

English Immersion Program

# Science Notes

6th grade 1<sup>st</sup> semester



Name : \_\_\_\_\_

Class : \_\_\_\_\_

Number : \_\_\_\_\_

Teacher : \_\_\_\_\_

# 前言

面對全球化及國際化浪潮，2030雙語國家政策發展藍圖中強調「厚植國人英語力」、「提升國家競爭力」為重要目標（國家發展委員會，2020），因此，為提升國民英語力以增加國際競爭力，政府預計於2030年打造臺灣成為雙語國家。

臺北市為因應此國家重要政策，積極推動每個行政區至少一所雙語實驗課程學校，自106學年度起至109學年度止，臺北市已有20所雙語實驗課程國小及8所雙語實驗課程國中，並將於110學年度再增加20校，達到48校之多，期望成為我國雙語教育之先驅，讓臺北市的孩子成為具有國際移動力的未來公民。

本校有感於雙語教育及近年來我國積極培養學童STEAM (Science, Technology, Engineering, Arts, and Mathematics) 結合科學、技術、工程、藝術，以及數學跨學科素養的教育趨勢，因此自108學年度開始針對六年級試辦自然課程雙語教學，以英語營造生活情境中的科學，透過趣味科學實驗增進學童以英語來進行科學探究的興趣與能力。

這本科學筆記本是本校六年級自然任課老師陳美卿、林怡伶、林雨慶、范瑋庭、張淑惠、陳姿瑾所共同設計的，期望學生可以紮紮實實的學習自然科學知識，更透過以英語指導科學實驗步驟，動手做實驗來激發學童的科學探究潛能、啟發學童善用英語進行科學領域學習的能力。

2020.09.02

# Weather Changes

## Water in the atmosphere

### Cloud and fog

Factors affecting cloud and fog formation.  
(雲) 和 (霧) 的形成原因。

### Rain, dew, frost and snow

Factors affecting rain, dew, frost and snow formation.  
(雨、露、霜、雪) 的形成原因。

### Water cycle

Water cycle in nature.  
大自然中 (水的循環) 過程。

## Weather chart and weather changes

### Satellite images

How to read satellite images to forecast weather changes.  
如何閱讀 (衛星雲圖) 來預測未來天氣演變。

Satellite images are photographed by meteorological satellites.  
衛星雲圖是由 (氣象衛星) 拍攝而成的圖片。

### Surface weather chart

The meaning of the symbols and information on surface weather charts.  
(地面天氣圖) 上的符號意義及帶給我們的資訊。

## Typhoon

### Typhoon is coming

The impact of typhoon to life.  
(颱風) 對生活的影響。

To decrease disasters caused by typhoon, we should know how to prevent typhoons. 要減少颱風所帶來的災害，就要知道(防颱)的方法。

### Typhoon

Factors affecting the formation and path of a typhoon.  
颱風的 (形成原因) 及 (路徑)。

Read typhoon-related information.  
閱讀颱風相關資料。



# Unit 1

# Weather Changes







# Unit 1 Weather Changes

## 天氣的變化

日期

應會認讀/聽懂的字彙

- |                                       |   |
|---------------------------------------|---|
| 1. 大氣 atmosphere                      | 1. 溫度計 thermometer       |
| 2. 凝結 condensation                    | 2. 線香 incense            |
| 3. 蒸發 evaporation 蒸散 transpiration    | 3. 錐形瓶 Erlenmeyer flask  |
| 4. 凝固 freezing 融化 melt                | 4. 燒杯 beaker             |
| 5. 水蒸氣 water vapor (小水滴 droplet)      | 5. 冰晶 ice crystal   |
| 6. 雲 cloud                            | 6. 大氣層 atmospheric layer  |
| 7. 霧 fog                              | 7. 中央氣象局 Central Weather Bureau   |
| 8. 霜 frost                            | 8. 等壓線 isobaric line  |
| 9. 雪 snow                             | 9. 地面天氣圖 surface weather chart  |
| 10. 雨 rain 降水 precipitation           | 10. 衛星雲圖 satellite images   |
| 11. 露 dew                             | 11. 熱帶性低氣壓 tropical depression  |
| 12. 固態 solid/液態 liquid/氣態 gas         | 12. 颱風 typhoon<br>(severe強/moderate中/weak輕)   |
| 13. 水循環 water cycle                   | 13. 颶風 hurricane  |
| 14. 氣象預報 weather forecast             | 14. 災害 disaster   |
| 15. 氣溫 temperature                    | 15. 颱風眼 typhoon eye   |
| 16. 濕度 humidity                       | 16. 淹水 flooding   |
| 17. 氣壓 atmospheric pressure           | 17. 坍方/土石流 landslide  |
| 18. 高/低氣壓<br>high/low pressure system | 18. 停電 outage/停水 out of water   |
| 19. 氣團 air mass                       | 19. 路徑 path   |
| 20. 暖/冷空氣 warm/cold air mass          | 20. 防颱準備<br>typhoon precautionary measures  |
| 21. 鋒面 front                          | 21. 颱風來臨的徵兆 signs of a typhoon  |
| 22. 冷/暖鋒 cold/warm front              | 22. 颱風警報發布 typhoon warning issued   |
| 23. 滯留鋒 stationary front              |   |

應聽懂/說出的科學概念:

- The weather in a low pressure area is cloudy.  
The weather in a high pressure area is sunny.
- The weather condition(狀況) in a stationary front is rainy.
- The typhoon is developed(發展) by tropical depression.
- Weather forecast for today is \_\_\_\_\_.
- We should prepare \_\_\_\_\_ before a typhoon comes.  
(手電筒flashlight, 膠帶tapes, 食物food, 民生用品daily commodities/necessities...)

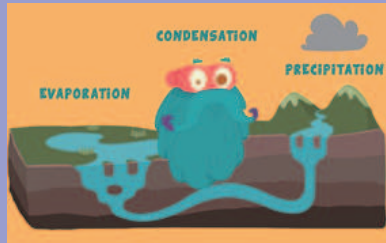
完成日期



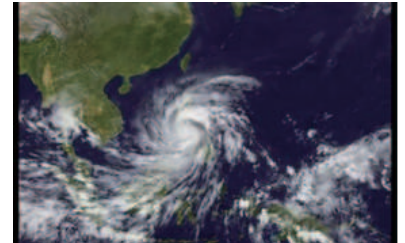
# For Further Watching

## Unit 1

1-1  
The Water Cycle.3



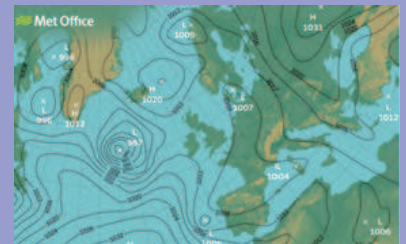
1-2  
Super Typhoon Haiyan Satellite Image Time Lapse  
12th November 2013



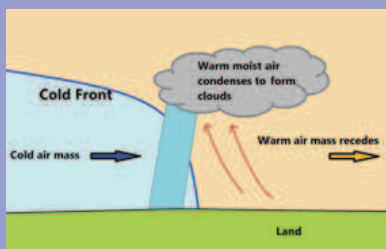
1-2  
Check Out the Satellites!



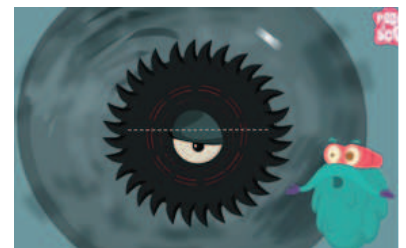
1-2  
How to Read a Synoptic Weather Chart



