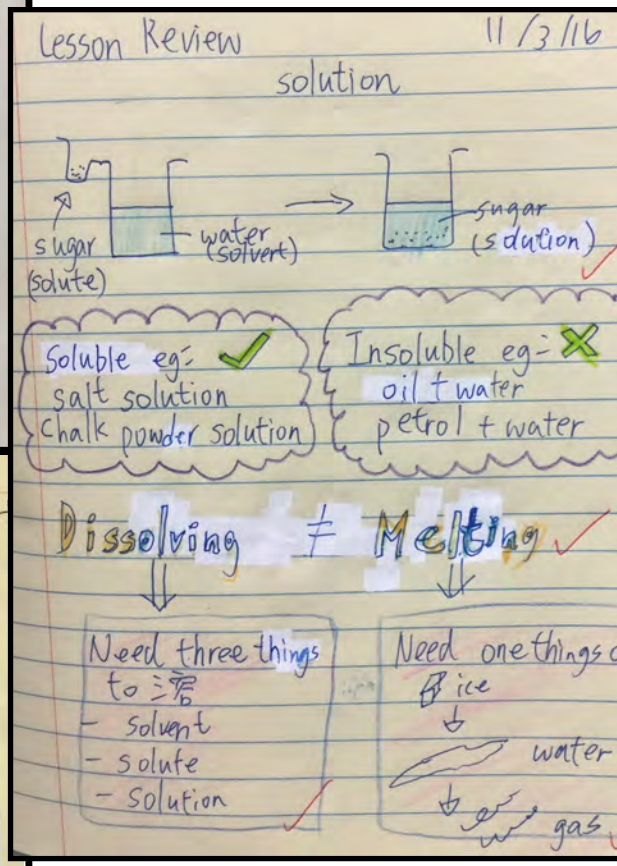
學生
1.制作視覺化筆記
2. 講解課堂回顧

我學生的視覺筆記-科學科

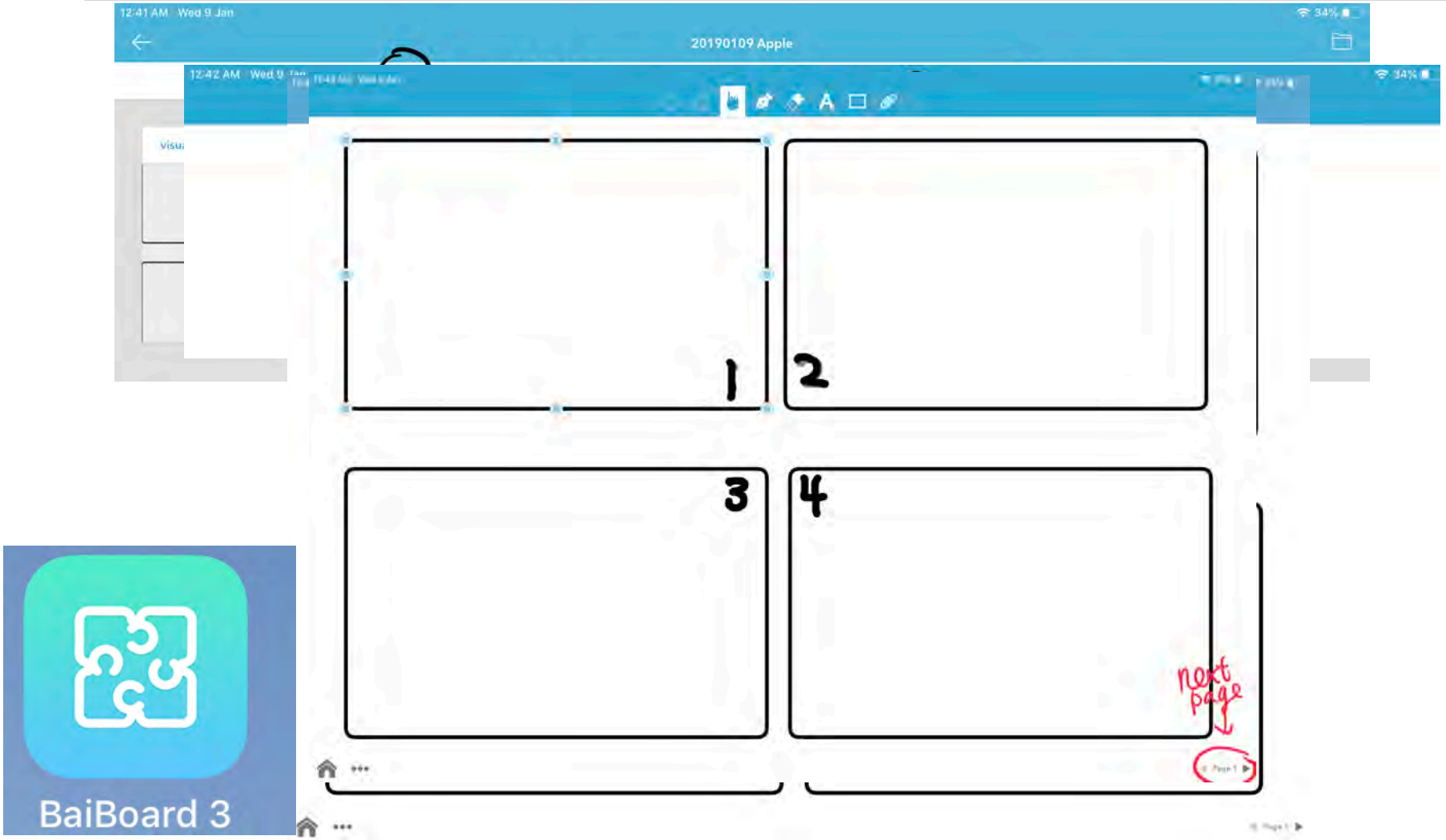








視覺筆記第三法則-互相觀摩


12:41 AM Wed 9 Jan
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next page
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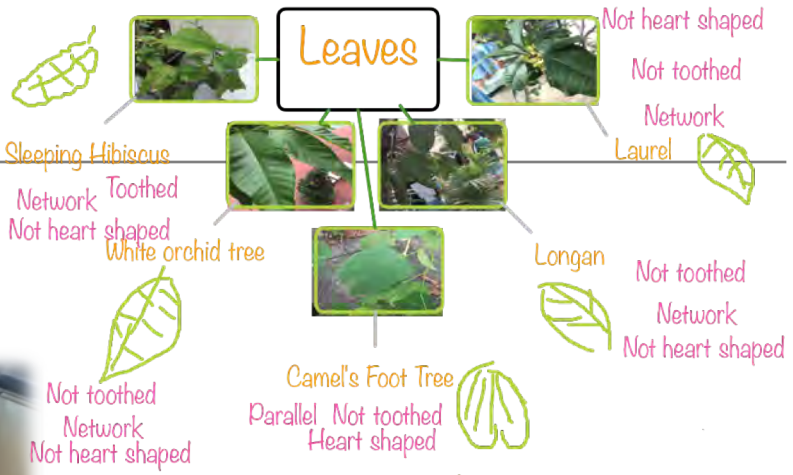
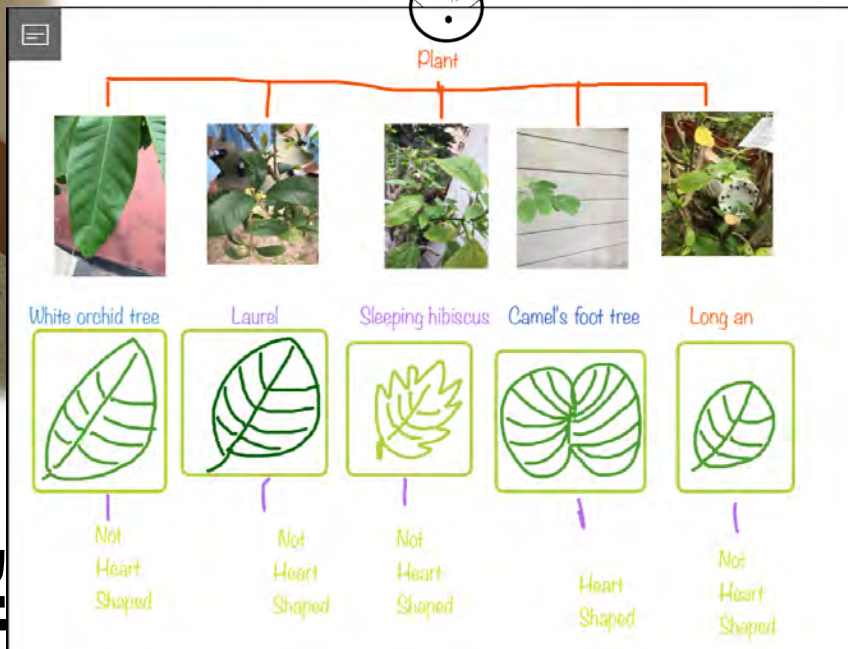
學生課堂及功課





