

110-112 學年度三峽區龍埔國民小學雙語成果專輯(雙語自然)

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壹、學校基本資料

學校名稱	龍埔國小	<input type="checkbox"/> 方案一 <input type="checkbox"/> 方案二 <input type="checkbox"/> 方案三 <input checked="" type="checkbox"/> 方案四				
學校狀況	<input type="checkbox"/> 12 班以下小型學校 <input checked="" type="checkbox"/> 13 班至 59 班中型學校 <input type="checkbox"/> 59 班以上大型學校					
實施 CLIL 課程 班級數	一年級班級數:9	四年級班級數:9				
	二年級班級數:9	五年級班級數:0				
	三年級班級數:9	六年級班級數:0				
執行 狀況	本校實施 CLIL 總班級數:共 <u>36</u> 班 實施 CLIL 課程領域、年級、班級數及學生參與數如下:					
	序號	CLIL 課程領域	實施年級	實施班級數	學生參與數	每週每班 上課節數
	1	生活	一年級	9	260	6
	2	英語	一年級	9	260	2
	3	生活	二年級	9	272	6
	4	英語	二年級	9	272	2
	5	體育	三年級	9	278	2
	6	自然	三年級	9	278	3
	7	美勞	三年級	9	278	2
	8	英語	三年級	9	278	3
	9	體育	四年級	9	272	2
	10	自然	四年級	9	272	3
	11	美勞	四年級	9	272	2
12	英語	四年級	9	272	3	

貳、實施概況

一、緣起：

本校自108學年度下學期奉教育局指示由英速魔法學院龍埔校區轉型為「新北市雙語實驗課程亮點學校」，並自109學年度起由小一新生全面進行每週共8節課的 CLIL 生活領域和英語課程，至今已經四年了。透過 CLIL 整合，讓學生從小一開始在生活領域及英語領域課程的環境下熟悉以英語學習各相關科目的內容；並規劃鷹架式的課程設計，使學生具備進入下一階段雙語科目領域的能力。

為了落實雙語課程政策，課程實施初期與即將接任一年級的導師群和外師經過多次慎重的會議討論，因為沒有適合學校的雙語生活教材，加上外師無法閱讀中文，最終決

議參考市面上生活教科書版本後，挑選適用的內容進行主題式教材編寫，同時著手翻譯十二年國教生活領域課程綱要之學習內容及學習表現供外師參考使用。

雙語生活教材編撰完成後，依據教學現場需要進行微調，目前該教材已應用於一、二年級，同時雙語生活音樂及雙語生活美勞也搭配生活課程單元主題進行教學，讓學生在不同領域反覆聽、說該單元主題的學習內容，除了對學科內容有更充分的理解，也增加語言文字輸入的頻率。

另外，自 111 學年度起，本校雙語實驗課程延伸至中年級的自然、體育、美勞、英語等領域，參酌之前課程開發的經驗，以及三年級進行雙語課程的領域特性，在中外師參考 108 課綱及審定版教科書後，我們決定以審定版教科書為上課主要依據，從課本中每單元抽一部分設計成為雙語教材，這樣做一方面學生能獲得有系統的學習，二方面也可以減輕授課教師的負擔與壓力。為避免日後因更換教科書版本而需大幅修改內容，各科目仍依主題式方式編撰，往後僅需視教科書內容進行微調即可。本校推動雙語教學的特色如下：

1. 自編教材：為使中師在課堂中能安心自信的使用英語授課，參酌現有教科書版本自編雙語生活教材。除了編製學生手冊彙整各章節重點及學習單，另編製教師手冊提供相關教學指引、討論議題、PPT 簡報及學習單解答供協同教師參考。為讓中師在課堂中能對課程中會使用到的英語更有信心，特在教學指引中加入” Teachers' Talk” 提供教師們語言的支持。
2. 師資雙軌：本校雙語實驗課程為新北市雙語實驗課程方案四學校，配置四位外籍英語教師，每位外師授課節數 20 節課，本國籍英文教師李昭慧老師協助中年級雙語體育教案設計，給予減課 3 節。為能有效運用外師資源，讓學校雙語授課不必受限於外師人力，故提昇校內非英語科系畢業教師的使用英語授課意願及能力至為重要。目前本校雙語授課科目安排如下：
 - ◎中外師協同授課：雙語生活、雙語自然、雙語體育。
 - ◎中師獨立授課：雙語美勞。
 - (1) 中外師協同授課除了主要確認學生學習狀況，也在教學中提昇中籍教師的英語口語能力和自信。每週共備時，中師們相互討論和彼此鼓勵，所以本校實施雙語的年級與課程中師回任的意願達到 70% 以上，此有助於中師對雙語教學能更熟悉更自信，師資結構趨向穩定。
 - (2) 中師獨立授課課程為逐年發展本校藝術領域美勞之校訂課程。在共備時，由具備英語能力的教師帶領領域教師共編教材，共同討論雙語課堂上可能遇到的狀況並練習必備的字彙用語，提升教師雙語教學的專業知能。
3. 規劃雙語教室：為讓學生能有別於一般教室的上課方式，我們運用原有的英速學院教室，規劃成低年級雙語生活情境教室，讓學生能在課堂中進行分組討論、遊戲學習。

「一個人能走得快，一群人能走得遠」正是龍埔老師們教授雙語課程的心情。我們深信雙語計畫的成功不只是一個課程的順利推動，更有團隊的共識和共好的衷心；我們希望看到在雙語課堂中，學生能在二種語言間自由切換的風景，每個人都能快樂的學習。

二、工作職掌：

(一) 行政支援

為推動本校雙語實驗教育，本校設置研發處專責學校雙語及英語課程相關業務，進行各處室間的橫向聯繫工作。此外，也成立雙語實驗課程推動小組，由校長擔任召集人，各處室皆納入推動小組，其工作職掌詳如下表所示。