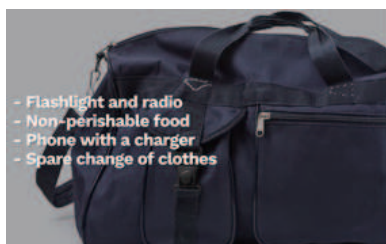
1-2  
How to Read Weather Maps



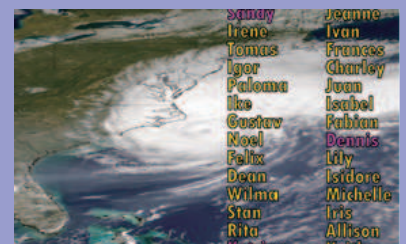
1-3  
Hurricane



1-3  
Typhoon Tips:  
What to Do Before,  
During and After



1-3  
How to Name a Typhoon



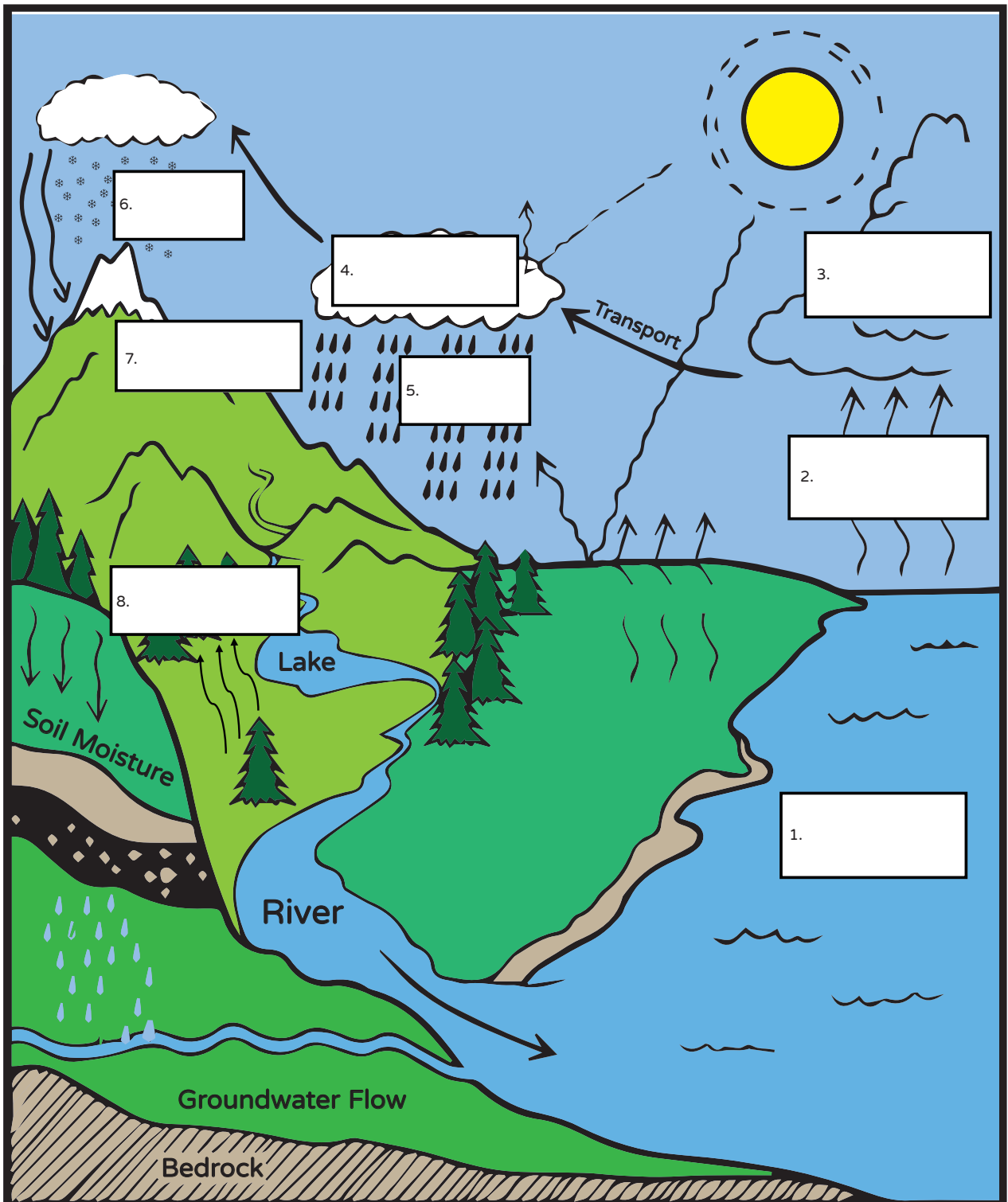
# 水循環 Water Cycle

■請在下圖中填入以下名詞(Add the words to the water cycle picture)  
可用中或英文：(每格2分)

- ★雲 cloud
- ★雨 rain
- ★海洋 ocean

- ★蒸發 evaporation
- ★蒸散 transpiration
- ★雪 snow

- ★凝結 condensation
- ★降水 precipitation



# What information can you get from this weather map?

- ★低氣壓中心 low pressure center    ★等壓線 isobaric line    ★暖鋒 warm front
- ★高氣壓中心 high pressure center    ★冷鋒 cold front    ★滯留鋒 stationary front
- ★陰雨連綿的天氣 drizzle    ★天氣晴朗 sunny
- ★氣溫增高，雨期長、雨勢較小，連綿性降雨。 Temperature rises, long rainy period, light rain, and continuous rainfall.
- ★氣溫顯著下降，雲量增多、下大雨、雷雨，風速變大。 Temperature drops, more cloud cover, heavy rain, thunderstorm, and wind speed increases.
- ★天氣會變壞、下雨。 The weather gets worse and it will rain.

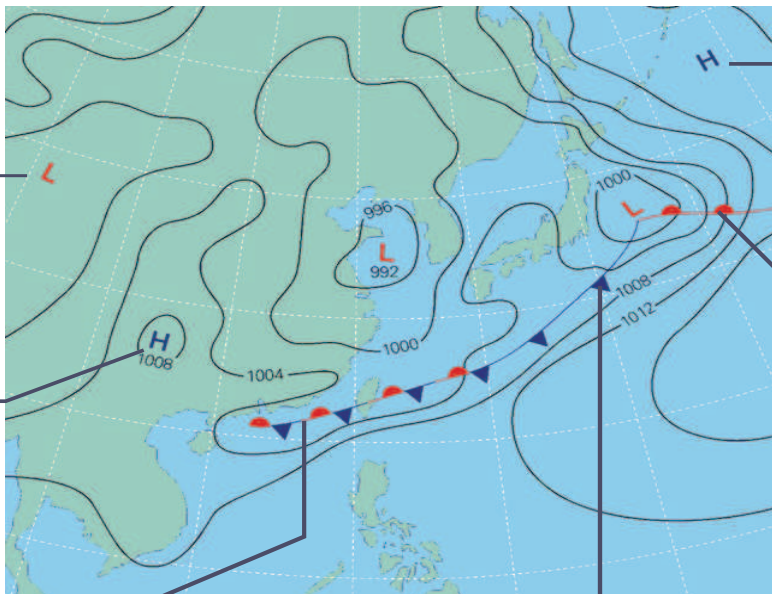
(每格2分)

This is (名稱) :

Possible weather conditions (可能的天氣狀況) :

This is (名稱) :

Possible weather conditions (可能的天氣狀況) :



This is (名稱) :

Possible weather conditions (可能的天氣狀況):

This is (名稱) :

Possible weather conditions (可能的天氣狀況) :

This is (名稱) :

Possible weather conditions (可能的天氣狀況) :

This is (名稱) :

Possible weather conditions (可能的天氣狀況) :



# 颱風 Typhoon

What can we learn from the typhoon path map? Please check the map and answer the following questions in English:

Tropical Depression ⊗ 熱帶性低氣壓

Moderate Typhoon ⚡ 中度颱風

Severe Typhoon ⚡ 強烈颱風

Weak Typhoon ⚡ 輕度颱風

(1) What was the category of the typhoon on July 28th? \_\_\_\_\_

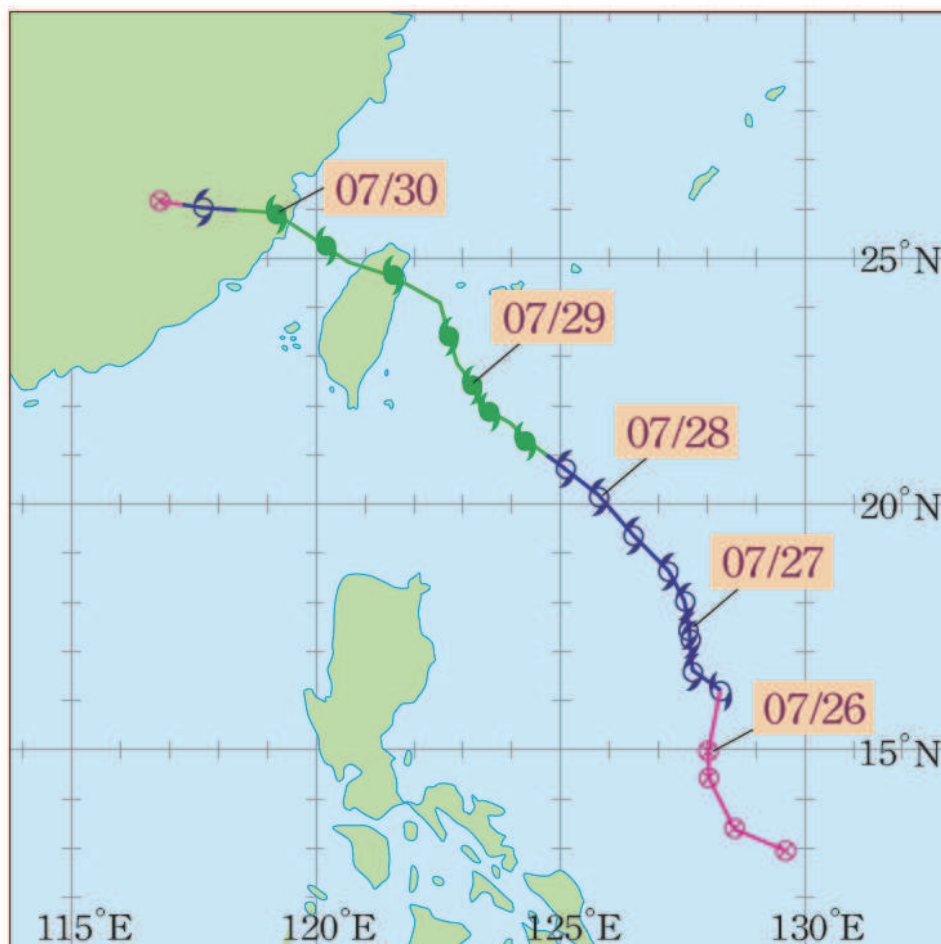
7月28日颱風的強度是

(2) When the typhoon made its landfall, what was the category of the typhoon? \_\_\_\_\_

登陸臺灣的颱風強度是

(3) When the typhoon made its landfall and weakened, it became a \_\_\_\_\_ once again.