提升互動，促進理解

分類圖

There is **a wide variety** of living things on Earth. Can you name some animals? Write down a list of as many animals as you can. Scientists have divided animals into two groups: those with backbones and those without. If you look over your list, probably all of the animals that you have named have bones, with a series of large bones in their backs that help them to move (e.g. run, climb, fly and swim). This is called the backbone or vertebral column. All animals with a backbone are called **vertebrates**. Vertebrates make up most of the "animals" that we are familiar with. Exceptions to this would be things like an insect, an octopus, a lobster or crab, a jellyfish, or a snail. Animals without backbones are called **invertebrates**.

Vertebrates can be classified into five groups, based on their skin covering, characteristics of their limbs (arms and legs, or their equivalent such as wings or fins), how they reproduce and how they maintain body temperature. Knowing the five classes of vertebrates and their characteristics helps you to understand more about these animals.

Fish live in water. Their skin is generally covered with slimy scales. Their limbs are modified into fins for swimming. They breathe with gills and lay eggs in water. Their body temperature changes with the environment. **Amphibians** can live in water and on land. They have moist skin and do not have scales, hair, or feathers. The skin can be smooth or rough. They breathe with gills, skin or lung. They lay eggs in water. Their body temperature changes with the environment. **Reptiles** have dry, hard scales. They breathe with lungs. Their body temperature changes with the environment. They lay eggs on land. **Birds** is covered with feathers and have a beak. Their forelimbs are modified as wings. They breathe with lungs. They lay eggs. They can maintain a constant body temperature. **Mammals** have fur or hair on the skin. They have mammary glands to produce milk for the young. They breathe with lungs. They can maintain a constant body temperature.

	1. Fish(example: goldfish)
Skin covering	
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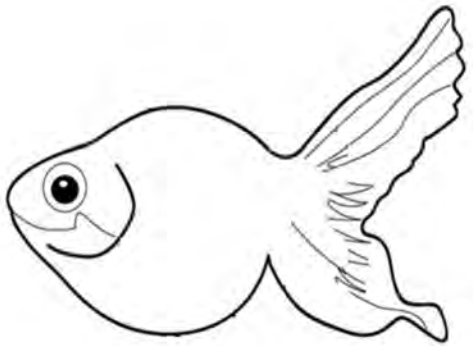
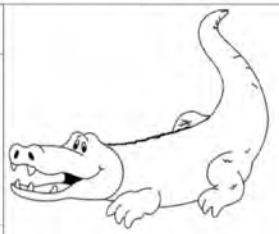
ction	
ture	



teristics of the vertebrates groups (1)

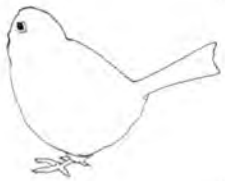
2.Amphibians(example: frog)	

3.Reptiles(example: crocodile)	



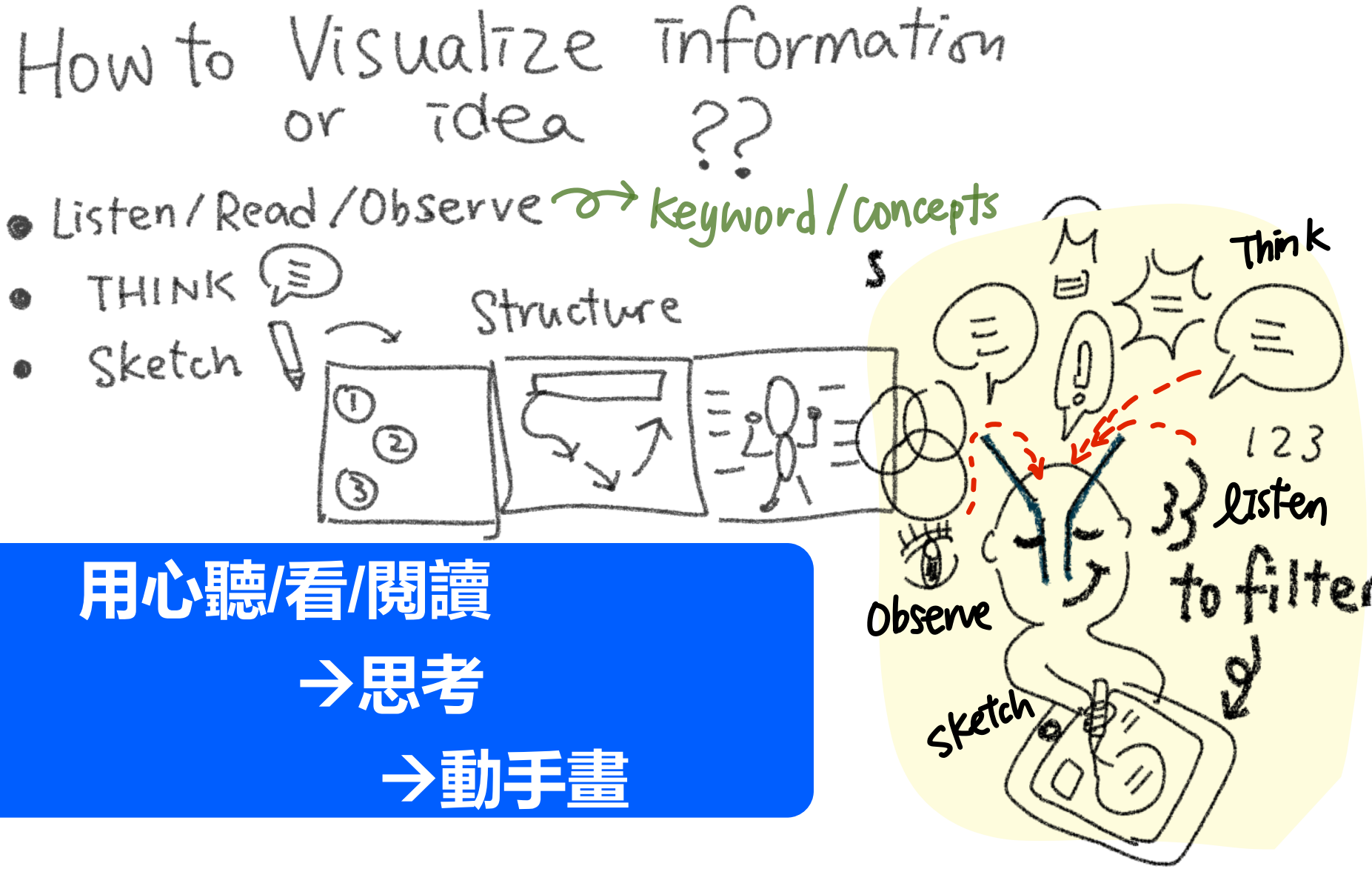
Group Work: Characteristics of the vertebrates groups (2)

	4.Birds(example: sparrow)
Skin covering	
Limbs	
Breathing	
Reproduction	
Body Temperature	



	5.Mammals (example: chimpanzee)
Skin covering	
Limbs	
Breathing	
Reproduction	
Body Temperature	

如何視覺化內容?