職稱	姓名	承辦業務	備註
校長	黃清海	1. 綜理雙語實驗學校各項相關業務 2. 各項工作業務統籌規劃及進度考核	召集人
研發主任	高文謙	1. 規劃龍埔國小校本課程轉化、教學模組研發、雙語實驗教育師資研習 2. 整合雙語實驗教育課程計畫、校內英語相關課程發展 3. 協助成立中外師雙語教育專業發展社群 4. 辦理中外師公開授課活動及課程分享會	執行秘書
教務主任	王柏文	1. 協助各領域排課事宜 2. 協助辦理各項研習及相關備課事宜 3. 協助辦理公開授課活動及課程分享會	處室代表
學務主任	胡大元	協助校內各項宣導活動雙語化建置作業	處室代表
總務主任	謝慶龍	各項雙語教學設備招標及環境建置工作	處室代表
輔導主任	張秭翊	協助後續補救教學策略擬定及執行	處室代表
人事主任	陳清雲	協助編制人員招聘事宜	處室代表
主計主任	施佳玲	協助經費核銷事宜	處室代表
行政助理	黃思綾	1. 協助各項行政事務運作 2. 執行相關預算編列及核銷事宜 3. 辦理教師研習及安排專業社群會議	
專案教師	江明儀 李旻臻	1. 協助雙語實驗課程研發及推展 2. 協助中外師進行課堂對話及課程規劃 3. 協助辦理教師研習及安排專業社群會議	
英文教師	李昭慧	1. 協助雙語實驗課程設計 2. 協助外師與英語教師課程搭配協調事宜	
領域教師	生活 自然 體育	1. 協助雙語實驗課程設計 2. 協助雙語課程研發事宜	雙語領域 代表教師

(二) 課程發展

本校雙語課程發展，由研發處主任擔任執行秘書，邀請兼具專業科目及英文專長之教師擔任課程研發主責人員，搭配該領域中外師每週進行共備活動研發課程，並定期邀請臺北大學劉慶剛教授擔任雙語實驗教育的指導專家，提供本校雙語課程規劃和建議，並陪伴雙語教學教師們學習成長。由於本校目前有數個領域實施雙語實驗課程，因此教務處協助規劃各領域教師每週有二節共同不排課時間，以利進行共同備課。備課時間說明如下：

星期	共備時間	領域	共備內容	參與人員
星期二	14:20- 16:00pm (第 6-7 節)	自然科學 領域	1. 課程教學進度 2. 教學課程設計討論 3. 課程教學分享與省思 4. 評量進行方式設計 5. 課程含括 3-4 年級雙語自然	蔡怡貞老師(主責教師)、褚美惠老師、陳柏汝老師、外師 Michelle、高文謙主任、江明儀老師、李旻臻老師
星期五	13:30- 15:00pm (第 5-6 節)	健康與體育 領域	1. 課程教學進度 2. 教學課程設計討論 3. 課程教學分享與省思 4. 評量進行方式設計 5. 課程含括 3-4 年級雙語體育	謝慶龍主任、徐宇澄老師、高健庭老師、倪玉婷老師、羅家宏老師、王復瑄老師、外師 Rori、李昭慧老師、高文謙主任、江明儀老師、李旻臻老師
星期四	13:30- 15:00pm (第 5-6 節)	生活領域	1. 課程教學進度 2. 教學課程設計討論 3. 課程教學分享與省思 4. 評量進行方式設計 5. 課程含括 1-2 年級雙語生活(含音樂、美勞)	G1、G2 導師 楊倬宜老師、黃英華老師、陳匯峯老師、蕭薇嫻老師、外師 Angela、Hanna、高文謙主任、江明儀老師、李旻臻老師
星期五	13:30- 15:00pm (第 5-6 節)	藝文領域	1. 課程教學進度 2. 教學課程設計討論 3. 課程教學分享與省思 4. 評量進行方式設計 5. 課程含括 3-4 年級雙語美勞	楊明鑫老師帶領其他 5 位美勞科任教師進行備課

(三) 協同教學

本校目前 1~4 年級部分領域實施雙語實驗教育，其中除了低年級生活音樂、生活美勞及中年級美勞為純中師教學外，低年級生活；中年級自然及體育採中外師協同授課方式進行，中外師協同教學模式採由外師主教，中師負責掌管學生學習狀態並適時給予必要協助方式操作，細節說明如下：

1. 低年級雙語生活

(1)生活 Life Skill 共三節課，由外師主教二節課、中師協同(導師)，另一節課由中師獨立教學，且中外師課程內容是互相銜接，前後連貫的。

(2)生活音樂一節課，由中師主教(科任)。

(3)生活美勞二節課，由本校具雙語美勞資格的中師進行獨立授課(科任)。

2. 中年級雙語自然

本校的雙語自然是採一節課外師主教、中師協同(科任)，另外二節課由中師獨立授課方式進行。其中外師主教部分教材，是由中外師討論審視審定版課本，並從中擷取內容後進行自編教材，並製作學習單進行教學，且中外師課程內容是互相銜接，前後連貫的。

3. 中年級雙語體育

本校的雙語體育是採一節課外師主教、中師協同(科任)，另外一節課由中師獨立授課方式進行。其中外師主教部分教材，是由中外師討論自審定課本中擷取內容後再行自編教材，製作教案進行教學，且中外師課程內容是互相銜接，前後連貫的。

4. 中年級雙語美勞

本校的雙語美勞是由中師獨立授課，有二位具雙語美勞資格的中師帶領美勞領域的所有夥伴由校訂課程中規劃設計雙語教學單元，將本校美勞的校訂課程進行1-6年級的縱向連貫。

5. 英語課程

本校的英語課程由7位英語本科系畢業或取得 CEF 架構之 B2級以上英語相關考試檢定及格證書教師進行授課。課程內容除了選用審定版本外，依學校校訂課程選用英語繪本進行教學，學生除了學習課本知識外，也搭配繪本讓學習更具生活化及趣味化。

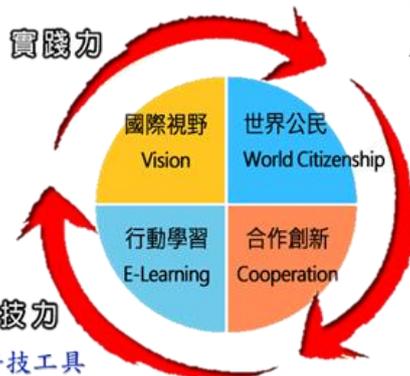
參、課程架構

一、課程規劃願景與原則

(一)龍埔國小發展的雙語願景

在龍埔國小「低碳、社群、人文、行動」的學校願景下，我們希望透過實施雙語教育，培養具有「國際視野、行動學習、合作創新、世界公民」的龍埔學子。

增加口語表達自信
提昇英語文字溝通能力



善用科技工具
拓展國際視野

龍埔願景:

行動、低碳
人文、社群

人文力

喜愛本國文化
了解並尊重他國文化

(二)課程設計規劃原則

1. 教材的選用:由於目前尚無適合的雙語生活教材可供使用，因此我們首先將生活領域課綱逐條翻譯成英文，讓外師了解生活課綱內容；也讓中外師參閱審定版本來進行自編教材的撰寫。這樣不僅可符合課綱指標，也減輕教師課程設計的難度，並發展出適合低年級學童之雙語教材。
2. 主題式的課程統整:以主題式的課程統整方式，讓學生在課程內容可以中英文重複學習，以達到了解學科內容和產生學習遷移作用。
3. 課程設計加強聽說能力的訓練:低年級的雙語實驗課程除了生活領域6節課外，也包括校訂的英轉課程2節。中年級的雙語實驗課程則是在藝術領域、健康與體育領域、自然領域等課程中實施，亦包括校訂的英轉課程。學生在能力建構上，領域科目著重在聽說能力的訓練及表達，英語課程則訓練學生的聽說讀寫技巧。
4. 課程的連結性:重視課程的橫向及縱向連結，在課程設計時除了橫向考量各主題單元間之關聯性外，亦同時評估學生之先備知識，建構縱向連結之課程鷹架，而為了釐清課程脈絡，我們亦建立了課程地圖，方便教師辨識，以深化學科知識，而中外師授課內容亦是前後互相連結，一脈相承，以確保課程之完整性。**(課程連結詳參課程地圖—有連結之課程用相同顏色標示)**

二、各科雙語課程規劃總表

龍埔國小 112 學年度課程規劃				
實施對象	低年級			備註
英語課程	龍埔英閱繪	字母教學 繪本導讀 (自編教材)	每週 2 節	英語中師
雙語生活課程	生活課程	常規常識教學 生活美勞 生活音樂 (自編教材)	每週 3 節 每週 2 節 每週 1 節	外師主教+導師協同 2 節 導師獨立授課 1 節 雙語中師讀錄授課 2 節 中師獨立授課 1 節 (音樂及美勞含括在生活課程架構中)
實施對象	中年級			備註
英語課程	龍埔英閱繪	何嘉仁版課本 繪本導讀	每週 3 節	英語中師
健康與體育	體育課程	康軒版課本 自編雙語教材	每週 2 節	外師主教+中師協同 1 節 科任中師獨立授課 1 節
自然科學	自然課程	翰林版課本 自編雙語自然 教材	每週 3 節	外師主教+中師協同 1 節 中師獨立授課 2 節
藝術	美勞課程	翰林版課本 自編校訂課程	每週 2 節	美勞中師獨立授課 2 節

◎以下課程架構依分科手冊科目不同分開呈現，礙於篇幅不統一呈現於此。

肆、雙語自然科學領域課程

The Domain of Natural Science Curriculum

一、雙語自然科學課程架構表

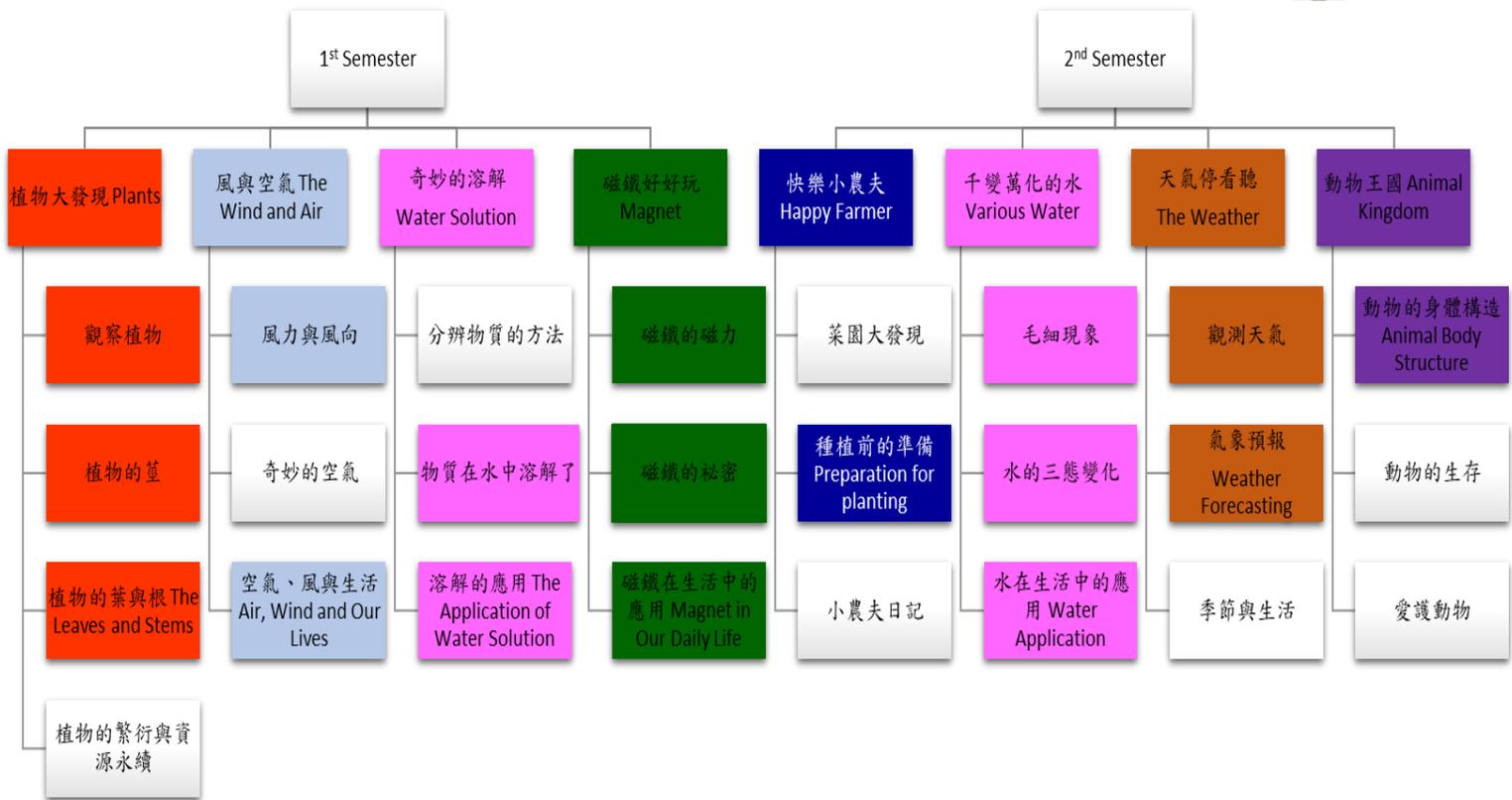
Grade	Grade Three 三年級		Grade Four 四年級	
	1st Semester 三上	2nd Semester 三下	1st Semester 四上	2nd Semester 四下
Chapter 1 第一章	<u>植物大發現 Plants</u> 1.1 觀察植物 1.2 植物的莖 1.3 植物的葉與根 1.4 植物的繁衍與資源永續	<u>快樂小農夫 Happy Farmer</u> 1.1 菜園大發現 1.2 種植前的準備 1.3 小農夫日記	<u>閃亮的天空 Moon</u> 1.1 一天的天空 1.2 月亮的位置 1.3 月相的變化	<u>生活中的力 A World of Force</u> 1.1 力的作用 1.2 力的比較與表示 1.3 力的傳送
Chapter 2 第二章	<u>風與空氣 The Wind and The Air</u> 2.1 風力與風向 2.2 奇妙的空氣 2.3 空氣、風與生活	<u>千變萬化的水 Various Water</u> 2.1 毛細現象 2.2 水的三態變化 2.3 水在生活中的應用	<u>水域環境 Aquatic Environments</u> 2.1 認識水域環境 2.2 水生植物 2.3 水生動物 2.4 珍惜水域環境	<u>水的奇妙現象 Properties of Water</u> 2.1 連通管 2.2 虹吸現象 2.3 引水裝置
Chapter 3 第三章	<u>奇妙的溶解 Water Solution</u> 3.1 分辨物質的方法 3.2 物質在水中溶解了 3.3 溶解的應用	<u>天氣停看聽 The Weather</u> 3.1 觀測天氣 3.2 氣象預報 3.3 季節與生活	<u>物質變變變 Changes in Matter</u> 3.1 影響物質變化的因素 3.2 溫度對物質的影響 3.3 酸與鹼對物質的影響	<u>變動的大地 The Earth's Changing Surface</u> 3.1 我們的大地 3.2 地表的變化 3.3 大地的災害
Chapter 4 第四章	<u>磁鐵好好玩 Magnet</u> 4.1 磁鐵的磁力 4.2 磁鐵的祕密 4.3 磁鐵在生活中的應用	<u>動物王國 Animal Kingdom</u> 4.1 動物的身體構造與功能 4.2 動物的生存 4.3 愛護動物	<u>聲光世界真有趣 The Interesting World of Sound and Light</u> 4.1 聲音的產生與傳播 4.2 光的直進與反射 4.3 聲音和光的應用	<u>能源與電路</u> 4.1 生活中的能源 4.2 燈泡亮了 4.3 串聯和並聯 4.4 節約能源

