



在「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」(國家發展委員會,2020);而如何提 升國民英語力以增加國際競爭力,是學校教育中努力的目標。

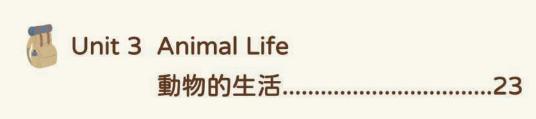
有感於雙語教育及近年來我國積極培養學童STEAM (Science, Technology, Engineering, Arts, and Mathematics)結合科學、技術、工程、藝術,以及數學跨學科素養的教育趨勢,本校自108學年度開始試辦自然課程雙語教學,以英語營造生活情境中的科學,透過趣味科學實驗增進學童以英語來進行科學探究的興趣與能力。

這本科學筆記本是本校自然課程雙語教學團隊~陳美卿、林雨慶、林怡伶、范瑋庭、陳宜君等教師所共同設計的;國立臺北教育大學雙語教學研究中心協助自然科學英語內容校對、編排及印製;期望學童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,厚植學童的科學力及英語力。















Unit 1 Stars 第一單元 星星的世界

> Stars 恆星

Stars shine in the sky and give off heat. 恆星會發光發熱。

The Sun is a star. 太陽是恆星

Constellations 認識星座 Constellations 星座 A constellation is a group of stars that form a pattern in the sky.

人們將星空中的恆星連接起來,形成各種圖案組合,稱為星座。

Planets 行星 The eight planets of the solar system are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.

太陽系的八大行星有水星、金星、地球、火星、木星、土星、天王星和海王星。

Observe stars 觀測星空 Use a star wheel to identify stars.

使用星座盤觀測星空。

Use a compass to tell the direction of a star.

利用指北針確認星星方位。

Use your clenched fists to measure the height of a star above the horizon.

用拳頭測量星星高度角。

Use apps to observe stars.

使用觀星軟體觀測星空。

Stars appear to move from east to west.

一天中,星星會有東升西落的移動現象。

In different seasons, we see different constellations in the night sky.

不同季節的夜晚,我們看到的星座也不相同。

Polaris stays in nearly the same place in the sky at all times. 北極星在天空中的位置幾乎不會改變。

stars 星星的移動

The movement of

日期:

1

應聽懂及認讀的生字

□ 1. 恆星	star	
□ 2. 行星	planet	
□ 3. 星座	constellation	

Neptune

□ 4. 水星 Mercury
□ 5. 金星 Venus
□ 6. 地球 Earth
□ 7. 火星 Mars
□ 8. 木星 Jupiter
□ 9. 土星 Saturn
□ 10. 天王星 Uranus

□ 11. 海王星

- □ 12. 星座盤 star wheel
 □ 13. 指北針 compass
 □ 14. 手錶 watch
 □ 15. 手電筒 flashlight
- □ 16. 方位 direction □ 17. 地平線 horizon
- □ 18. 拳頭數 number of fists
- □ 19. 北極星 Polaris
 □ 20. 北斗七星 Big Dipper
 □ 21. 仙后座 Cassiopeia
 □ 22. 季節 season
 - e sky.
- 1. A constellation is a group of stars that form a pattern in the sky. 星座是從地球上看會形成圖案的恆星組合。
- 2. We use a star wheel to identify stars and constellations. 星座盤可以用來了解星空。
- 3. In different seasons, we see different constellations in the night sky. 星空隨四季時間變化。
- 4. Polaris stays in nearly the same place in the sky at all times. 北極星在天空中的位置幾乎不會改變。



Science Videos Unit 1

1-1 Stars





1-1 What Are Stars?





1-1 The 12 Star Signs





1-1 Eight Planets





1-2 How Do We Study the Stars?





1-2 How to Read the Stars in the Night Sky





1-3 How to Navigate Using the Stars





1-3 What Are Stars and Constellations?