用心聽/看/閱讀

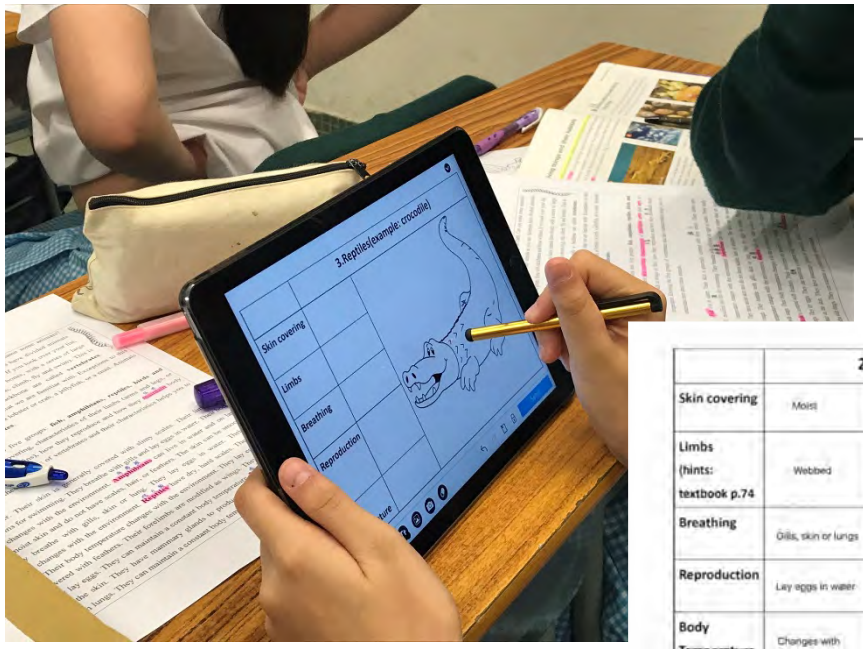
→思考

→動手畫

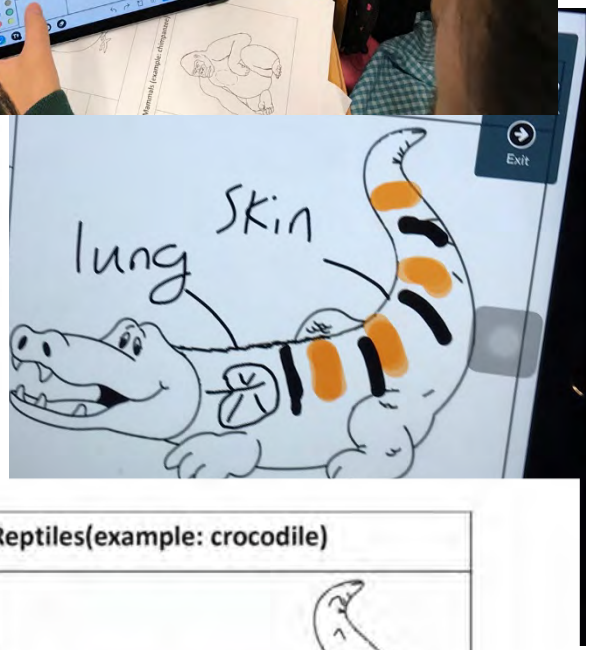
了解重點→以視覺方式表達

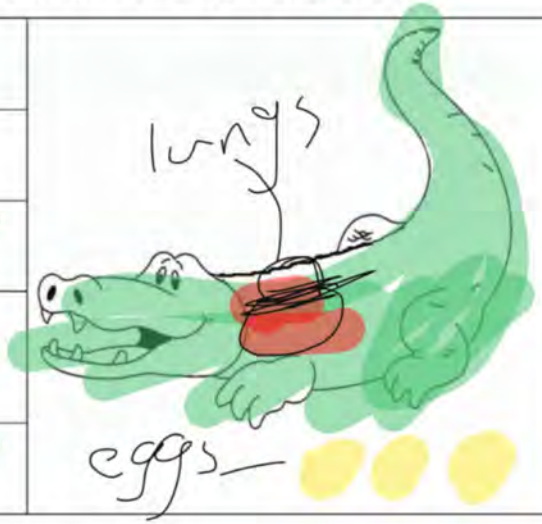
Fish live in water. Their skin is generally covered with slimy scales. Their limbs are modified into fins for swimming. They breathe with gills and lay eggs in water. Their body temperature changes with the environment. **Amphibians** can live in water and on land. They have m… …an be smooth or

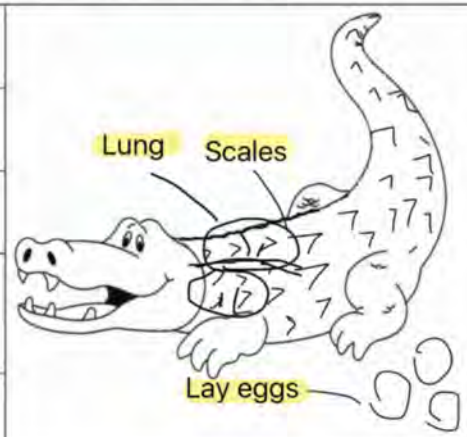
	1. Fish(example: goldfish)
Skin covering	
Limbs	
Breathing	
Reproduction	
Body Temperature	



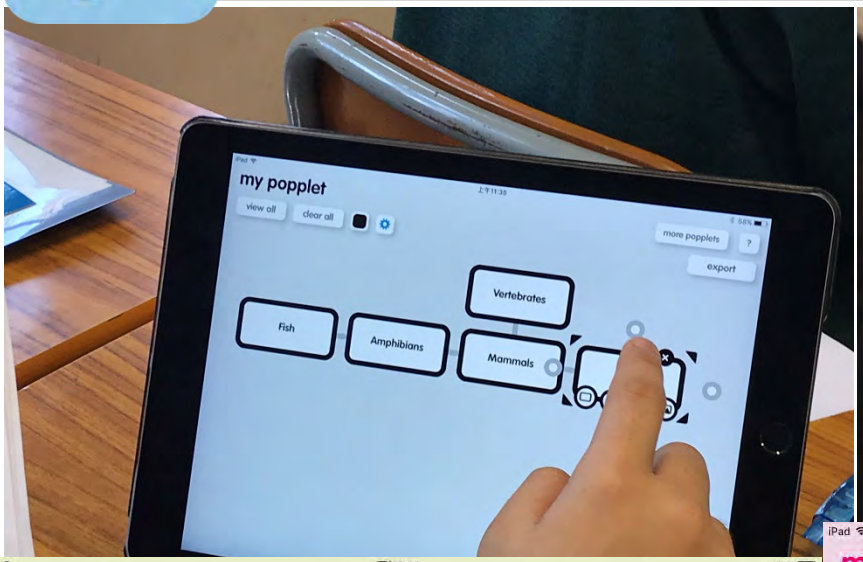
	2.Amphibians(example: frog)	
Skin covering	Moist	
Limbs (hints: textbook p.74	Webbed	
Breathing	Gills, skin or lungs	
Reproduction	Lay eggs in water	
Body Temperature	Changes with the environment	