颱風遇到陸地後，強度減弱，最後又會變回



# SCIENCE READING

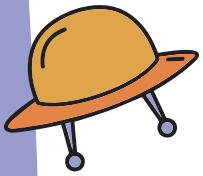
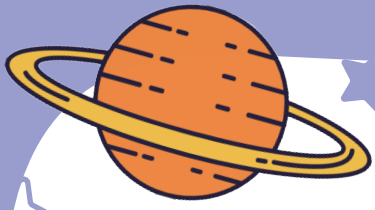
## Unit 1



<https://i.pinimg.com/originals/6c/46/fb/6c46fb162cf86ae6f55e1f168472cf09.gif>

- ( ) 1 : How does snow turn into water?  
A) freezing B) evaporation  
C) melting D) condensation
- ( ) 2 : Snow is a form of \_\_\_\_\_.  
A) transpiration B) humidity  
C) precipitation D) evaporation

# NOTES



# Heat and Our Lives

## Changes in heated materials

- Physical properties
- Volume

- Hardness
- Color
- Smell

## Thermal expansion and contraction

- Liquid
- Gas
- Solid

## Heat transfer

- Conduction
- Convection
- Radiation

Heat is transferred from higher temperature to lower temperature through materials. 藉著物質將熱由(高溫)處傳向(低溫)處。

Liquid and gas transfer heat through convection. 利用對流來傳播熱的形態有(液體)、(氣體)。

Heat is transferred from higher temperature to lower temperature without materials. 不用倚靠(物質)就可以傳播熱，但還是由高溫傳向低溫。

The heated part of air and water will start to move upward and the colder part will move downward, causing a cycle. 空氣和水等會流動的物質，會由(受熱)的部分開始向上運動，同時引起較(冷)的部分(向下)運動，造成循環。

## Buildings in hot places

- Ventilation
- Transparent
- Keep the sun out and use insulation

Convection, radiation (dissipation) 對流、散熱。

Radiation is inevitable because heat enters as long as light enters. 無法阻擋(輻射熱)，因為(光)進入屋內，(熱)就進入屋內。

Different designs for sunshade 各種(遮陽)設計



# Unit 2

# Heat

# Unit 2 Heat

## 熱對物質的影響

日期

### 應會認讀 / 聽懂的字彙

- |                                    |                        |
|------------------------------------|------------------------|
| 1. 熱脹 thermal expansion            | 1. 冷氣 air conditioner  |
| 2. 冷縮 contraction                  | 2. 太陽能板 solar panel    |
| 3. 熱傳導 conduction                  | 3. 百葉窗 shutter         |
| 4. 熱對流 convection                  | 4. 熱氣球 hot air balloon |
| 5. 熱輻射 radiation                   | 5. 巧克力 chocolate       |
| 6. 熱傳遞 heat transfer               | 6. 雞蛋 egg              |
| 7. 可逆的改變 reversible change         | 7. 酒精燈 alcohol lamp    |
| 不可逆的改變 irreversible change         | 8. 保溫袋 isothermic bag  |
| 8. 節能減碳                            | 9. 羽絨外套 down jacket    |
| energy saving and carbon reduction | 10. 保溫杯 thermos bottle |
| 9. 雨水回收 rainwater recycling        | 11. 鐵軌縫隙 railroad gap  |
| 10. 綠色建築 green buildings           | 12. 電塔 electric tower  |
|                                    | 13. 橋樑 bridge          |

### 應聽懂 / 說出的句型:

- Heat is transferred through conduction, convection and radiation.
- Conduction happens when heat moves from a hot thing to a cold one through direct touch.  
Convection happens when heat moves from a hot thing to a cold one through a moving liquid or gas.  
Radiation happens when heat moves from a hot thing to a cold one without touching each other.
- Cooking eggs is an irreversible change.  
Melting chocolate is a reversible change.
- The air conditioner works by the application (應用) of convection and conduction.

本頁  
完成日期

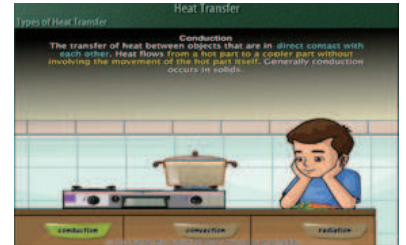
# For Further Watching

## Unit 2

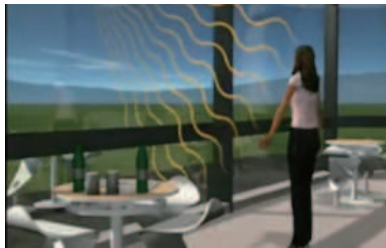
2-1  
Thermal Expansion -  
Why are Gaps Left  
Between Railway  
Tracks?



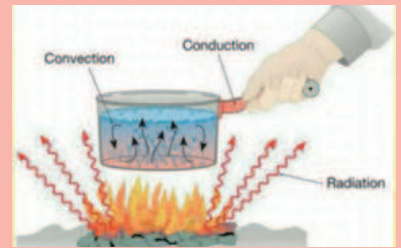
2-2  
Types of Heat  
Transfer



2-2  
Animation - Third  
Heat Flow : Radiation  
(Commerical)



2-2  
Heat Transfer:  
Conduction,  
Convection,  
and Radiation



2-2  
Conduction,  
Convection,  
and Radiation  
[SONG!]



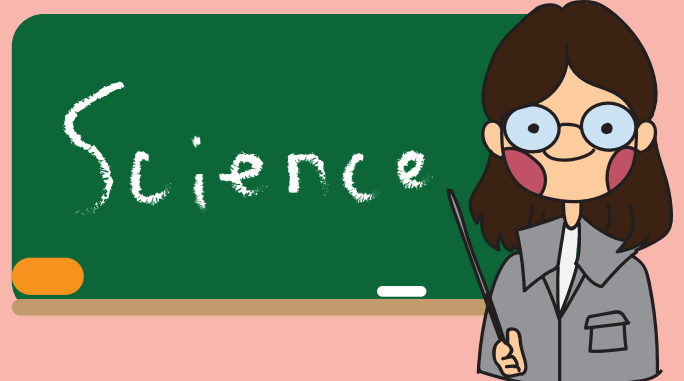
2-3  
10 Ways to Save  
Electricity at Home



10 Ways to Save  
Electricity at Home



2-3  
Saving Energy  
Around The Home  
- Energy Efficiency  
Tips



# When a material is heated 物質受熱後

Heating an egg is

[ ] a reversible change

[ ] an irreversible change

because the color, shape, and hardness of the egg cannot be changed back again.

Other examples are heating \_\_\_\_\_ and \_\_\_\_\_.



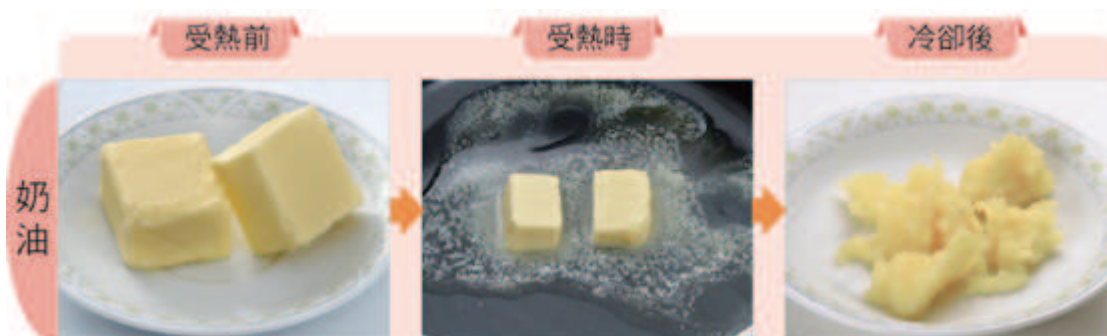
Heating butter is

[ ] a reversible change

[ ] an irreversible change

because the heated butter can be turned back into solid butter.

Other examples are heating \_\_\_\_\_ and \_\_\_\_\_.





# HEAT TRANSFER

conduction

傳 導

convection

對 流

radiation

輻 射

Choose the BEST heat transfer option for each picture below.

請依圖片及文字敘述選擇最適合的熱傳播的方式，並將答案填入 \_\_\_\_\_ 中。

1. An oven mitt gets warmer while transporting a hot pan.

拿熱的烤盤時，烤箱手套會變熱



2. The sun causes water in a pond to evaporate.

太陽使池塘中的水蒸發



3. Hot air inflates a hot air balloon

熱空氣使熱氣球膨脹



4. A spoon gets warmer after sitting in a bowl of soup

放在熱湯中的金屬湯匙會變熱



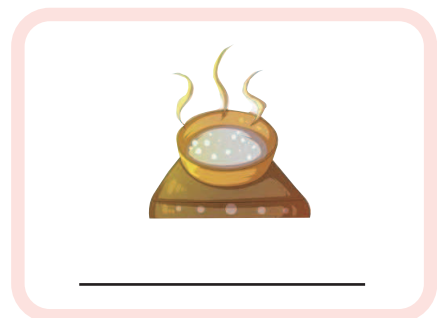
5. A bowl of oatmeal cools

熱的燕麥片放在大碗中使它變涼



6. A pot on an induction cooker

放在電磁爐上的鐵鍋



# Heat Insulation and Heat Dissipation

Insulation helps heat to stay. Dissipation helps heat to spread.

Write down whether the picture shows heat insulation or heat dissipation.

減緩熱的傳播速度可以保溫，加快熱的傳播速度就可以達到散熱的效果。

以下生活中的例子是為了保溫還是散熱？



Putting a lid on a cup is an example of \_\_\_\_\_.  
茶杯加上蓋子是為了...



Using an ice pack for therapy is an example of \_\_\_\_\_.  
利用冰袋冰敷是為了...



Turning on the fan is an example of \_\_\_\_\_.  
吹電扇是為了 ...



Tucking ourselves in a quilt is an example of \_\_\_\_\_.  
蓋上厚棉被是為了...



Blowing on the soup before eating is an example of \_\_\_\_\_.  
喝熱湯之前先吹氣是為了...