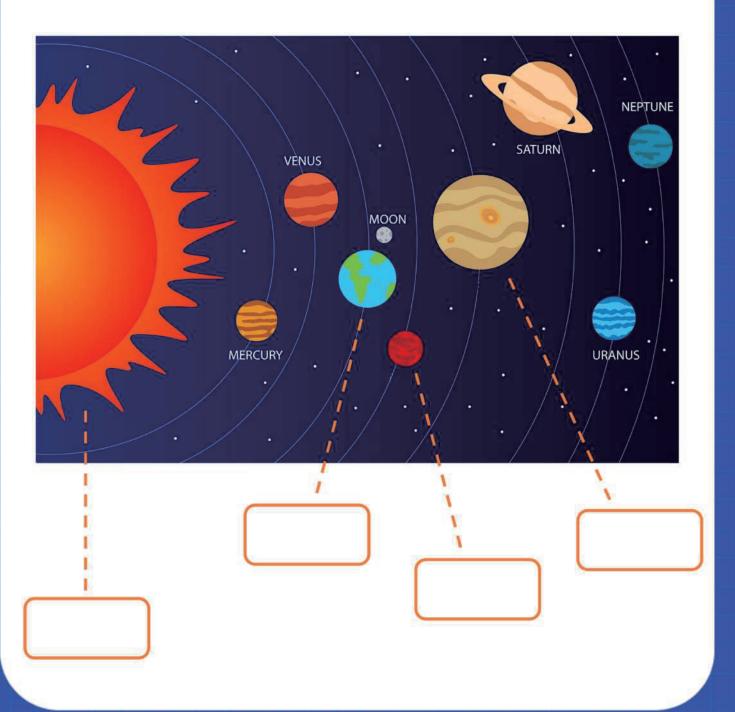




The Solar System

• Fill in the boxes using the words below.

Sun Earth Mars Jupiter





Polaris is almost directly above the North Pole. It does not move a lot. It is not very bright, so we need to look for other stars or constellations to find Polaris.



How can we use the Big Dipper or Cassiopeia to find Polaris?

Draw your answer below and label the parts.

How can Polaris help us in our daily lives? Put v inside the □.
□ It can help us find our way when we get lost.
□ It can help us know the latitude (緯度) of a location.

If you can think of other ways, write them down.



D









Summer 7月15日晚上9點可以看到哪些星星或星座? 星星或星座 方位 高度角 牛郎星 織女星

Autumn 10月15日晚上9點可以 看到哪些星星或星座?					
方位	高度角				

Let's Review

•	Fill in the	blanks usin	g the words	below.	
	Big Dipper	compass	seasons	stars	Polaris
1.	Constellation	ns are groups of		,.7	They look
	like shapes o	or pictures in the	night sky. In	ancient tir	ne, people
	told stories a	about them.			
2.	There are ma	any ways to obs	erve stars. We	e can use a	Y
		to tell the			
	a star wheel	to identify stars	•		
3.	Stars appear	to move across	the sky from	east to we	est. But
	there is one	special star calle	ed	,	the North
	Star. It stays	in nearly the sa	me place in tl	ne sky at a	ll times.
4.	Different cor	nstellations appe	0.552	9.50)	~
		For exam	ple, on winte	r evenings	, we can see
		ınter (獵戶座). As	35A 35T	es, it event	ually sets
	earlier and e	arlier in the wes	t.		
5.	lf we want to	o find Polaris in s	summer, we c	an look fo	r the

Unit 2

Air 認識空氣







Oxygen 氧氣 We can make oxygen. 我們可以製造氧氣 Add carrots to hydrogen peroxide to make oxygen.

將胡蘿蔔加入過氧化氫中以產生氧氣

Oxygen is colorless and tasteless.