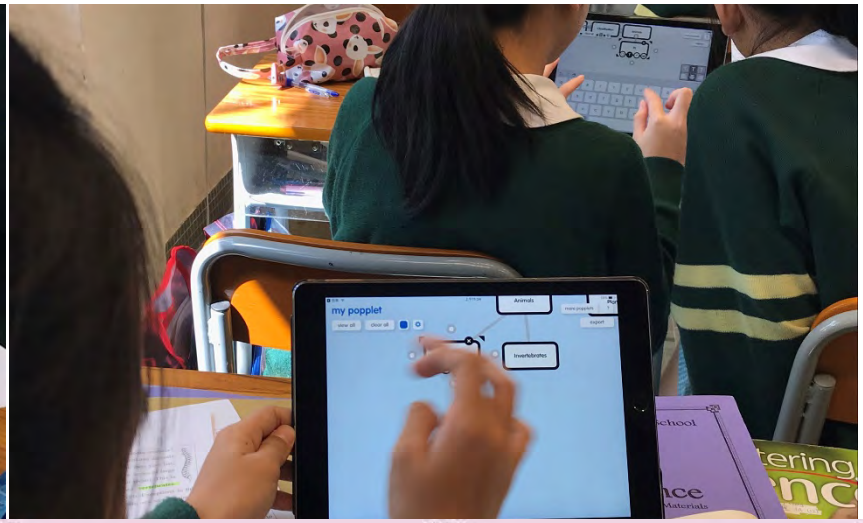


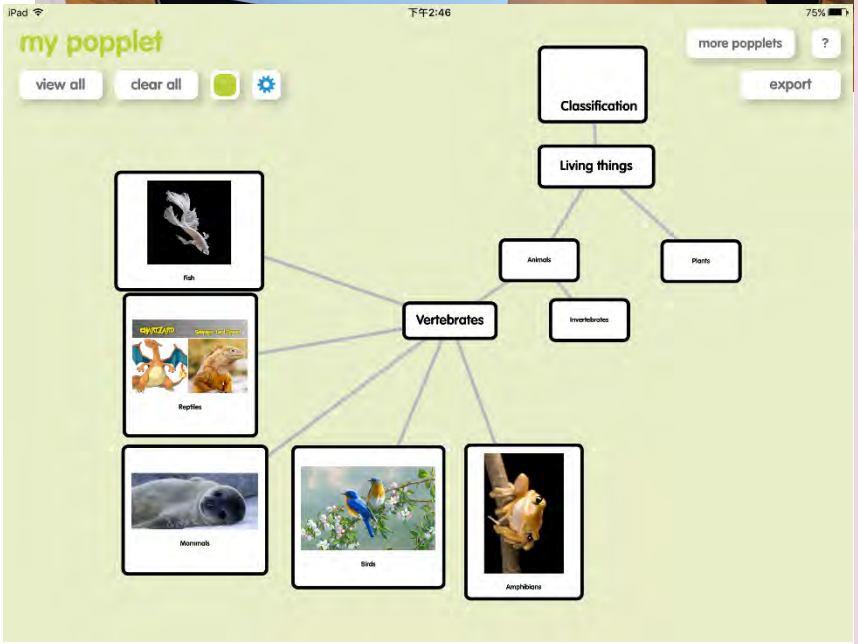
	3.Reptiles(example: crocodile)	
Skin covering	Dry and hard scales	
Limbs		
Breathing	Breathe with lungs	
Reproduction	Lay eggs on land	
Body Temperature	Changes with the environment	

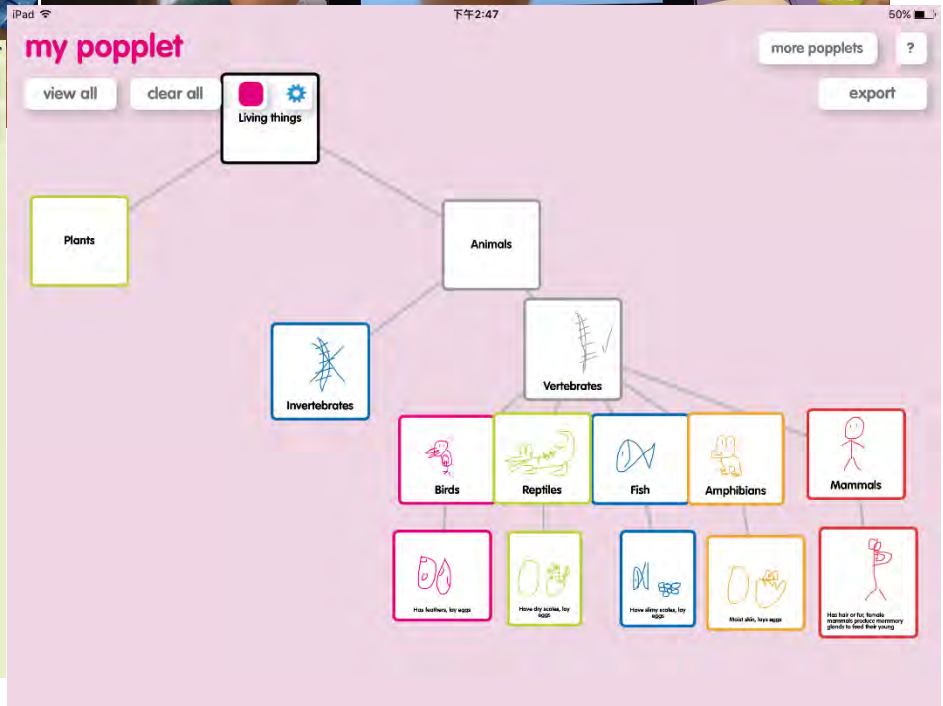
3.Reptiles(example: crocodile)	
	