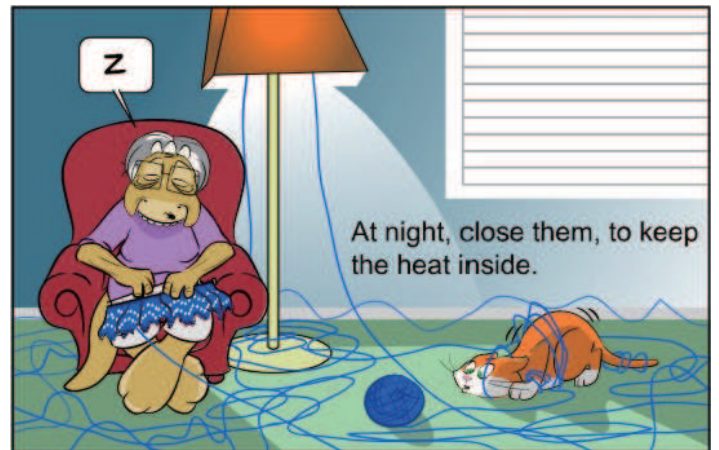
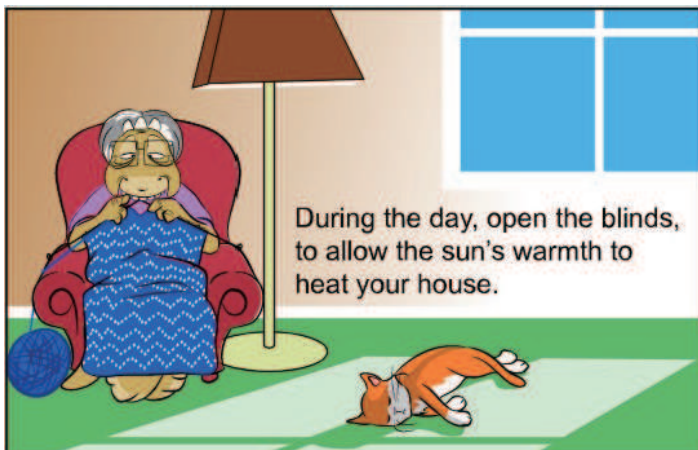


Putting ice cream in a Styrofoam box is an example of \_\_\_\_\_.  
用保麗龍盒裝冰淇淋是為了...

# SCIENCE READING

## Unit 2

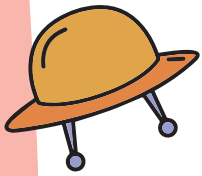
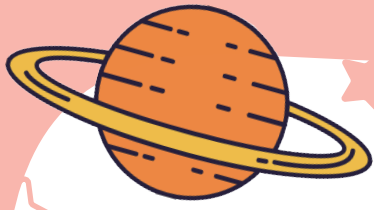
Let the sun help you out :



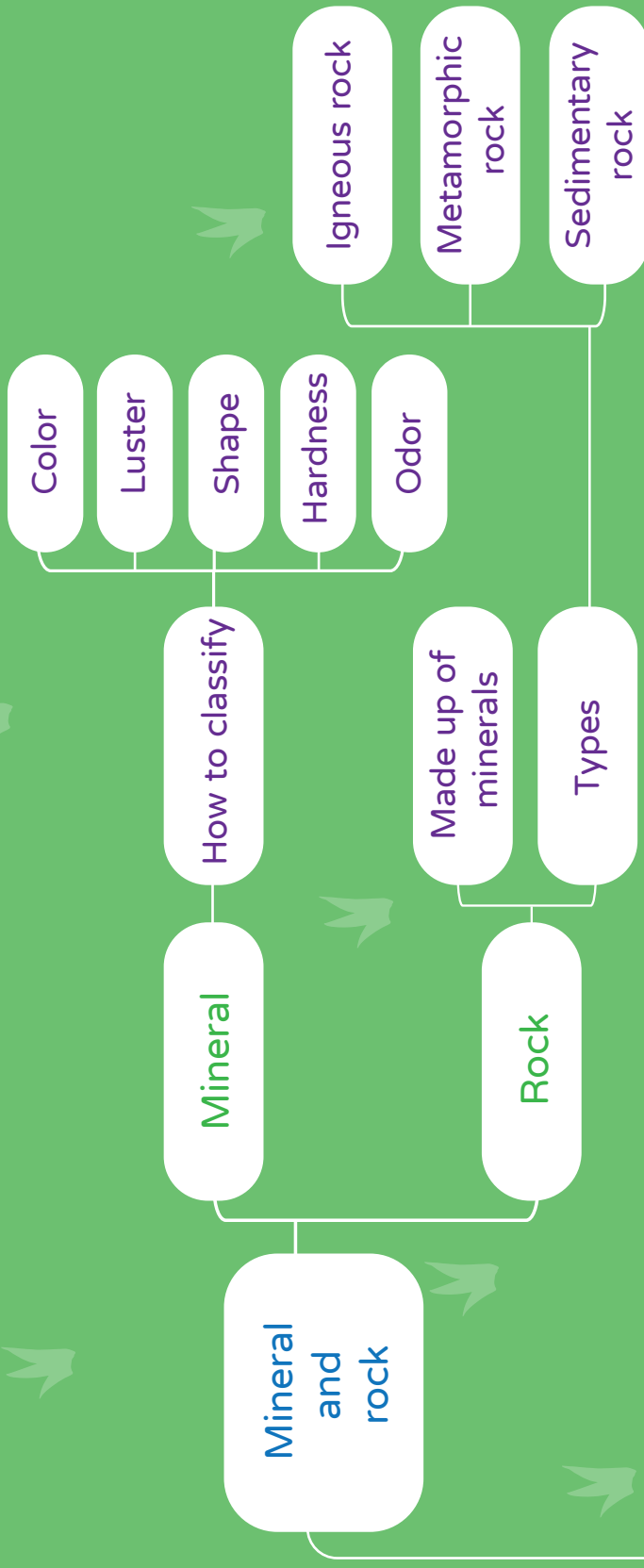
<https://greenplanet4kids.com/comic/save-heating-cooling/blinds-save-energy>

- ( ) 1 : Sunlight warms the house through \_\_\_\_\_ .  
A) conduction    B) convection  
C) radiation      D) solar panel
- ( ) 2 : Closing the blinds keep heat inside the house through \_\_\_\_\_.  
A) conduction  
B) dissipation  
C) insulation  
D) radiation

# NOTE







# Land Changes

## Changes in Earth's surface



The strength of each process depends on location. 每個過程的強度取決於河流位置。

- Upstream, weathering and erosion are stronger than deposition. 上游，搬運和侵蝕比堆積強。
- Midstream, weathering and erosion are weaker while deposition is stronger (when compared to upstream). 中游，搬運和侵蝕較弱，而堆積則較強（與上游相比）。
- Downstream, weathering and erosion are weaker than deposition. 下游，搬運和侵蝕比堆積要弱。

## Earthquake

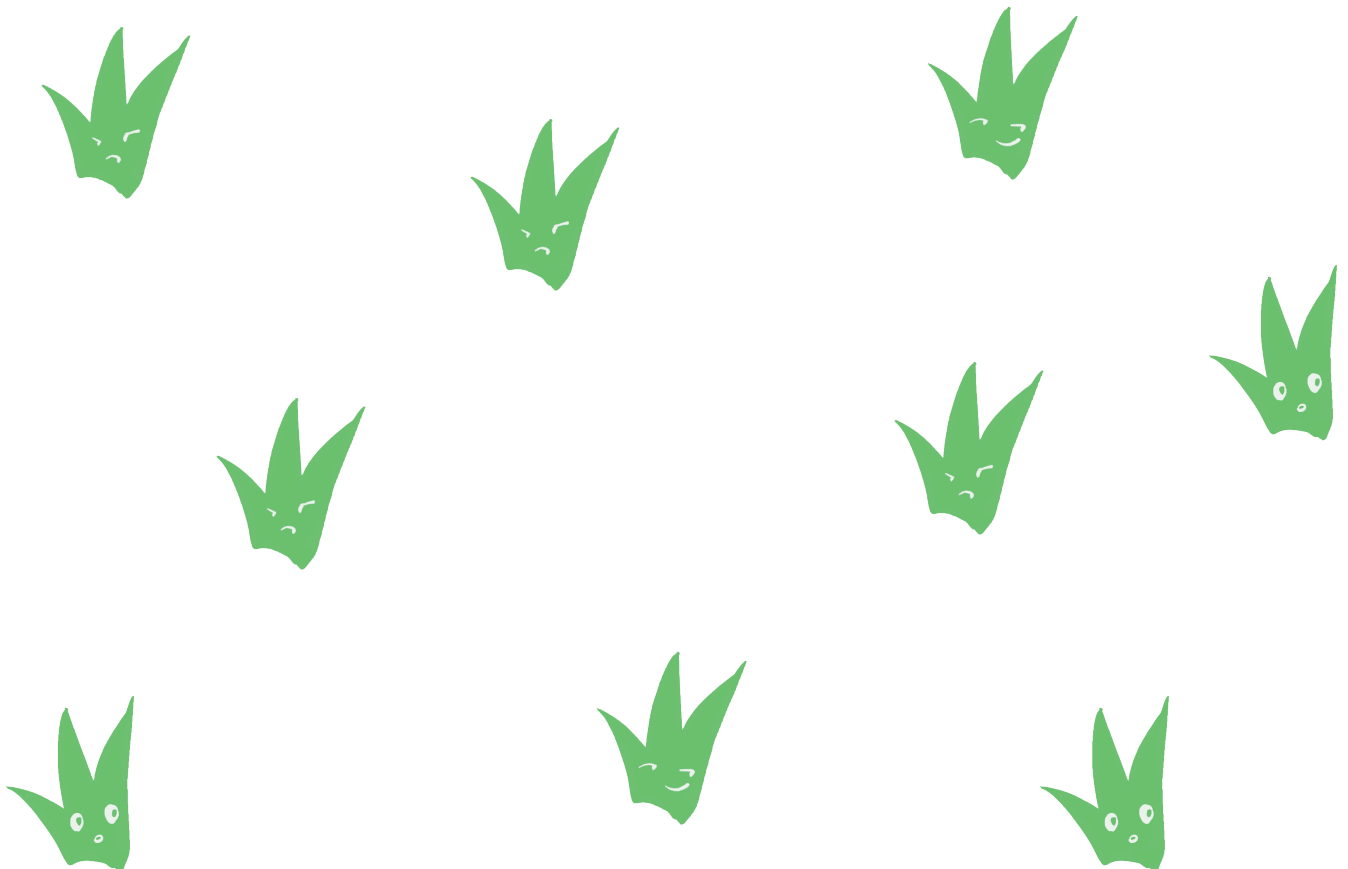
### Damages/ disasters

Learn how to protect yourself and be safe against earthquakes. 學習了解如何保護自己及如何安全防震。