氧氣是無色無味的氣體

Oxygen has features 氧氣的特性 Incense burns in a bottle of oxygen 線香可以在氧氣瓶內燃燒

Oxygen supports burning. 氧氣幫助燃燒

Oxygen is useful 氧氣的用處 Oxygen is used in the hospital and aquarium. It is mixed with acetylene to cut steel

氧氣用於醫院和水族館。氧氣與乙炔混合可切割鋼

We can make carbon dioxide

我們可以製造二氧化碳

Add baking soda to vinegar to make carbon dioxide 利用蘇打粉加醋來製造二氧化碳

Carbon dioxide is colorless and tasteless

二氧化碳是無色無味的氣體

Carbon dioxide 二氧化碳 Carbon dioxide has features

二氧化碳的特性

Incense does not burn in a bottle of carbon dioxide 線香在二氧化碳瓶內不會燃燒

Carbon dioxide does not support burning 二氧化碳不會幫助燃燒

Carbon dioxide turns limewater turbid. 會使澄清石灰水變(混濁)

Carbon dioxide is useful

二氧化碳的用處

Carbon dioxide is used in fire extinguisher, carbonated drink and dry ice 二氧化碳用於滅火器、碳酸飮料和乾冰



Air and Burning 空氣與燃燒 Three elements are needed to make fire 生火需要的元素

There is a right way to use a fire extinguisher 正確使用滅火器

Fire safety is crucial for protecting lives and property. 消防安全對於保護生命財產安全至關重要。

oxygen heat fuel 氧氣 燃燒 燃料 Removing one of these elements will stop fire 移除其中一個元素

PASS: Pull, Aim, Squeeze, Sweep(拉)、(瞄)、(壓)、(掃)

Watch what you are cooking, and do not overload an electrical outlet.

注意烹調的安全,不要超載電源插座。

When there is a fire, walk outside while staying low and do not use the elevator.

發生火災時,請低身走到室外,不要使用電梯。



Water 水 The human body is about 50 percent water. 人體約50%是水。

People used to come to this city to take the

人們過去常來這座城市享用這裡的泉水。

The main factors contributing to rust 影響鐵生鏽的因素

Air 空氣 Air is composed mainly of nitrogen and oxygen.

空氣主要由氮氣和氧氣組成。

Acidic solutions 酸性溶液 The acidic solution revitalized the tissue, that favouring the propagation of anaerobic infection.

酸性溶液使組織恢復活力,有利於厭氧菌感染的傳播。

Preventing rust 防止鐵生鏽的方法 Isolate water 隔絕水 Water is passed through a filter to remove particles and contaminants.

水透過過濾器去除顆粒和污染物。

Isolate from the air 隔絕空氣

Use vacuum sealing. 使用真空密封。

Isolate acidic solutions 隔絕酸性溶液 Use distillation to heat to its boiling point, turn into vapor, and then cool and condense back into liquid form, leaving behind impurities.

使用蒸餾加熱至沸點,變成蒸氣,然後冷卻並 冷凝回液體形式,留下雜質。



UNIT 2 Air 認識空氣

日期:

應聽懂及認讀的生字

□ 1. 鐵製品 siron products □ 2. 生 鏽 rust □ 3. 生鏽的 rusty □ 4. 鋼 棉 steel wool □ 5. 酸性溶液 acidic solution □ 6. 防 鏽 prevent rust □ 7. 電 鍍 plating	□ 19. 二氧化碳□ 20. 小蘇打粉□ 21. 醋□ 22. 石灰水□ 23. 混濁□ 24. 碳酸飮料□ 25. 材料	carbon dioxide baking soda vinegar limewater murky carbonated drink material
□ 8. 空氣 air □ 9. 無色的 colorless □ 10. 無味的 odorless □ 11. 燃燒 burning □ 12. 氧氣 oxygen □ 13. 蠟燭 candle	□ 26. 要素 □ 27. 加熱 □ 28. 燃料 □ 29. 過度乘載 □ 30. 逃生梯	element heat fuel overload escape ladder
□ 14. 消防隊員 fireman □ 15. 或物 combustible □ 16. 暖氣 heater □ 17. 插座 socket □ 18. 抹布 rag	□ 31. 滅火器 □ 32. 拉 □ 33. 瞄 □ 34. 壓 □ 35. 掃	fire extinguisher pull aim squeeze sweep

- 1. Plants are the main source of atmospheric oxygen. 植物是大氣氧氣的主要來源。
- 2. The increased use of natural gas will help reduce carbon dioxide emissions. 增加天然氣的使用將有助於減少二氧化碳排放。
- 3. There was a pile of rusty old cans by the door. 門邊有一堆生鏽的舊罐頭。
- 4. Iron rusts due to a chemical reaction between iron and oxygen in the presence of moisture or water.