The Domain of Natural Science Curriculum Map

二、雙語自然科學領域課程學習地圖

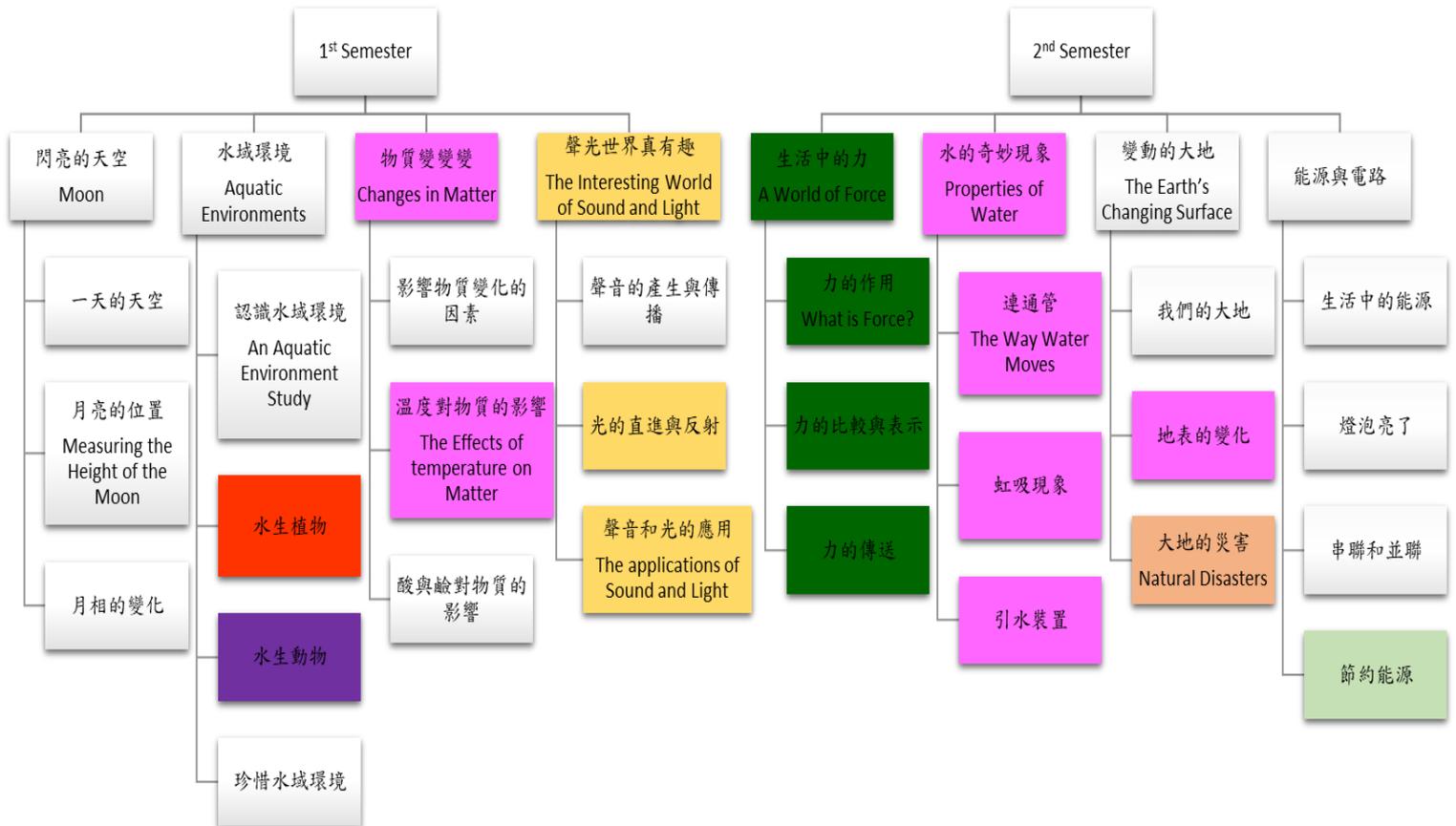
- ✓ 不同顏色標示該課程已有前後互相銜接之鷹架。
- ✓ 低年級自然科相關課程將以相同顏色標示。