# Unit 3

## Land Changes



# Unit 3 Land Changes

## 地質的變化

### 應聽懂及認讀的生字

- |  |       |
|--|-------|
| 1. <input type="checkbox"/> even**             | 平陡    |
| 2. <input type="checkbox"/> steep**            | 陡峭的   |
| 3. <input type="checkbox"/> landslide**        | 土石流   |
| 4. <input type="checkbox"/> canyon**/valley**  | 峽谷/山谷 |
| 5. <input type="checkbox"/> weathering         | 搬運/風化 |
| 6. <input type="checkbox"/> erosion**          | 侵蝕    |
| 7. <input type="checkbox"/> deposition         | 堆積    |
| 8. <input type="checkbox"/> collapse**         | 倒塌    |
| 9. <input type="checkbox"/> rock**             | 岩石    |
| 10. <input type="checkbox"/> mineral           | 礦物    |
| 11. <input type="checkbox"/> hardness          | 硬度    |
| 12. <input type="checkbox"/> crystallization** | 結晶    |
| 13. <input type="checkbox"/> turbulent         | 湍急的   |

- |  |          |
|--|----------|
| 14. <input type="checkbox"/> sedimentary rock    | 沉積岩      |
| 15. <input type="checkbox"/> igneous rock        | 火成岩      |
| 16. <input type="checkbox"/> metamorphic rock    | 變質岩      |
| 17. <input type="checkbox"/> marine cave         | 海蝕洞      |
| 18. <input type="checkbox"/> chessboard rock**   | 豆腐岩      |
| 19. <input type="checkbox"/> sea cliff           | 海蝕崖      |
| 20. <input type="checkbox"/> wave-cut platform** | 海蝕(平臺)** |
| 21. <input type="checkbox"/> Mohs hardness scale | 莫氏硬度表    |

### Minerals 礦物:

- |   |             |
|---|-------------|
| 1. <input type="checkbox"/> talc                      | 滑石          |
| 2. <input type="checkbox"/> gypsum                    | 石膏          |
| 3. <input type="checkbox"/> quartz                    | 石英          |
| 4. <input type="checkbox"/> feldspar                  | 長石          |
| 5. <input type="checkbox"/> black mica/<br>white mica | 黑雲母/<br>白雲母 |
| 6. <input type="checkbox"/> calcite                   | 方解石         |
| 7. <input type="checkbox"/> diamond**                 | 鑽石          |
| 8. <input type="checkbox"/> sulfur                    | 硫磺          |
| 9. <input type="checkbox"/> copper                    | 銅礦          |
| 10. <input type="checkbox"/> iron ore**               | 鐵礦          |
| 11. <input type="checkbox"/> graphite                 | 石墨          |

### Rocks 岩石:

- |  |     |
|--|-----|
| 12. <input type="checkbox"/> limestone | 石灰岩 |
| 13. <input type="checkbox"/> granite   | 花崗岩 |
| 14. <input type="checkbox"/> sandstone | 砂岩  |
| 15. <input type="checkbox"/> shale     | 頁岩  |
| 16. <input type="checkbox"/> basalt    | 玄武岩 |
| 17. <input type="checkbox"/> marble**  | 大理石 |
| 18. <input type="checkbox"/> slate     | 板岩  |
| 19. <input type="checkbox"/> andesite  | 安山岩 |
| 20. <input type="checkbox"/> gneiss    | 片麻岩 |

### Applications 應用:

- ① talc 滑石 → talcum powder 爽身粉
- ② sulfur 硫磺 → gunpowder 火藥
- ③ graphite 石墨 → pencil lead 筆心
- ④ limestone 石灰岩 → cement 水泥
- ⑤ granite 花崗岩 → wall/floor 牆壁/地板

1. Rocks are made up of one or more minerals.
2. A harder mineral can scratch (刮) a softer one.
3. We can use nails, coins or iron ruler to scratch minerals.  
Their hardness can also be compared.
4. When there is an earthquake, drop, cover and hold.  
Wait until the earthquake stops.

完成日期



# For Further Watching

## Unit 3

3-1  
Be a Rock Detective!  
<https://www.youtube.com/watch?v=tNs1gqkYerg>



3-1  
Types of Rocks  
<https://www.youtube.com/watch?v=CeuYx-AbZdo>



3-1  
3 Types of Rocks  
<https://www.youtube.com/watch?v=17l2LrjZi9o>



3-2  
Erosion and Sedimentation:  
How Rivers Shape the Landscape  
<https://www.youtube.com/watch?v=EMwGPPJ1Umk>



3-2  
Why Do Rivers Curve?  
<https://www.youtube.com/watch?v=8a3r-cG8Wic>



3-2  
Why Do Rivers Have Deltas?  
<https://www.youtube.com/watch?v=A47ythEcz74>



3-3  
What Causes Earthquakes?  
[https://www.youtube.com/watch?v=AArne-wh\\_Uc](https://www.youtube.com/watch?v=AArne-wh_Uc)



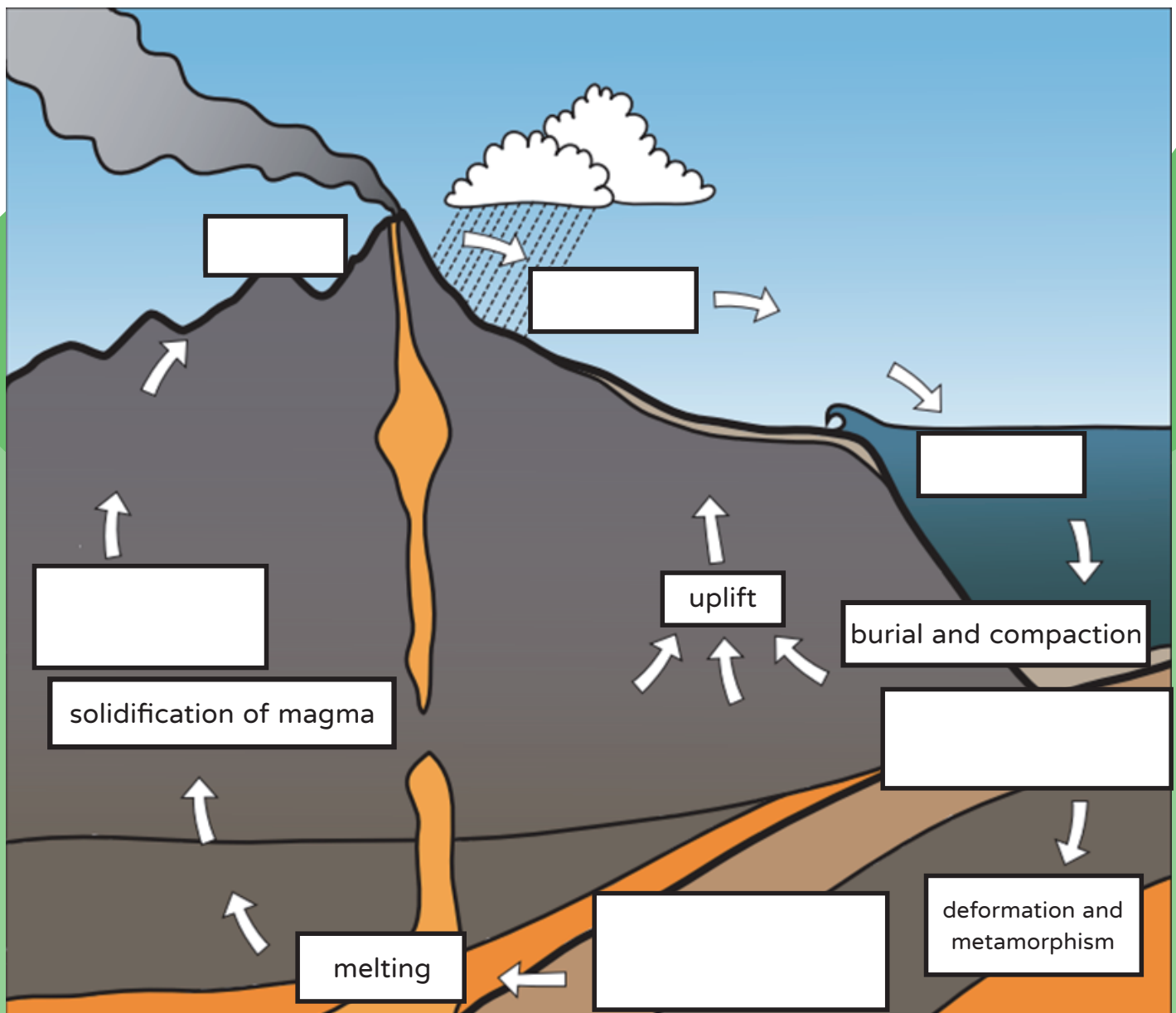
3-3  
What is an Earthquake?  
<https://www.youtube.com/watch?v=dJplU1rSOFY>



# Rock Cycle 搖滾週期

Add the words to the rock cycle picture (填入單詞到石頭轉動的格子中).