鐵生鏽是由於鐵和氧氣在濕氣或水存在的情況下發生化學反應。

Science Videos Unit 2



2-1 Is Fire a Solid, a Liquid, or a Gas?





2-1 Air Contains Oxygen Experiment





2-1 Chemical Change Making Oxygen





2-1 The Smokin' Science of Fire ExtinguishersExtinguishers





2-1 Fire Safety - Top 10 Tips to Keep You Safe at Home





2-2 Vinegar + Baking Soda + Balloons =Fizzy Fun!





2-2 To Prove the Presence of Carbon Dioxide in Air





2-2 Climate Science in a Nutshell #4: Too Much Carbon Dioxide





2-3 Corrosion and Rust - Science



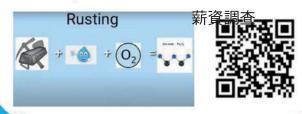


2-3 Rusting-Iron + water + oxygen = iron oxide





2-3 Prevention of Rusting –
Physical and Chemical Changes ||
Chapter 6 || Class 7



2-3 Rust : Prevention & Treatment | Environmental Chemistry | Chemistry | FuseSchool





2-3 Rusting of Iron





2-3 How to stop rust







The reason of ruaty

There are many iron objects around our daily life, after a period of time, some iron products will rust (生鏽). Please observe the iron products on campus (校園), and observe the rusty environment, the observation results recorded in the table below.

1. What are the iron products (鐵製品) on campus?	
2.What are the characteristics (特徵) of these iron products after rusting? (Available draw)	
3.Based on the observations, what kind of the environment rusting easily?	

Oxygen

Michael and Hannah are talking about what happens to the oxygen made from adding carrots to hydrogen peroxide.



Who is correct?

- A. Hannah
- B. Michael
- C. Hannah and Michael are correct
- D. Hannah and Michael are wrong

Why?

What are the main gases found on Earth?

- a. carbon dioxide and nitrogen
- b. carbon dioxide and oxygen
- c. hydrogen and oxygen
- d. nitrogen and oxygen

二氧化碳 carbon dioxide

氫氣 hydrogen

氮氣 nitrogen

氧氣 oxygen

Carbon Dioxide

Fill in the blank using one of the words below.

burning

cooking

extinguishing

Carbon dioxide forms when wood goes through -



Is carbon dioxide used to make these things?

Circle : if yes and circle : if no.



dry ice



fire extinguisher



carbonated drink











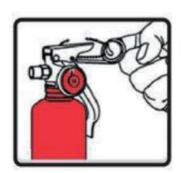


Extinguishing Fire

Remember the PASS Word



Pull the pin (or other motion) to unlock the extinguisher.





Aim at the base (bottom) of the fire and stand 6 - 10 feet away.



Squeeze

Squeeze the lever to discharge the agent.



Sweep

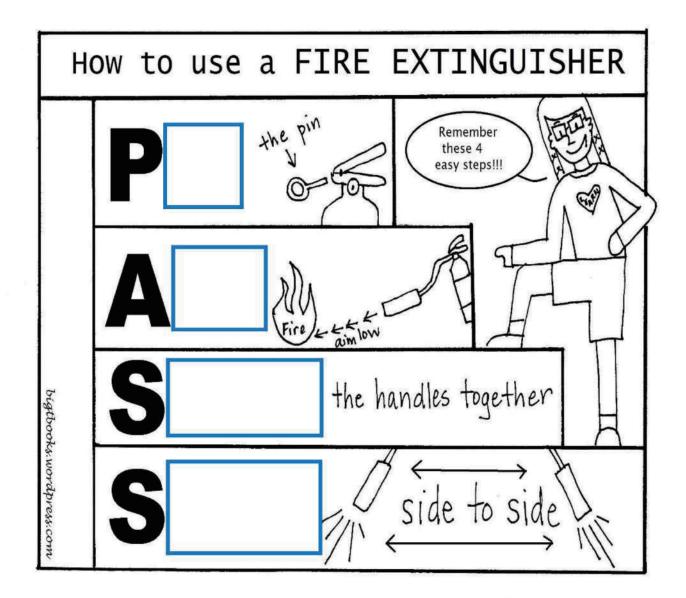
Sweep the spray from left to right until the flames are totally extinguished.