G3 Semester 1&2
三年級



G4 Semester 1&2
四年級

- ✓ 不同顏色標示該課程已有前後互相銜接之鷹架。
- ✓ 低年級自然科相關課程將以相同顏色標示。



The Domain of Natural Science Curriculum Learning Focus

三、自然科學領域課程學習重點

(外師主教之小節以灰色標示其中英文學習重點，俾便外師參考)

Grade Three 1 st Semester 三年級上學期			
	Sections	Learning Focus	
		Learning Performance	Learning Content
Chapter 1: The Plants 植物大發現	1-1 觀察植物	<p>po-II-1 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。</p> <p>ah-II-1 透過各種感官了解生活週遭事物的屬性。</p>	<p>INb-II-6 常見植物的外部形態主要由根、莖、葉、花、果實及種子所組成。</p>
	1-2 植物的莖	<p>tc-II-1 能簡單分辨或分類所觀察到的自然科學現象。</p> <p>pc-II-2 能用簡單形式的口語、文字或圖畫等，表達探究之過程、發現。</p>	<p>INb-II-4 生物體的構造與功能是互相配合的。</p> <p>INb-II-6 常見植物的外部形態主要由根、莖、葉、花、果實及種子所組成。</p>
	1-3 The leaves and The Stems 植物的葉與根	<p>tc-II-1 Students can easily distinguish or classify the observed natural science phenomena. 能簡單分辨或分類所觀察到的自然科學現象。</p> <p>pc-II-2 Students can use the simple forms of speaking, writing, or drawing to express the process and findings of inquiry. 能利用簡單形式的口語、文字或圖畫等，表達探究之過程、發現。</p>	<p>INb-II-6 The external morphology of common plants is mainly composed of roots, stems, leaves, flowers, fruits, and seeds. 常見植物的外部形態主要由根、莖、葉、花、果實及種子所組成。</p>
	1-4 植物的繁衍與資源永續	<p>tm-II-1 能經由觀察自然界現象之間的關係，理解簡單的概念模型，進而與其生活經驗連結。</p> <p>an-II-3 發覺創造和想像是科學的重要元素。</p>	<p>INg-II-1 自然環境中有許多資源。人類生存與生活需依賴自然環境中的各種資源，但自然資源都是有限的，需要珍惜使用。</p>

Chapter 2: The Wind and Air 風與空氣	2-1 風力與風向	pe-II-2 能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和紀錄。	INc-II-1 能以合理的參考標準或工具代替實際的數值，例如：測量磁力的強弱時，能以吸起迴紋針的數量作比較度量；測量風力大小時，能以風車轉動的快慢、旗子飄揚的高度訂定比較的標準。
	2-2 奇妙的空氣	pe-II-2 能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和紀錄。	INd-II-4 空氣流動產生風。
	2-3 Air, Wind and Our Lives 空氣、風與生活	pa-II-1 Students can organize existing information or data by using simple classification, charting, etc. 能運用簡單分類、製作圖表等方法，整理已有的資訊或數據。	INa-II-4 The form of the substances changes depending on the temperature. 空氣流動產生風。
Chapter 3: Water Solution 奇妙的溶解	3-1 分辨物質的方法	pe-II-2 能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和紀錄。 ah-II-1 透過各種感官了解生活週遭事物的屬性。	INa-II-3 物質各有其特性，並可依其特性與用途進行分類。 INc-II-7 利用適當的工具觀察不同大小、距離位置的物體。
	3-2 物質在水中溶解了	pe-II-2 能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和紀錄。 ac-II-1 能簡單分辨或分類所觀察到的自然科學現象。	INe-II-2 溫度會影響物質在水中溶解的程度(定性)及物質燃燒、生鏽、發酵等現象。 INe-II-3 有些物質溶於水中，有些物質不容易溶於水中。
	3-1 The Application of Water Solution 溶解的應用	ah-II-1 Students can understand the characteristic of reality in life by all kinds of sense. 透過各種感官了解生活週遭事物的屬性。	INe-II-3 Some substances can dissolve in water, and some do not easily dissolve in water. 有些物質溶於水中，有些物質不容易溶於水中。
Chapter 4: Magnet 磁鐵好好玩	4-1 磁鐵的磁力	po-II-1 能從日常經驗、學習活動、自然經驗，進行觀察，進而能察覺問題。 ai-II-2 透過探討自然與物質世界的規律	INa-II-3 物質各有其特性，並可以依其特性與用途進行分類。 INe-II-7 磁鐵具有兩極，同極相斥，異極相吸；磁鐵會吸引含鐵的物體。磁力強

		性，感受發現的樂趣。	弱可由吸起含鐵物質數量多寡得知。
	4-2 The Secret of Magnet 磁鐵的秘密	<p>pe-II-1 Students can understand the possible effects of a change in one factor and predict the approximate outcome of the activity. 能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和記錄。</p> <p>an-II-1 Students can experience that all science inquiry begins with questions. 體會科學的探索都是由問題開始。</p>	<p>INa-II-3 Matter has characteristics, and it can be classified by its characteristics and applications. 物質各有其特性，並可以依其特性及用途進行分類。</p>
	4-3 磁鐵在生活中的應用	<p>ah-II-1 透過各種感官了解生活週遭事物的屬性。</p>	<p>INa-II-3 物質各有其特性，並可以依其特性與用途進行分類。</p> <p>INb-II-1 物質或物體各有不同的功能或用途。</p>