Popplets--Conclusion: Mind-Map

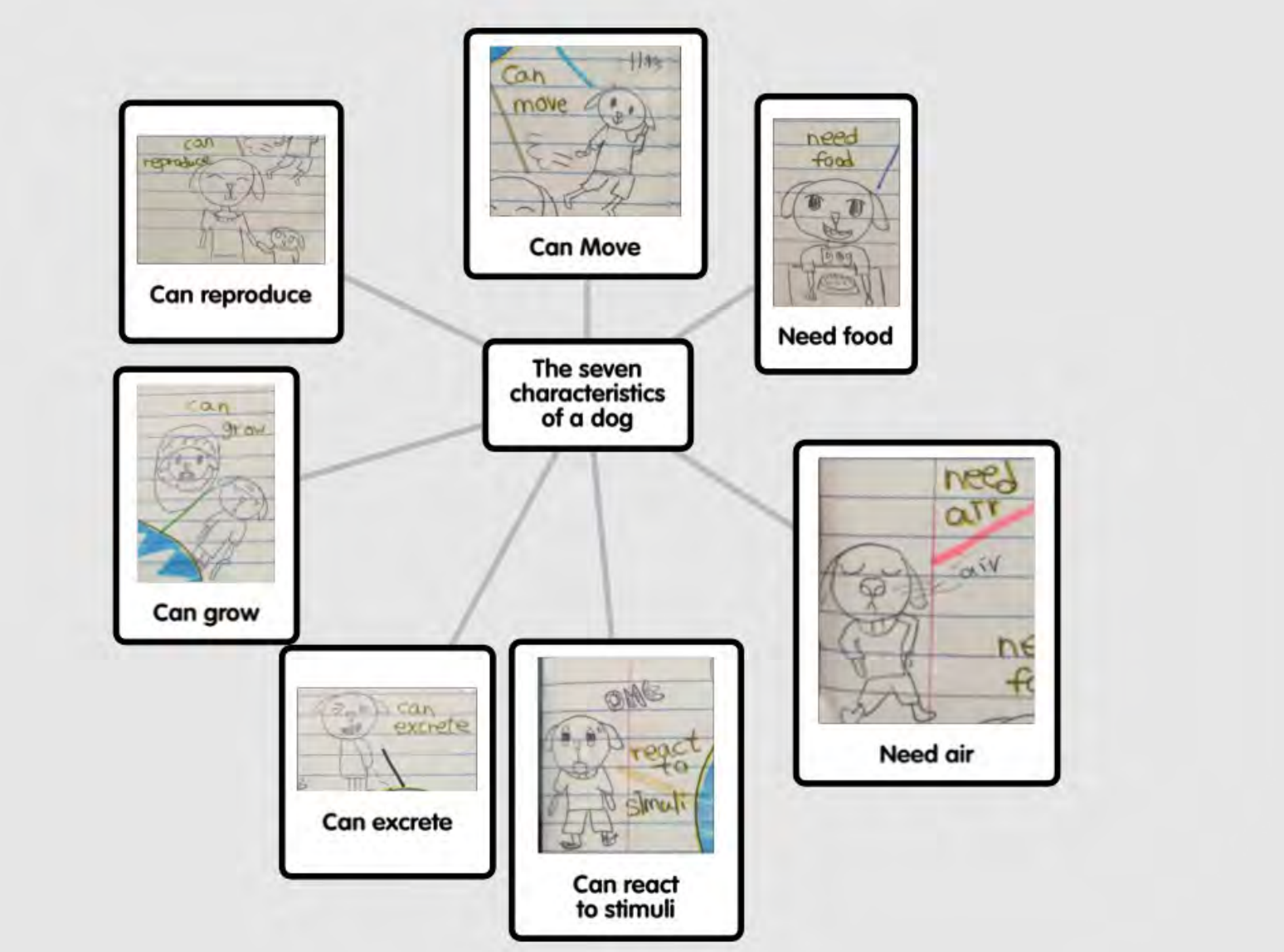






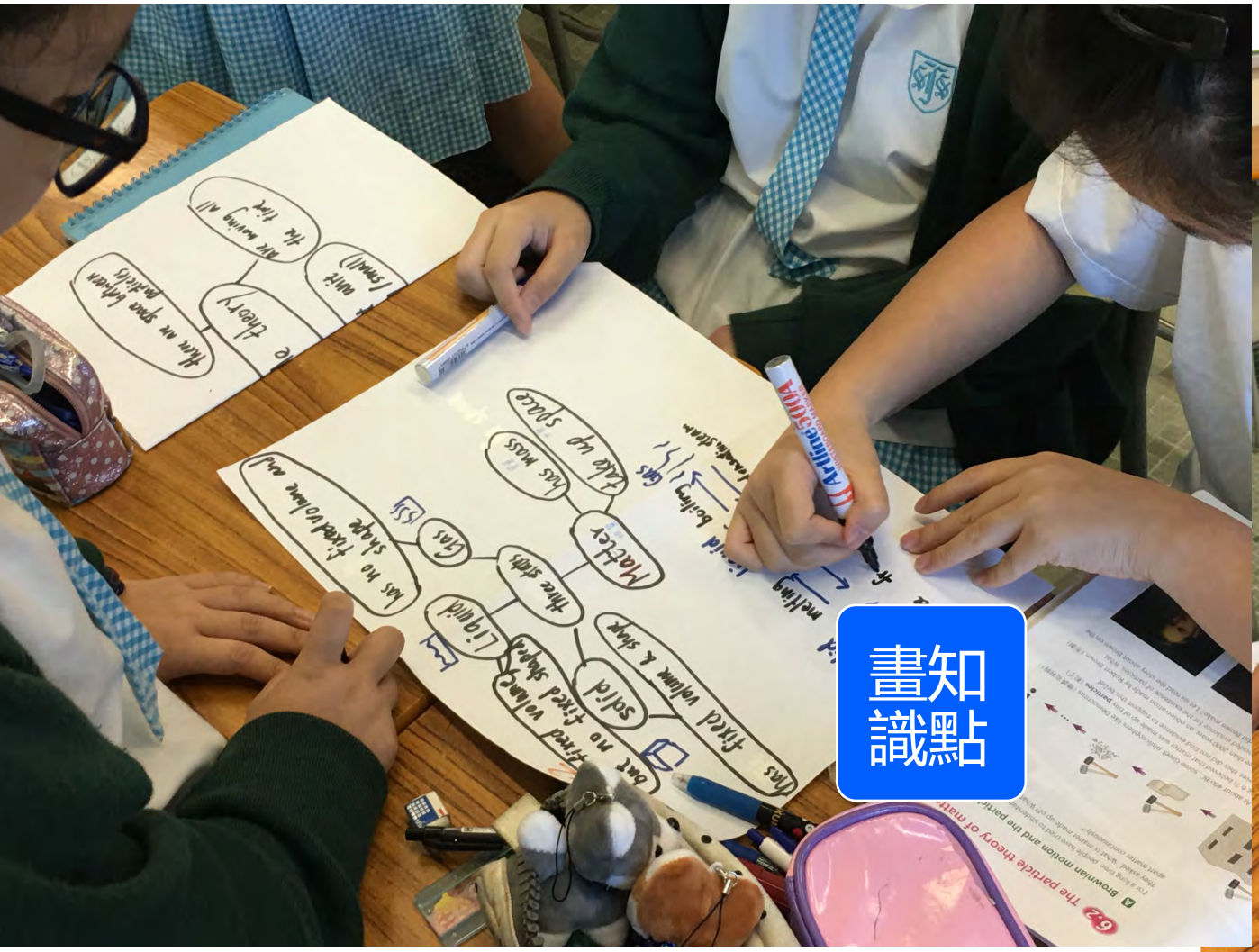


Chapter Summary :