Extinguishing Fire

Write the missing letters inside the







Let's Review

• Fill in	the blanks	_ using the words	below.	
	REPORTED CATHERING	de la companya de la		me Transaction
rust	oxygen	carbon dioxide	fire	plating
	the primary me 	tal involved in the f	ormation	of
2	i	s abundant in the E	arth's atn	nosphere
		of the air we breath		nospriere,
		olays a role in the fo eraction with water		
4. Intense	heat from	ca	an cause	protective
coatings	or surface treat	ments on metal obj	ects to de	egrade or
burn off.				
5. Some _		materials, suc	h as chro	mium, nickel,
or zinc, ar	e inherently res	sistant to corrosion.		

Unit 3

Animal Life 動物的生活 Unit 3
Animal Life
第三單元
動物的生活



Animal body structures and movements 動物的身體構造 和運動

Move 運動

Animals use their muscles, bones and joints to move. 利用(肌肉)帶動(骨骼)和(關節)來運動

Animal survival methods 動物求生存的方 式

How animals

continue to live 動物延續生命的 Find food 覓食 Animals find food based on their body structure. 不同動物的覓食方式和牠們的(身體構造)有關

Avoid predators 游敵 Animals do different things to avoid predators. 為了避免遭到(獵食),動物會以不同方式避敵

Nest 築巢 Animals build nests to keep and protect their offspring. 築巢的目的主要是為了(繁殖)和保護下一代

Socialize 社會行為

Animals live and work together. 動物會分工合作、共同生活稱為(社會行為)

Court 求偶

Animals look for a mate. 目的是為了(繁衍子代)

Give birth 生殖

親子和子代

Oviparity 卵生 Some animals lay eggs that later become live offspring.

母體將(卵)生出體外,在體外發育成小動物

Viviparity 胎生 Some animals give birth to live offspring. 卵在(母體)內發育成完整個體,再由母體產下

方式 Parents and offspring Parents raise their offspring so that they live and continue to pass their traits.

有些動物有(育幼)的行為,親代會照顧子代

The traits of parents and offspring are the same in some ways, but different in others. 親代和子代的特徵(相似),但不完全相同

Dichotomous keys 二分法 Animals can be classified based on their body structure and function.

先找出(分類標準),再分成符合標準和不符合標準的動物

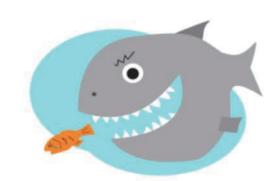
UNIT 3 Animal Life 動物的生活

日期:

應聽懂及認讀的生字

- □ 1. 行為 behavior □ 2. 運動 move □ 3. 肌肉 muscle □ 4. 骨骼 bone □ 5. 關節 joint □ 6. 身體構造 body structure
- □ 7. 捕食者 predator □ 8. 獵食(物) prey
- □ 9. 築巢 nest □ 10. 子代 offspring
- □ 11.社交 socialize
- □ 12. 分類(n) classification
- □ 13. 分類(v) classify
- □ 14. 二分法 dichotomous keys
- □ 15. 構造 structure
- □ 16. 功能 function

- □ 17. 求偶 court
- □ 18. 伴侶 mate
- □ 19. 繁殖 reproduction
- □ 20. 卵生(adj) oviparous
- □ 21. 胎生(adj) viviparous
- □ 22. 特質 trait



- 1. Animals find ways to survive, reproduce and raise their offspring. 動物有不同的生存繁殖與養育下一代的方式。
- 2. Animals can be classified based on their body structure and function. 動物藉由身體構造與功能來分類。