Grade Three 2nd Semester 三年級下學期

	Sections	Learning Focus	
		Learning Performance	Learning Content
Chapter 1: Happy Farm 快樂小農夫	1-1 菜園大發現	<p>po-II-1 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。</p>	<p>INa-II-7 生物需要能量子力(養分)、陽光、空氣、水和土壤，維持生命、生長和活動。</p>
	1-2 Preparation for Planting 種植前的準備	<p>pe-II-2 Students can correctly and safely operate items, devices, scientific equipment, and use chemicals suitable for their learning stage. And they can observe and record the experimental process. 能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和紀錄。</p> <p>ai-II-3 Students can enjoy the pleasure of</p>	<p>INa-II-7 Organisms need energy (nutrients), sunlight, air, water, and soil to sustain life, growth, and activities. 生物需要能量子力(養分)、陽光、空氣、水和土壤，維持生命、生長和活動。</p>

		<p>pursuing their own ideas via hands-on practices. 透過動手實作，享受以成品來表現自己構想的樂趣。</p> <p>an-II-1 Students can experience that all science inquiry begins with questions. 體會科學的探索都是由問題開始。</p>	
	1-3 小農夫日記	<p>ai-II-3 透過動手實作，享受以成品來表現自己構想的樂趣。</p>	<p>INa-II-7 生物需要能量子力(養分)、陽光、空氣、水和土壤，維持生命、生長和活動。</p>
Chapter 2: Various Water 千變萬化的水	2-1 毛細現象	<p>tr-II-1 能知道、記錄所得自然現象的結果是有其原因的，並依據習得的知識，說明自己的想法。</p> <p>po-II-1 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。</p> <p>an-II-1 體會科學的探索都是由問題開始。</p>	<p>INc-II-6 水有三態變化及毛細現象。</p>
	2-2 水的三態變化	<p>po-II-2 能依據觀察、蒐集資料、閱讀、思考、討論等，提出問題。</p> <p>pe-II-2 能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和紀錄。</p> <p>ai-II-3 透過動手實作，享受以成品來表現自己構想的樂趣。</p>	<p>INc-II-6 水有三態變化及毛細現象。</p> <p>INd-II-1 當受到外在因素作用時，物質或自然現象可能會改變。改變有些快、有些較慢；有些可以回復，有些則不能。</p>
	2-3 The Application of Water in Our Life 水在生活中的應用	<p>po-II-1 Students can make observations from daily experiences, learning activities, and the natural environment, and then they are able to become aware of problems. 能從日常經驗、學習活動、自然</p>	<p>INg-II-1 There are many resources in the natural environment. The survival and life of humans depend on various resources in the natural environment. Natural resources are limited; we need to cherish them.</p>

		<p>環境，進行觀察，進而能察覺問題。</p> <p>pc-II-1 Students can listen attentively to their classmates' reports, ask questions or make comments. And they can conduct a review of the method, process or outcome of the inquiry. 能專注聆聽同學報告，提出疑問或意見。並能對探究方法、過程或結果，進行檢討。</p>	<p>自然環境中有許多資源。人類生存與生活需依賴自然環境中的各種資源，但自然資源都是有限的，需要珍惜使用。</p> <p>INg-II-2 Making the resources of the Earth sustainable can be achieved with low-carbon and water-saving methods in daily life. 地球資源永續可結合日常生活中低碳與節水方法做起。</p>
<p>Chapter 3: The Weather 天氣停看聽</p>	<p>3-1 觀測天氣</p>	<p>ti-II-1 能在指導下觀察日常生活現象的規律性，並運用想像力與好奇心，了解及描述自然環境的現象。</p> <p>tc-II-1 能簡單分辨或分類所觀察到的自然科學現象。</p> <p>po-II-2 能依據觀察、蒐集資料、閱讀、思考、討論等，提出問題。</p> <p>pc-II-2 能利用簡單形式的口語、文字或圖畫等，表達探究之過程、發現。</p>	<p>INc-II-1 使用工具或自訂參考標準可量度與比較。</p> <p>INd-II-2 物質或自然現象的改變情形，可以運用測量的工具和方法得知。</p>
	<p>3-2 Weather Forecasting 氣象預報</p>	<p>po-II-2 Students can ask questions based on observation, data collection, reading, thinking, and discussion. 能依據觀察、蒐集資料、閱讀、思考、討論等，提出問題。</p> <p>pa-II-2 Students can use the information or data they receive to generate explanations, get answers, and solve problems. And they can compare their own inquiry results with others (e.g., from a teacher) and check if the results are similar</p>	<p>INd-II-6 The temperatures in the four-seasons of a year are varied; similarly, the weather in each season is different. We can know the possible changes in weather through weather reports. 一年四季氣溫會有所變化，天氣也會有所不同。氣象報告可以讓我們知道天氣的可能變化。</p> <p>INd-II-7 Rainfall, temperature, wind direction, wind speed, and other data are usually used in the weather forecasts to show the weather status. These data are</p>

		<p>or not.</p> <p>能從得到的資訊或數據，形成解釋、得到答案、解決問題。並能將自己的探究結果與他人的結果(例如：來自老師)相比較，檢查是否相近。</p>	<p>measured by using appropriate instruments.</p> <p>天氣預報常用雨量、溫度、風向、風速等資料來表達天氣狀態，這些資料可以使用適當儀器測得。</p> <p>INf-II-1 Common technology products in daily life. 日常生活中常見的科技產品。</p>
	3-3 季節與生活	<p>ti-II-1 能在指導下觀察日常生活現象的規律性，並運用想像力與好奇心，了解及描述自然環境的現象。</p> <p>tc-II-1 能簡單分辨或分類所觀察到的自然科學現象。</p>	<p>INd-II-6 一年四季氣溫會有所變化，天氣也會有所不同。氣象報告可以讓我們知道天氣的可能變化。</p> <p>INf-II-4 季節的變化與人類生活的關係。</p>
Chapter 4: Animal Kingdom 動物王國	4-1 Animal Body Structure 動物的身體構造與功能	<p>po-II-1 Students can make observations from daily experiences, learning activities, and the natural environment, and then they are able to become aware of problems. 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。</p> <p>ai-II-1 Students can maintain their curiosity about natural phenomena. They can explore and probe continuously to find new discoveries. 保持對自然現象的好奇心，透過不斷的探尋和提問，常會有新的發現。</p>	<p>INb-II-5 The external morphology of common animals mainly divides into head, trunk, and limbs. But the characteristics and names of the body parts of different animals are different. 常見動物的外部形態主要分為頭、軀幹和肢，但不同類別動物之各部位特徵和名稱有差異。</p>
	4-2 動物的生存	<p>po-II-1 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。</p> <p>po-II-2 能依據觀察、蒐集資料、閱讀、思考、討論等，提出問題。</p>	<p>INb-II-7 生物需要能量(養分)、陽光、空氣、水和土壤，維持生命、生長和活動。</p> <p>INb-II-7 動植物體的外部形態和內部構造，與其生長、行為、繁衍後代和適應環境有關。</p>