- ★ deposition (堆積)
- ★ erosion (侵蝕)
- ★ weathering (搬運/風化)
- ★ igneous rock (火成岩)
- ★ metamorphic rock (變質岩)
- ★ sedimentary rock (沉積岩)



<https://www.education.com/worksheet/article/rock-cycle-quiz/>

# Is this a mineral or a rock?

Calcite (方解石)

Granite (花崗岩)

Limestone (石灰岩)

Quartz (石英)

Sandstone (砂岩)

Talc (滑石)

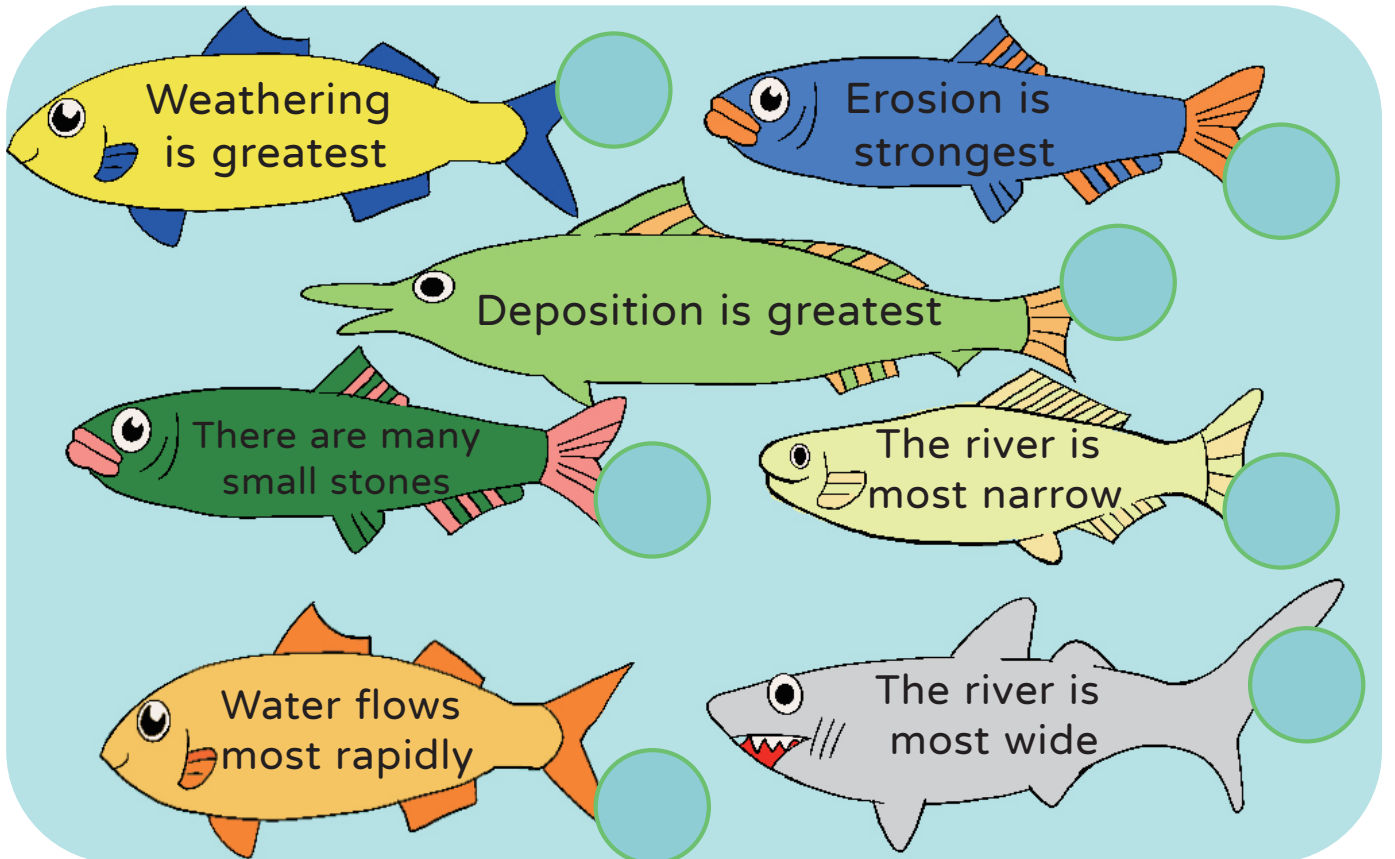
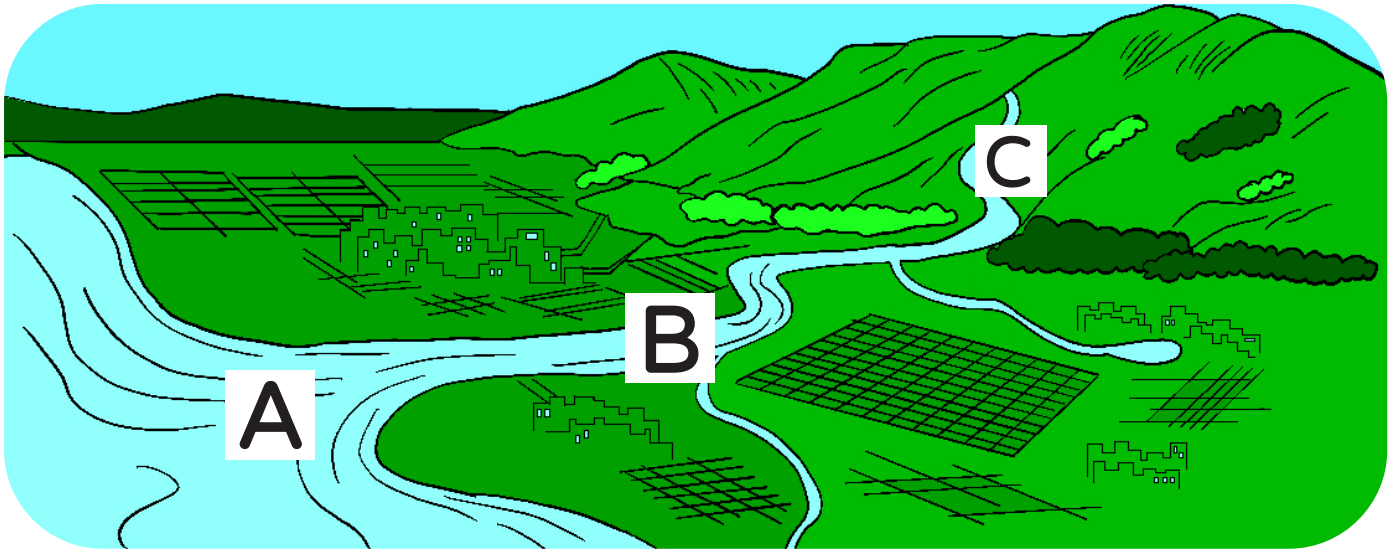
A harder mineral can scratch a softer one.

For example, \_\_\_\_\_  
can scratch \_\_\_\_\_.

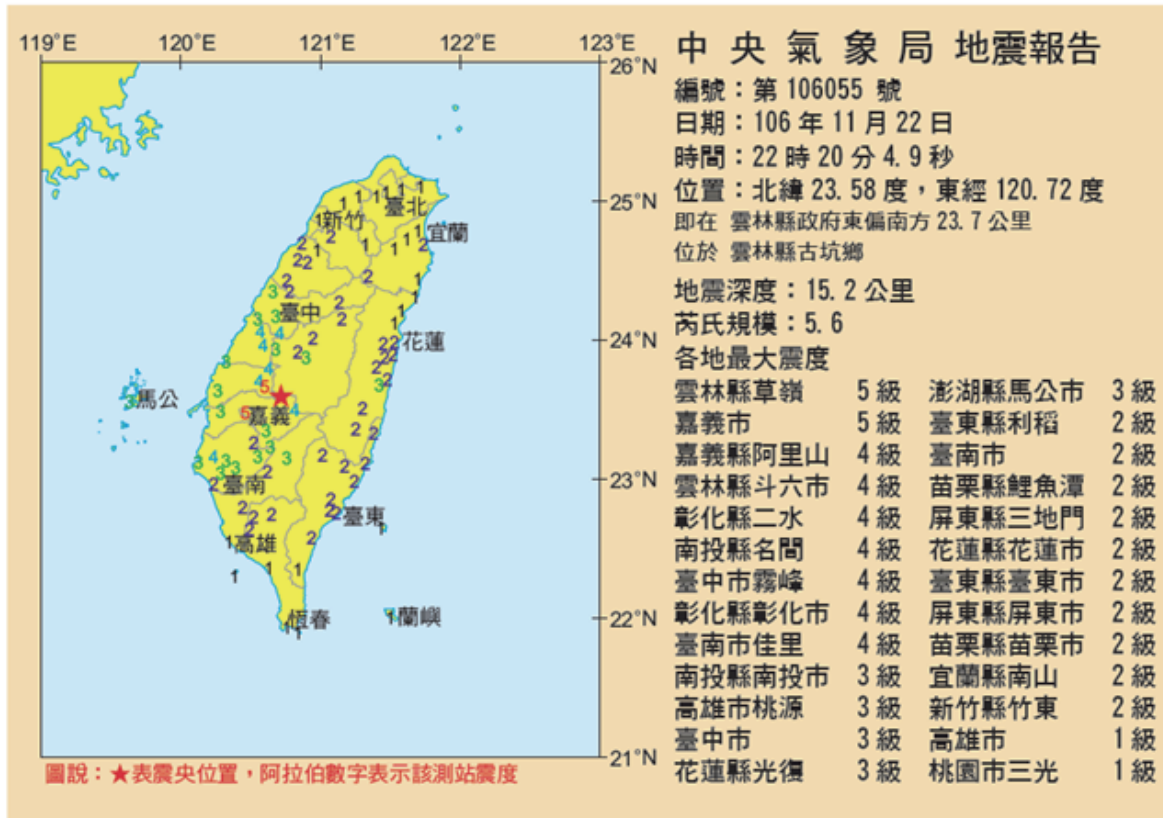
# Exploring the River

Based on the description, determine in which part of the river each fish lives.