Science Videos Unit 3

3-1 Animals' Body Parts and Movements





3-1 Animals on the Move





3-1 Top 10 Animals with Amazing Camouflage





3-2 Animals that Mate for Life | Nat Geo Wild





3-2 Oviparous and Viviparous Animals





3-2 Animal Parents | Animals for Kids | Wild Animal Families





3-3 Animal Classification for Children: Classifying Vertebrates and Invertebrates for Kids





3-3 Dichotomous Key





3-3 Dichotomous Keys: Identification Achievement Unlocked





3-3 How Adaptation in Animals Work





Animal movements

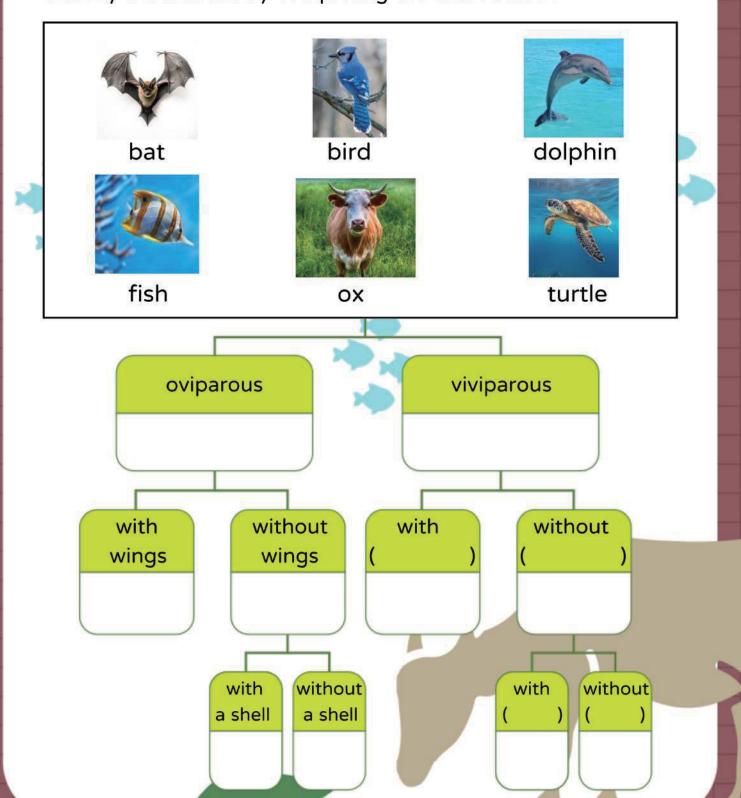
Put $last V$ inside the $oxedsymbol{\square}$.					
Animal	Moves by	Body part used			
fish	☐ crawling ☐ flying ☐ swimming ☐ walking	☐ feet ☐ fins ☐ wings			
bird	☐ crawling ☐ flying ☐ swimming ☐ walking	☐ feet ☐ fins ☐ wings			
crocodile	☐ crawling ☐ flying ☐ swimming ☐ walking	☐ feet ☐ fins ☐ wings			
lion	☐ crawling ☐ flying ☐ swimming ☐ walking	☐ feet ☐ fins ☐ wings			
dog	☐ crawling ☐ flying ☐ swimming ☐ walking	☐ feet ☐ fins ☐ wings			
turtle	☐ crawling ☐ flying ☐ swimming ☐ walking	☐ feet ☐ fins ☐ wings			

Animal reproduction

Write oviparous or viviparous inside the Then classify the animals by writing their names on the ____ beetle elephant human animals give birth to live offspring. Examples are cat, ______, _____, and _____. animals give birth to live offspring. Examples are turtle, _____, ____, and _____.

Animal classification

Classify the animals by completing the chart below.



Let's Review

• Fill in the <u>blanks</u> using the words below.					
behavior	classify	mate			
nests	offspring	predators			
traits					
They use their muscle based on their body s	to describe an animal's es, bones and joints to m structure. They do differ Animals build g. Animals live and work	nove. They find food ent things to avoid to keep and			
They raise their offsp	The traits of parents and				
We can	animals based o	on their structure and			

Unit 4

Sound and Musical Instruments 聲音與樂器

Unit 4 Sound and Musical Instruments 第四單元 聲音與樂器



Three elements of understanding sound.