	4-3 愛護動物	<p>po-II-1 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。</p>	<p>INb-II-7 動植物體的外部形態和內部構造，與其生長、行為、繁衍後代和適應環境有關。</p> <p>INb-II-3 生物從出生、成長到死亡有一定的壽命，透過生殖繁衍下一代。</p>
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Grade Four 1 st Semester 四年級上學期			
	Sections	Learning Focus	
		Learning Performance	Learning Content
<p>Chapter 1: Moon 閃亮的天空</p>	<p>1-1 一天的天空</p>	<p>po-II-1 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。</p> <p>ai- II -2 透過探討自然與物質世界的規律性，感受發現的樂趣。</p>	<p>INc- II -10 天空中天體有東升西落的現象，月亮有盈虧的變化，星星則是有些亮有些暗。</p>
	<p>1-2 Measuring the Height of the Moon 月亮的位置</p>	<p>ti- II -1 Students can observe the patterns of daily life phenomena and use their imagination and curiosity for understanding and describe natural environment phenomena under the teacher's guidance. 能在指導下觀察日常生活現象的規律性，並運用想像力與好奇心，了解及描述自然環境的現象。</p> <p>po- II -1 Students can make observations from daily experiences, learning activities, and the natural environment, and then they are able to become aware of problems. 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。</p> <p>ah- II -2 Students can communicate their opinions and discoveries with others by systematic classification</p>	<p>INc- II -1 Using tools or custom standards to measure and compare. 使用工具或自訂參考標準可量度與比較。</p> <p>INc- II -2 Daily use of measurement units and metrics. 生活中常見的測量單位與度量。</p> <p>INc- II -10 In the sky, the celestial bodies rise from the east and fall in the west. The moon phases wax and wane. Some stars are bright and some stars are dim. 天空中天體有東升西落的現象，月亮有盈虧的變化，星星則是有些亮有些暗。</p> <p>INd- II -2 The changes in substances or natural phenomena can be detected by using measurement instruments and</p>

		and expression. 透過有系統的分類與表達方式，與他人溝通自己的想法與發現。	methods. 物質或自然現象的改變情形，可以運用測量的工具和方法得知。
	1-3 月相的變化	pa- II -2 能從得到的資訊或數據，形成解釋、得到解答、解決問題。並能將自己的探究結果和他人的結果（例如：來自老師）相比較，檢查是否相近。	INc- II -10 天空中天體有東升西落的現象，月亮有盈虧的變化，星星則是有些亮有些暗。 INd- II -2 物質或自然現象的改變情形，可以運用測量的工具和方法得知。
Chapter 2: Aquatic Environments 水域環境	2-1 An Aquatic Environmet Study 認識水 域環境	ti- II -1 Students can observe the patterns of daily life phenomena and use their imagination and curiosity for understanding and describe natural environment phenomena under the teacher's guidance. 能在指導下觀察日常生活現象的規律性，並運用想像力與好奇心，了解及描述自然環境的現象。 ah- II -1 Students can understand the characteristic of reality in life by all kinds of sense. 透過各種感官了解生活週遭事物的屬性。	INa- II -1 The natural world (including biotic and abiotic) is made up of different substances. 自然界（包含生物與非生物）是由不同物質所組成。 INc- II -8 Different living organisms exist for different environments. 不同的環境有不同的生物生存。(水域環境)
	2-2 水生植物	ti- II -1 能在指導下觀察日常生活現象的規律性，並運用想像力與好奇心，了解及描述自然環境的現象。 ai- II -1 保持對自然現象的好奇心，透過不斷的探尋和提問，常會有新發現。 po- II -2 能依據觀察、蒐集資料、閱讀、思考、討論等，提出問題。	INb- II -7 動植物體的外部形態和內部構造，與其生長、行為、繁衍後代和適應環境有關。

	2-3 水生動物	<p>ti- II -1 能在指導下觀察日常生活現象的規律性，並運用想像力與好奇心，了解及描述自然環境的現象。</p> <p>ah- II -2 透過有系統的分類與表達方式，與他人溝通自己的想法發現。</p>	<p>INb- II -7 動植物體的外部形態和內部構造，與其生長、行為、繁衍後代和適應環境有關。</p>
	2-4 珍惜水域環境	<p>tr- II -1 能知道觀察、記錄所得自然現象的結果是有其原因的，並依據習得的知識，說明自己的想法。</p>	<p>INf- II -2 不同的環境影響人類食物的種類、來源與飲食習慣。</p> <p>INf- II -5 人類活動對環境造成影響。</p> <p>INf- II -7 水與空氣汙染會對生物產生影響。</p>
	3-1 影響物質變化的因素	<p>ti-II-1 能在指導下觀察日常生活現象的規律性，並運用想像力與好奇心，了解及描述自然環境的現象。</p> <p>an- II -1 體會科學的探索都是由問題開始。</p>	<p>INd- II -1 當受外在因素作用時，物質或自然現象可能會改變。改變有些較快、有些較慢；有些可以回復，有些則不能。</p>
Chapter 3: Changes in Matter 物質變變變	3-2 The Effects of Temperature on Matter 溫度對物質的影響	<p>pe- II -1 Students can understand the possible effects of a change in one factor and predict the approximate outcome of the activity. 能了解一個因素改變可能造成的影響，進而預測活動的大致結果。在教師或教科書的指導或說明下，能了解探究的計畫。</p> <p>ai- II -2 Students can explore the pattern of the nature and the physical world, and feel the pleasure of discovering. 透過探討自然與物質世界的規律性，感受發現的樂趣。</p>	<p>INa- II -4 The form of the substances changes depending on the temperature. 物質的形態會因溫度的不同而改變。</p> <p>INa-II-5 Temperature can be increased by irradiation from the sun, material burning, and rubbing. Temperature can be detected by some metrical methods. 太陽照射、物質燃燒和摩擦等可以使溫度升高，運用測量的方法可知溫度高低。</p> <p>INe-II-2 The temperature affects the solubility</p>