Write A, B or C inside the  .



# An earthquake is coming!



Based on the report, where is the epicenter (震央) of the earthquake? \_\_\_\_\_

What should you do during an earthquake (地震時的防範)?  
 Circle the answer.

## 地震災害防範措施

- ㄅ、保持冷靜盡速躲在堅固家具、桌子下，並用書包保護頭部。
- ㄆ、家中應準備救急箱及滅火器，並告知家人所儲放的地方，了解使用方法。
- ㄇ、察看周圍的人是否受傷，如有必要予以急救或通知救護人員。
- ㄎ、切勿靠近窗戶，以防玻璃震破。

# Science Watching

## Unit 3

Be a Rock Detective! (<https://youtu.be/tNs1gqkYerg?t=160> 2:42 – 3:55)

Watch the video and listen carefully to the narrator to help you fill in the blanks using the words below.

colors      textures      igneous rock  
metamorphic rock      sedimentary rock

Here's our first mystery rock. What kind do you think it is? You see those bendy stripes? This rock looks like it's been stretched and squeezed. It must have gone through quite a change, and in fact intense heat and pressure gave this rock its squiggly bands. Because it went through a big change inside the earth, it must be a \_\_\_\_\_.

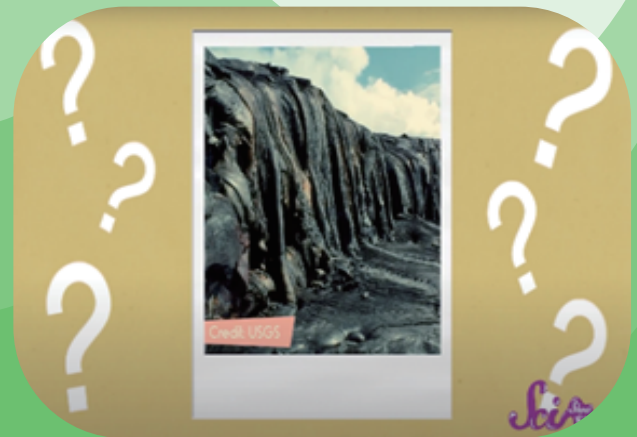


Now what about this one,  
Rock Detectives?

Check out those layers—kind of like a big cake. Those are layers of sediment that were put down by rivers and oceans over millions of years. Since you can see it's made up of smooshed up layers of sediment, can you guess what it is? It must be a \_\_\_\_\_.

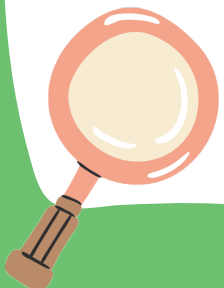
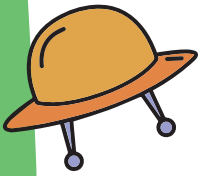
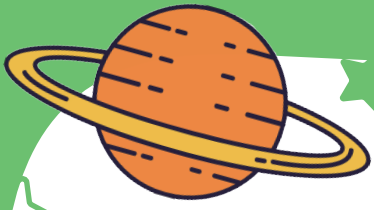


This stuff hardly looks like rock at all. Those big goopy loops of black rock look like they're practically melting. And at one time, they were. They were made when lava from a volcano spilled into the ocean and solidified into rock. And since this rock came from lava or magma, you know it's \_\_\_\_\_.



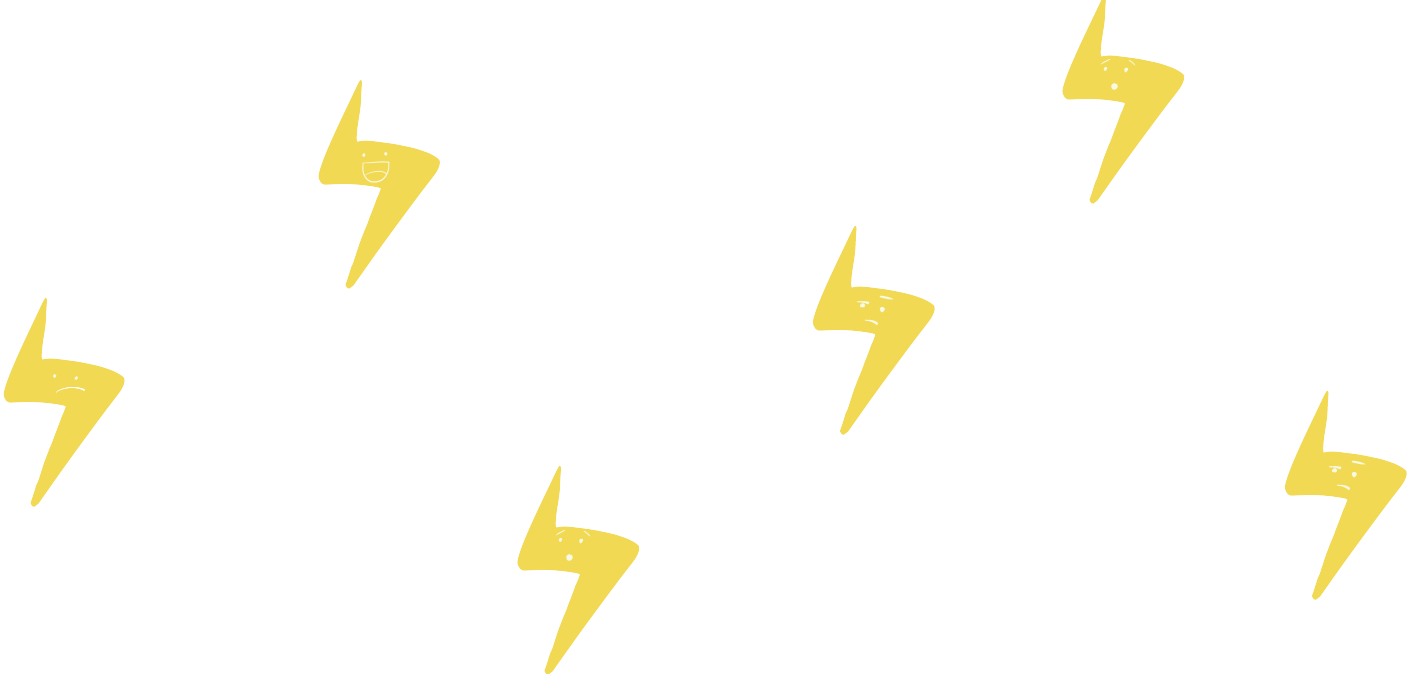
So now you know there's more to rocks than meets the eye. They all have different \_\_\_\_\_ and \_\_\_\_\_. Each one has a story to tell—a story of how it formed.

# NOTES










Unit 4  
Electricity  
and Magnetism



# Unit 4 Electricity and Magnetism

## 電磁作用

### 應聽懂及認讀的生字

1. <input type="checkbox"/> compass**	指北針	11. <input type="checkbox"/> magnetic**	磁力的
2. <input type="checkbox"/> magnet**	磁鐵	12. <input type="checkbox"/> magnetism	磁性
3. <input type="checkbox"/> electromagnet	電磁鐵	13. <input type="checkbox"/> enameled wire	漆包線
4. <input type="checkbox"/> electromagnetic	電磁的	14. <input type="checkbox"/> sandpaper**	砂紙
5. <input type="checkbox"/> current**	電流	15. <input type="checkbox"/> wooden stick**	木棒
6. <input type="checkbox"/> magnetic field**	磁場		
7. <input type="checkbox"/> maglev train	磁浮列車	16. <input type="checkbox"/> telephone**	電話
8. <input type="checkbox"/> magnetic crane**	電磁起重機	17. <input type="checkbox"/> remote control**	遙控器
9. <input type="checkbox"/> geomagnetism	地磁	18. <input type="checkbox"/> electric motor	小馬達
10. <input type="checkbox"/> battery**	電池	19. <input type="checkbox"/> flashlight**	手電筒
(in series)	(串聯)	20. <input type="checkbox"/> dryer**	吹風機
(in parallel)	(並聯)		
		21. <input type="checkbox"/> electric bell**	電鈴
		22. <input type="checkbox"/> electrical wire	電線
		23. <input type="checkbox"/> induction coil	線圈
		24. <input type="checkbox"/> paper clip**	迴紋針
		25. <input type="checkbox"/> iron rod	小鐵棒

#### 1. 同極相斥;異極相吸

Like poles of magnets repel each other, while unlike poles attract each other.

#### 2. 線圈越多，電磁鐵磁性越強。

The greater the number of coils, the stronger the magnet.

#### 3. 電池數量越多，電磁鐵磁性越強。

The greater the number of batteries, the stronger the magnet.