認識聲音三要素

Volume 音量

Timbre

音色

Pitch 音調 The more a thing vibrates, the higher the volume. 物體振動越多,音量越大

Each thing vibrates differently and makes a different timbre.

物體振動不一,產生不同的音色

The faster a thing vibrates, the higher the pitch. 物體振動越快,音調越高

The slower a thing vibrates, the lower the pitch. 物體振動越慢,音調越低

Making simple musical instruments 製作簡易樂器 Stringed instrument 弦樂器

Press to control the string length 按壓控制琴弦長短

Small paper box 小紙盒 Iron box 鐵盒 Rubber band 橡皮筋

Percussion 打擊樂器 The materials are the same, and the keys must be long or short.

材質一樣且琴鍵必須有長有短

Wood chips 木片條 Bamboo strip 竹片條 Plastic strip 塑膠條

Wind instrument 管樂器 Adjust the length of the air column 調整空氣柱的長短 Straw 吸管 Water pipe 水管 Cotton棉花

Noise and prevention 噪音與防治

Noise is a type of sound. 噪音是聲音的一種

Noise can be loud. 噪音可以很大聲

We can measure noise. 測量噪音

We can stop noise 停止噪音 A decibel meter measures noise level. 利用分貝器測量噪音

We are all responsible for being quiet. 維護安寧是我們的責任

UNIT 4 Sound and Musical Instruments 聲音與樂器

日期:

應聽懂及認讀的生字

- □ 1. 振動(n) vibration □ 2. 振動(v) vibrate □ 3. 音量 volume □ 4. 大聲 loud □ 5. 較大聲的 louder loudest □ 22. 分貝器 □ 6. 最大聲的 □ 7. 小聲 soft □ 8. 較小聲的 softer □ 9. 最小聲的 softest □ 10. 音調 pitch □ 11. 高 high □ 12.較高(音)的 higher □ 13.最高(音)的 highest
 - □ 17. 音色 timbre □ 18. 噪音 noise □ 19. 噪音程度 noise level □ 20. 安靜 quiet □ 21. 分貝 decibel
 - □ 23. 弦樂器 stringed instrument □ 24. 打擊樂器 percussion □ 25. 管樂器 wind instrument □ 26. 橡皮筋 rubber band

decibel meter

- □ 27. 竹片條 bamboo strip □ 28. 吸管 straw □ 29. 水管 water pipe □ 30. 棉花 cotton
- 1. The more a thing vibrates, the higher the volume. 物體振動越多,音量越大 The less a thing vibrates, the lower the volume. 物體振動越少,音量越小

low

□ 14. 低

□ 15.較低(音)的 lower □ 16.最低(音)的 lowest

- 2. The faster a thing vibrates, the higher the pitch. 物體振動越快,音調越高 The slower a thing vibrates, the lower the pitch. 物體振動越慢,音調越低
- 3. Each thing vibrates differently and makes a different timbre. 物體振動不一,產生不同音色
- 4. Musical instrument types are stringed instruments, percussion instruments, and windinstruments.

樂器類型有弦樂器、打擊樂器和管樂器

Science Videos Unit 4

4-1 What is Sound?





4-1 Can Sound Move Objects? Cool Science Experiment





4-1 Sound Wave Demo with Tuning Forks and a Bowl of Water





4-1 What is Sound? For Kids





4-1 What is Sound? The Dr. Binocs Show | Learn Videos for Kids





4-2 Experimenting with Sound and Pitch





4-2 Length of Rubber Band Determines
Pitch I Sound I Physics





4-2 SOUND for Kids —Loundness, Pitch and Timbre InScience for Kids





4-3 What is Noise Pollution? |What Causes Noise Pollution? |The Dr. Binocs Show





4-3 Why Do Doctors Use Stethoscopes?