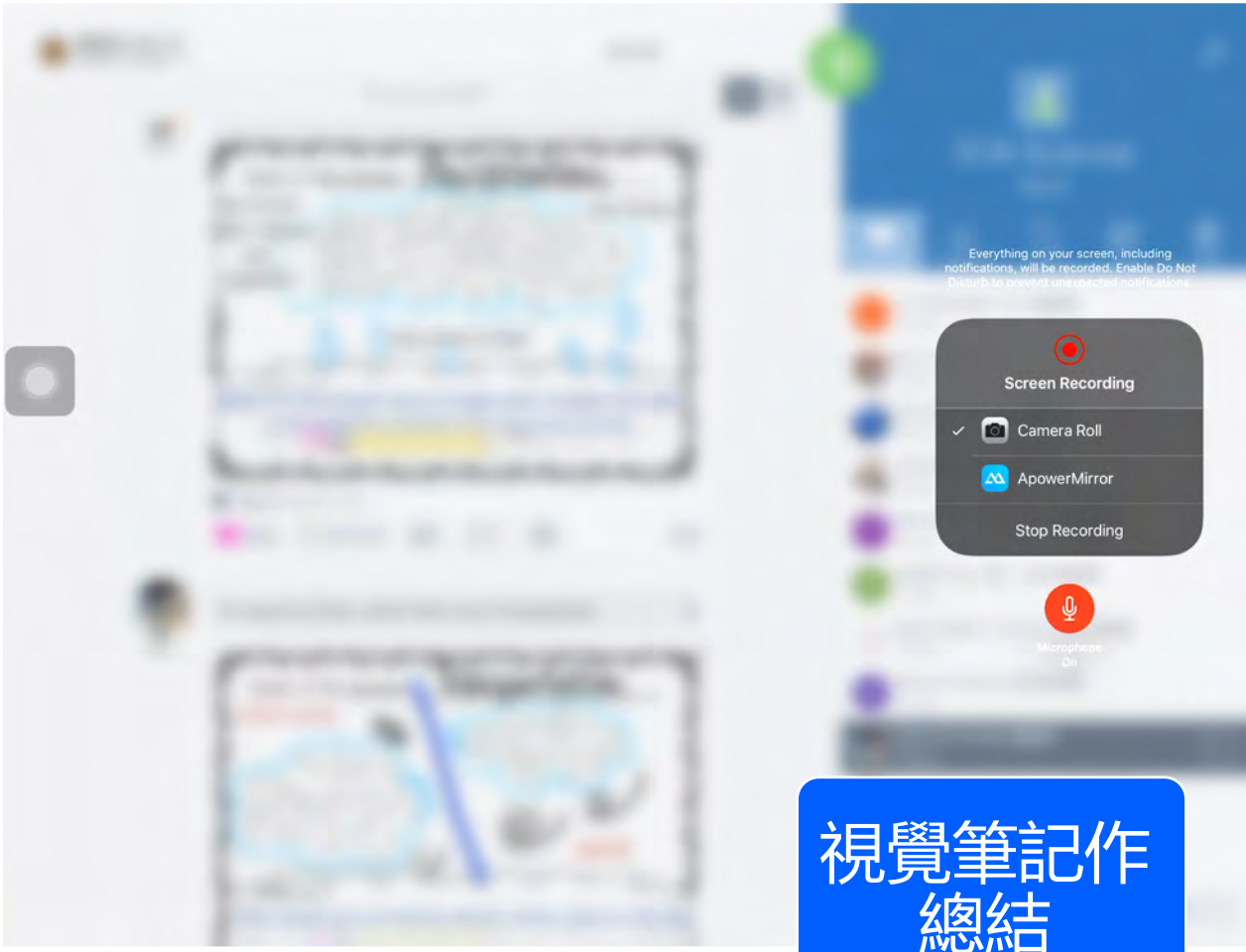



Visual Sketchnotes
Rule 4 :
Practice
everyday
#Everyone
Can
create
I cannot
Draw!!
Planner
Bookreport
Notes
Lesson
Review
TED Talk

視覺筆記在溫習中的應用-科學科



視覺筆記在溫習中的應用-科學科



視覺筆記作
總結


MAKING Learning Visible:
Visual Sketchnotes
by Viansin @ 2019
Visual Elements
Bullets
Containers
Arrows
Colours
Everyone can create Drawings
Face
People
concepts
Rules :
1. It is NOT ART!
2. DARE to draw!
3. SHARE with others
4. Practice more !
Teach
Learning apps

21st Century Teaching SKOLE - The International Dimension in the Classroom

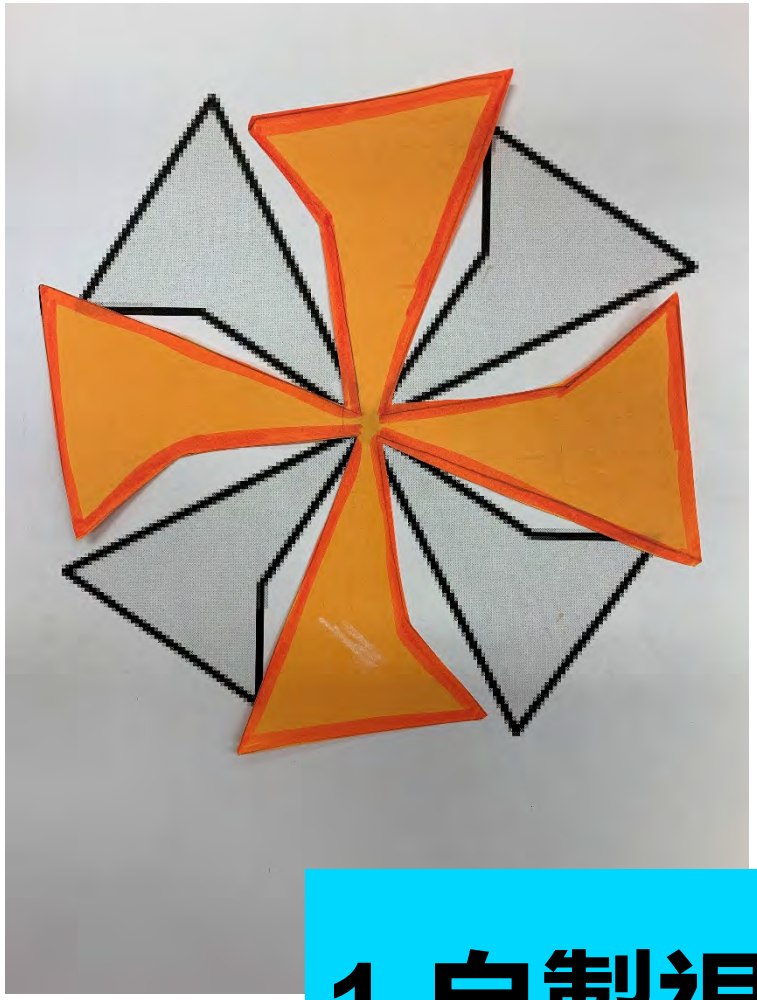
t the demands of the 21st Century labour market?