\*\*學測指考7000單字

完成日期



# For Further Watching

## Unit 4

4-1  
Earth's Magnetic Field  
– Earth Itself is a Huge  
Magnet – Magnetosphere  
<https://www.youtube.com/watch?v=Gea4cEA5Ris>



4-1  
Magnets How Do They  
Work by Minutephysics  
<https://www.youtube.com/watch?v=q3uchK1dZlo>



4-1  
Earth and Compasses  
| Magnetism | Physics  
| FuseSchool  
<https://www.youtube.com/watch?v=OsQNHFIF8w4>



4-2  
How Electricity Works  
– Working Principle  
<https://www.youtube.com/watch?v=mc979OhitAg>



4-2  
Awesome Idea! How to  
Twist Electric Wire  
Together/ Properly Joint  
Electrical Wire | Part 1  
<https://www.youtube.com/watch?v=N8F6KcfB9Go>



4-2  
18 Electric Inventions  
to Make Your Home Smart  
<https://www.youtube.com/watch?v=UMi002pO2Z0>



4-2  
Introduction to Electricity  
– Video for Kids  
<https://www.youtube.com/watch?v=Uf76pThNXZc>



4-3  
Build Your Electric  
Magnet in 30 Seconds  
Tutorial  
<https://www.youtube.com/watch?v=aq1zGr8wE9U>



4-3  
How Do Maglev Trains  
Work?  
<https://www.youtube.com/watch?v=m-rNILcfTKM>



# Geomagnetism

Fill in the blanks using the words below.

attract

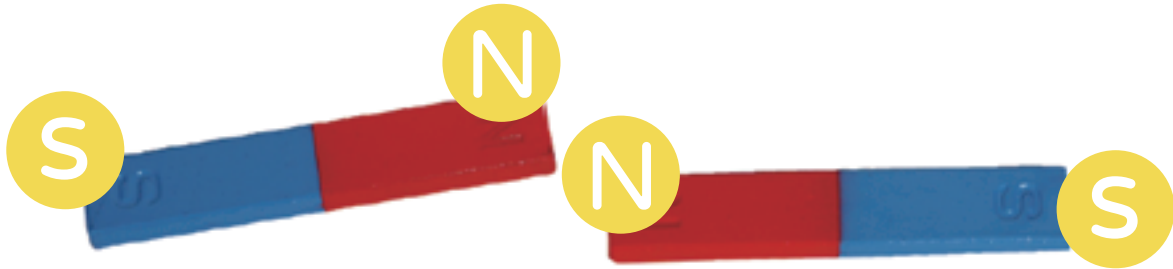
geomagnetism

north

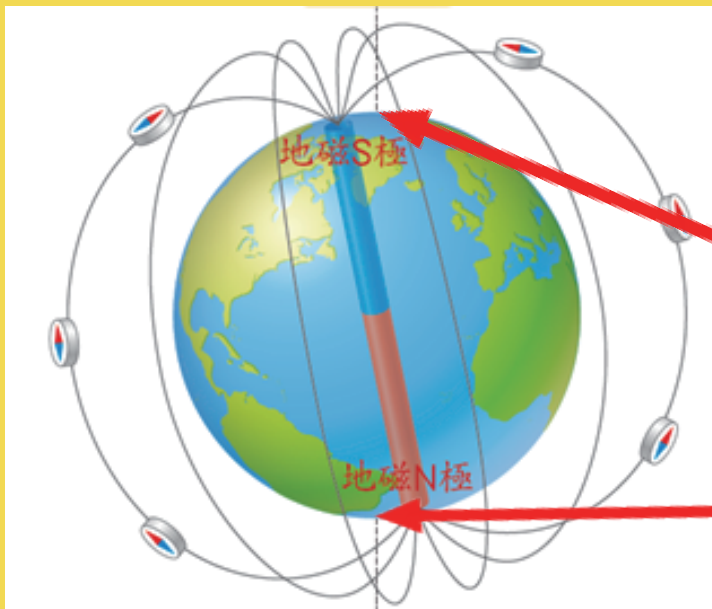
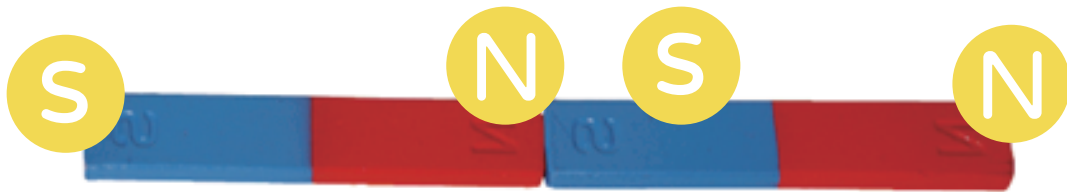
repel

south

Like poles of magnets \_\_\_\_\_ each other.



Unlike poles of magnets \_\_\_\_\_ each other.



Earth is like a big magnet. The study of its magnetic field is called \_\_\_\_\_.

This is the geographic \_\_\_\_\_ pole.

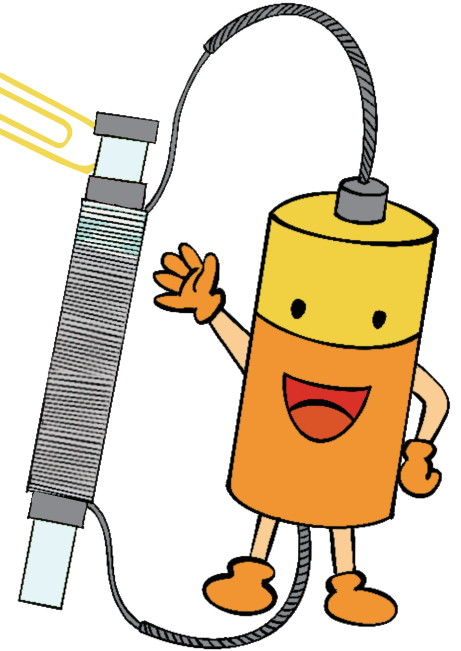
This is the geographic \_\_\_\_\_ pole.

# Electromagnet

Let's make an electromagnet!

1. What materials do we need to make an electromagnet?

Material	Purpose



2. Please draw how you will put together the materials to make an electromagnet.

3. How many paper clips can your electromagnet pick up?

4. How can make the electromagnet stronger? Write or draw your ideas.

# Magnet versus Electromagnet

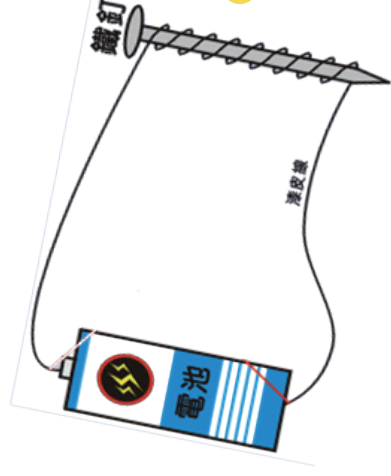
Match each description with the correct picture.

Always magnetic



Strength of magnetic field (磁場強度) **cannot be** changed

Not always magnetic



Strength of magnetic field (磁場強度) **can be** changed

Needs electric current (電流)

Poles **can be** reversed (相反)

**Does not need** electric current (電流)

Poles **cannot be** reversed (相反)

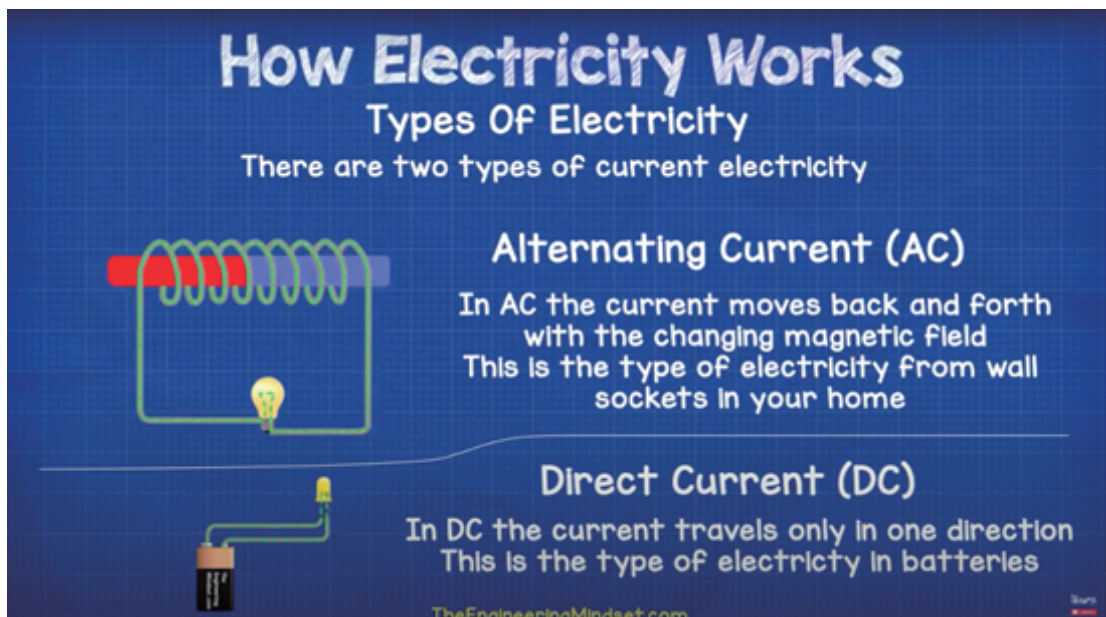
# Science Watching

## Unit 4

How Electricity Works (<https://youtu.be/mc979OhitAg?t=499> 8:20 – 9:42)

Watch the video and listen carefully to the narrator to help you fill in the blanks using the words below.

AC AC power alternating current batteries circuit  
DC DC power direct current solar panels



There are two types of current electricity. That being alternating current or \_\_\_\_\_, and then direct current or \_\_\_\_\_.

Alternating current simply means that the current flows backwards and forwards in a \_\_\_\_\_ as the terminals are constantly reversed. This is a bit like the tide of the sea.



It goes in and out, in and out, in and out. So there is reversing constantly. Now \_\_\_\_\_ is the most common source of power and the plug sockets in your homes, in your buildings, in schools, and work places, et cetera, these are all being providing alternating current, AC.

Now, on the other hand, we've got \_\_\_\_\_, or DC, and that simply means that the current flows directly in only one direction. It does not alternate. This is what's provided from \_\_\_\_\_ and almost all your handheld devices are from this as well.

So we can convert AC to DC and vice versa using power electronics. And this is how we charge and power small devices, and it's also how \_\_\_\_\_ can be used to power our homes because solar panels produce \_\_\_\_\_ and our homes need \_\_\_\_\_. So we have to convert this for it to be usable. So both AC and DC have pros and cons to it.

# NOTES