Volume

Fill in the blanks using the words below.

high low vibration



A long string (琴弦) makes a sound with a _____pitch (音高).

A short string (琴弦) makes a sound with a_____ pitch (音高).

Which glass makes the highest pitch? Put V inside the .

Which of these things are wind instrument?
Which of these things are percussion?
Which of these things are stringed instrument?

A B C



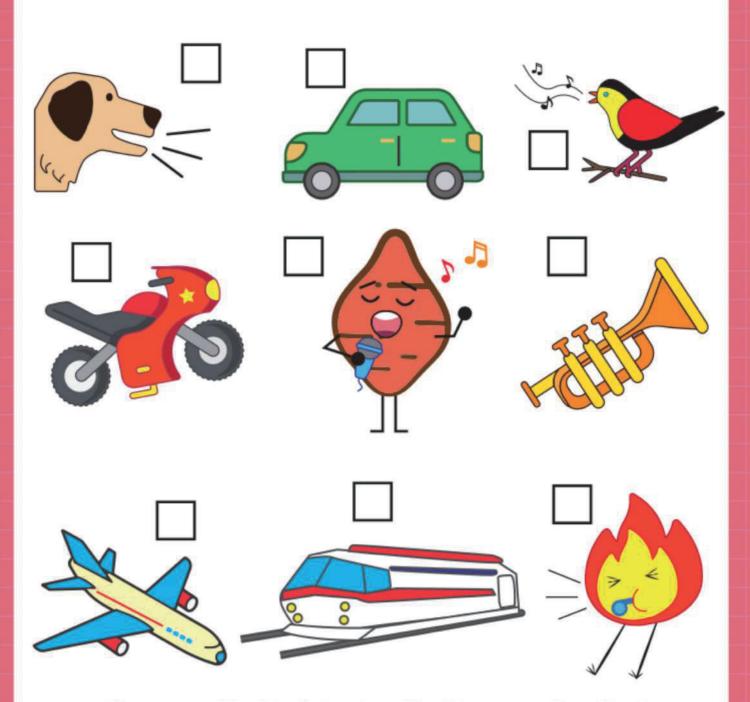
D E F



G H)



Noise and Prevention



Do not stand beside the loudest thing. Your ears will get hurt!

Let's Review

• Fill in the blanks using the words below.

decibel meter noise pitch sound timbre vibrates volume

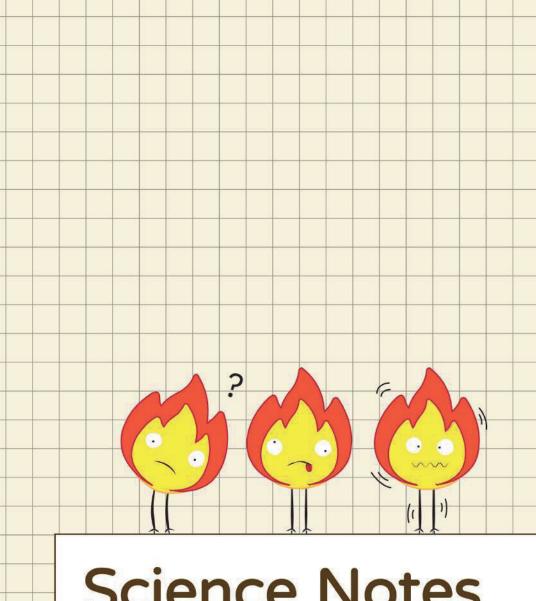
Ve can make sound. If a thing, it makes a
. We can change a sound's volume, pitch and
imbre. The more a thing vibrates, the higher the
.The less a thing vibrates, the lower the volume.
he faster a thing vibrates, the higher the The
lower a thing vibrates,the lower the pitch. Finally, each thing vibrates
lifferently and makes a different
is a type of sound. It can be loud. It can be
neasured using a We can stop noise because we
re all responsible for being guiet.



Date	Points	Emoticon	Date	Points	Emoticon



Date	Points	Emoticon	Date	Points	Emoticon



Science Notes

Bilingual Science 5th Grade 2nd Semester

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