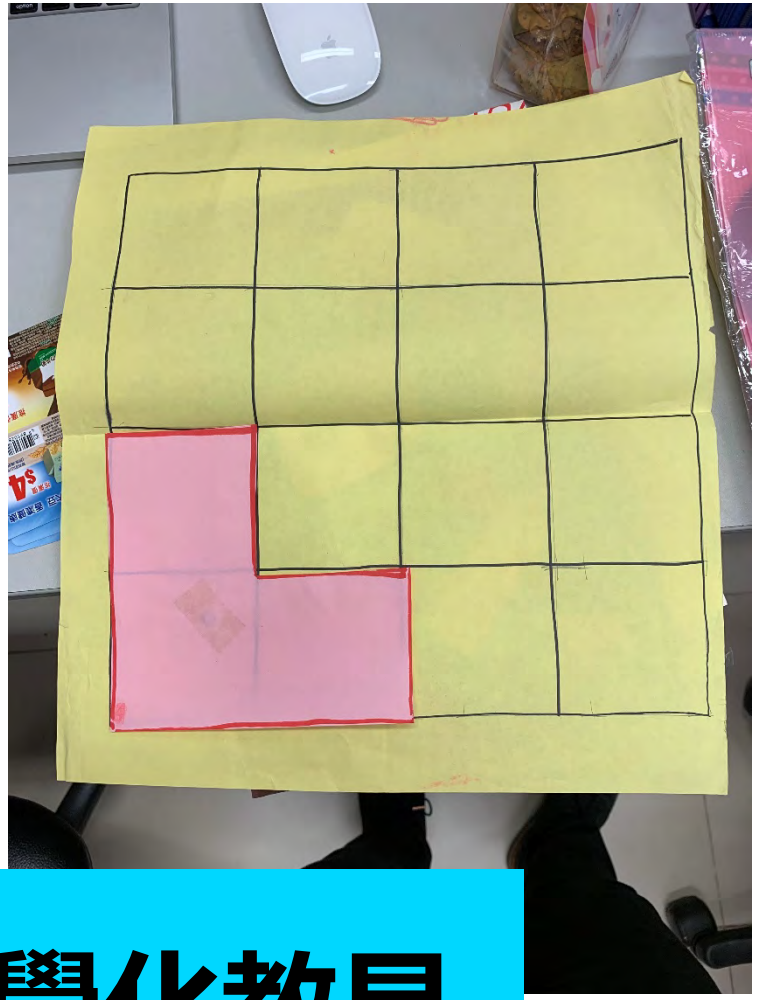
moovly

0:06

1:57

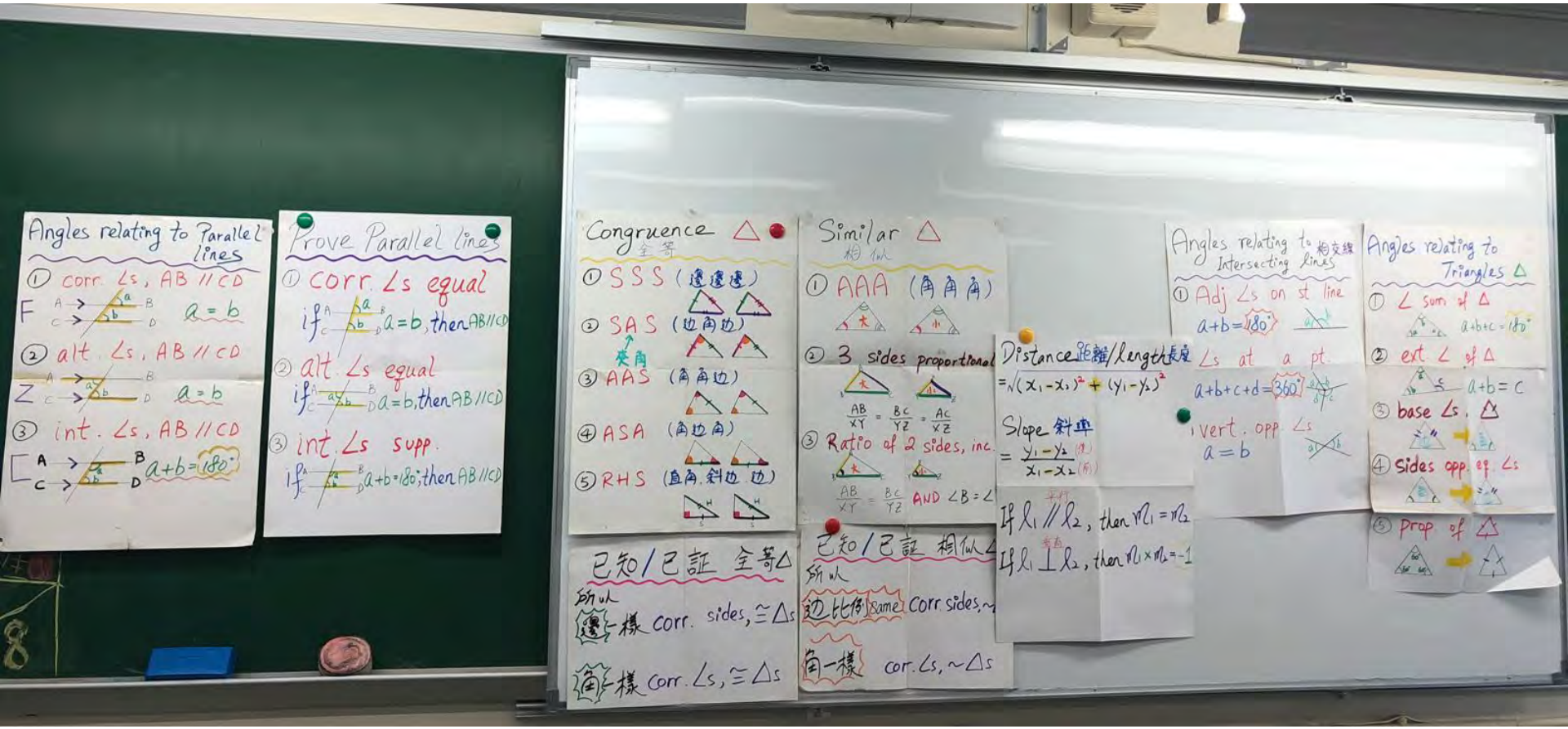
視覺筆記在溫習中的應用-數學科





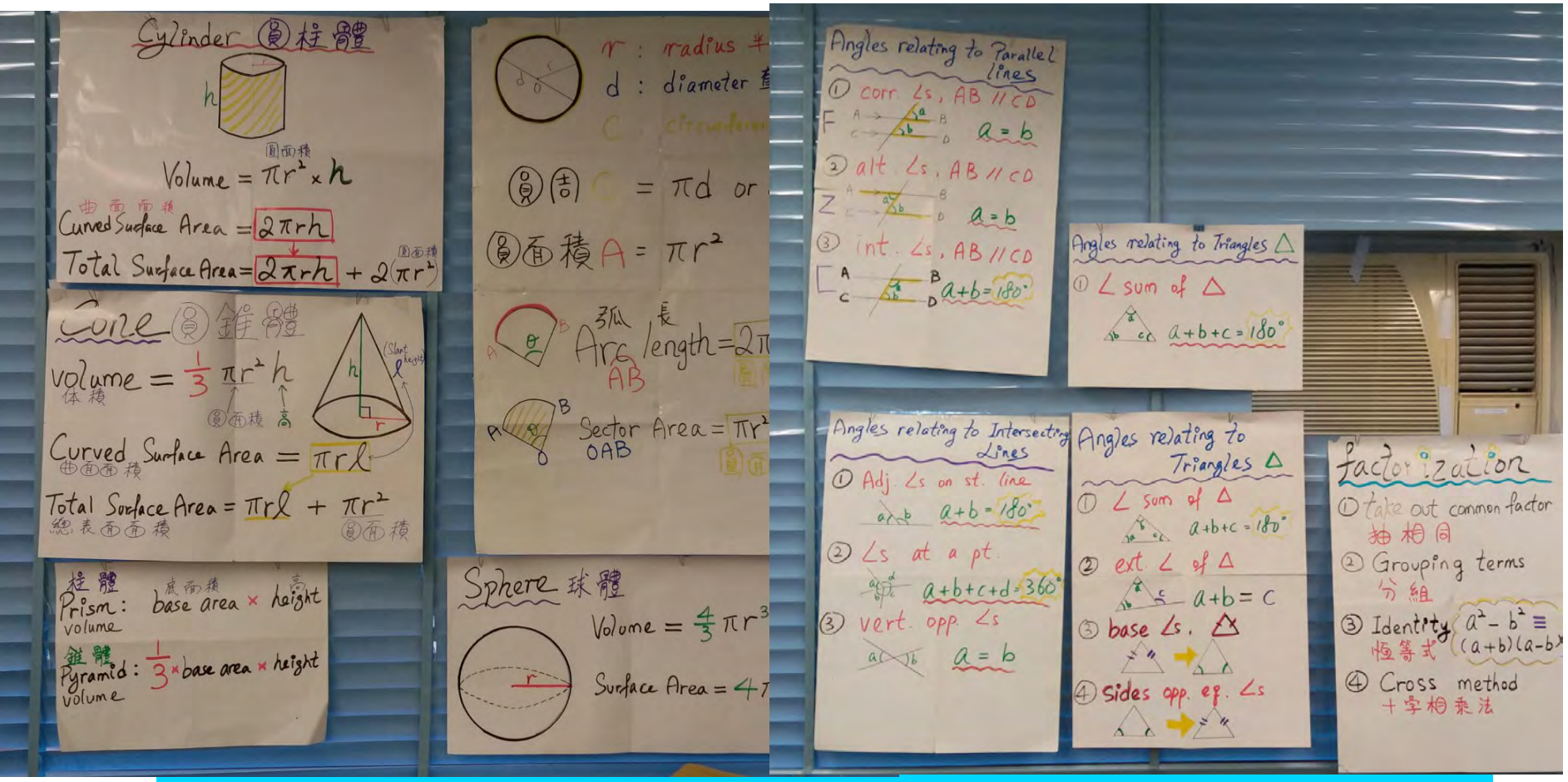
1.自製視覺化教具

視覺筆記在溫習中的應用-數學科



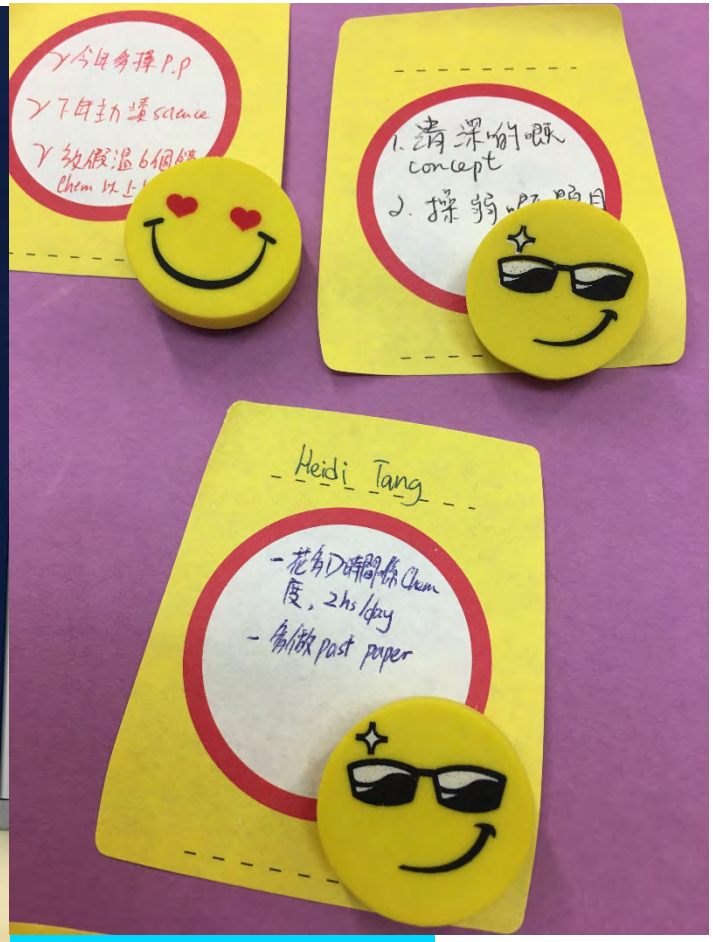
2.營造視覺複習場景，串聯要點

視覺筆記在溫習中的應用-數學科

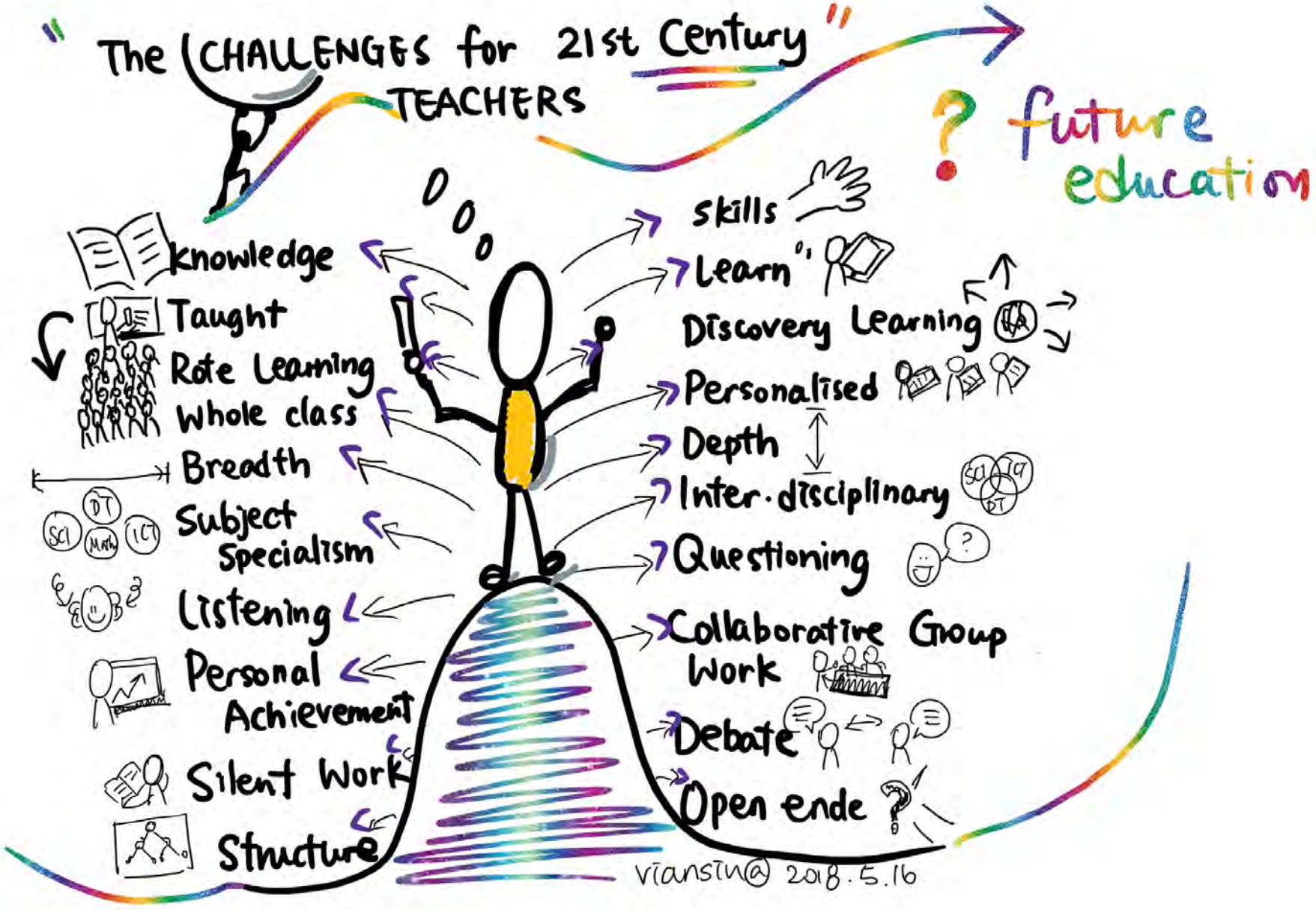


2.營造視覺複習場景，串聯要點

視覺引導的其他的應用-成長思維心法



鼓勵反思，提升自我


The CHALLENGES for 21st Century TEACHERS
future education
knowledge
Taught
Rote Learning
Whole class
Breadth
Subject Specialism
Listening
Personal Achievement
Silent Work
Structure
skills
Learn
Discovery Learning
Personalised
Depth
Inter-disciplinary
Questioning
Collaborative Group Work
Debate
Open ende
vianstu@ 2018.5.16