			of substances in water (qualitative), and the burning, rusting, and fermentation of substances. 溫度會影響物質在水中溶解的程度（定性）及物質燃燒、生鏽、發酵等現象。
	3-3 酸與鹼對物質的影響	pa-II-1 能運用簡單分類、製作圖表等方法，整理已有的資訊或數據。 ah-II-1 透過各種感官了解生活週遭事物的屬性。	INe-II-4 常見食物的酸鹼性有時可利用氣味、觸覺、味覺簡單區分，花卉、菜葉會因接觸到酸鹼而改變顏色。
Chapter 4: The Interesting World of Sounds and Light 聲光世界真 有趣	4-1 聲音的產生與傳播	po-II-1 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。 po-II-2 能依據觀察、蒐集資料、閱讀、思考、討論等，提出問題。	INe-II-5 生活周遭有各種的聲音；物體振動會產生聲音，聲音可以透過固體、液體、氣體傳播。不同的動物會發出不同的聲音，並且作為溝通的方式。
	4-2 光的直進與反射	po-II-1 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。 po-II-2 能依據觀察、蒐集資料、閱讀、思考、討論等，提出問題。	INe-II-6 光線以直線前進，反射時有一定的方向。
	4-3 The Application of Sounds and Light 聲音和光的應用	ah-II-1 Students can understand the characteristic of reality in life by all kinds of sense. 透過各種感官了解生活週遭事物的屬性。 an-II-2 Students can communicate their opinions and discoveries with others by systematic classification and expression. 察覺科學家們是利用不同的方式探索自然與物質世界的形式與規律。	INf-II-1 Common technology products in daily life. 日常生活中常見的科技產品。

Grade Four 2nd Semester 四年級下學期

	Sections	Learning Focus	
		Learning Performance	Learning Content
Chapter 1: A World of Force 生活中的力	1-1 What is Force? 力的作用	<p>tc-II-1 Students can easily distinguish or classify the observed natural science phenomena. 能知道觀察、記錄所得自然現象的結果是有其原因的，並依據習得的知識，說明自己的想法。</p> <p>po-II-1 Students can make observations from daily experiences, learning activities, and the natural environment, and then they are able to become aware of problems. 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。</p>	<p>INd-II-8 There are different forms of force. 力有各種不同的形式。</p> <p>INd-II-9 An object's motion, situation or shape may be changed by force. When objects are deformed by force, some may restore to their original state, and some may not restore. 施力可能會使物體改變運動情形或形狀；當物體受力變形時，有的可恢復原狀，有的不能恢復原狀。</p>
	1-2 力的比較 與表示	<p>pe-II-2 能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和記錄。</p> <p>pc-II-2 能利用簡單形式的口語、文字或圖畫等，表達探究之過程、發現。</p> <p>tm-II-1 能經由觀察自然界現象之間的關係，理解簡單的概念模型，進而與其生活經驗連結。</p> <p>pa-II-1 能運用簡單分類、製作圖表等方法，整理已有的資訊或數據。</p>	<p>INc-II-1 使用工具或自訂參考標準可量度與比較。</p> <p>INc-II-2 生活中常見的測量單位與量。</p> <p>INc-II-3 力的表示法，包括大小、方向與作用點等。</p> <p>INc-II-4 方向、距離可用以表示物體位置。</p> <p>INd-II-2 物質或自然現象的改變情形，可以運用測量的工具和方法得知。</p>
	1-3 力的傳送	<p>pe-II-2 能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和記錄。</p>	<p>INc-II-5 水和空氣可以傳送動力讓物體移動。</p>

<p>Chapter 2: Properties of Water 水的奇妙現象</p>	<p>2-1 The Way Water Moves 連通管</p>	<p>ti-II-1 Students can observe the patterns of daily life phenomena and use their imagination and curiosity for understanding and describe natural environment phenomena under the teacher's guidance. 能在指導下觀察日常生活現象的規律性，並運用想像力與好奇心，了解及描述自然環境的現象。</p> <p>po-II-1 Students can make observations from daily experiences, learning activities, and the natural environment, and then they are able to become aware of problems. 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。</p>	<p>INb-II-1 Matters or objects have different functions or uses. 物質或物體各有不同的功能或用途。</p> <p>INb-II-3 The siphon phenomena can be used to suck the water out of a container. The connecting tube can be used to measure the horizon. 虹吸現象可用來將容器中的水吸出；連通管可測水平。</p>
	<p>2-2 虹吸現象</p>	<p>po-II-2 能依據觀察、蒐集資料、閱讀、思考、討論等，提出問題。</p> <p>an-II-1 體會科學的探索都是由問題開始。</p>	<p>INb-II-1 物質或物體各有不同的功能或用途。</p> <p>INb-II-3 虹吸現象可用來將容器中的水吸出；連通管可測水平。</p>
	<p>2-3 引水裝置</p>	<p>pe-II-2 能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和記錄。</p> <p>ai-II-3 透過動手實作，享受以成品來表現自己構想的樂趣。</p>	<p>INb-II-7 動植物體的外部形態和內部構造，與其生長、行為、繁衍後代和適應環境有關。</p>
<p>Chapter 3: The Earth's Changing Surface 變動的大地</p>	<p>3-1 我們的大地</p>	<p>tc-II-1 能知道觀察、記錄所得自然現象的結果是有其原因的，並依據習得的知識，說明自己的想法。</p> <p>pc-II-2 能利用簡單形式的口語、文字或圖畫等，表達探究之過、發現。</p>	<p>INc-II-9 地表具有岩石、沙、土壤等不同環境，各有特徵，可以分辨。</p>

	<p>3-2地表的變化</p>	<p>tr-II-1 能知道觀察、記錄所得自然現象的結果是有其原因的，並依據習得的知識，說明自己的想法。</p> <p>po-II-2 能依據觀察、蒐集資料、閱讀、思考、討論等，提出問題。</p>	<p>INd-II-5 自然環境中有沙石及土壤，會因水流、風而發生改變。</p>
	<p>3-3 Natural Disasters 大地的災害</p>	<p>pc-II-1 Students can listen attentively to their classmates' reports, ask questions or make comments. And they can conduct a review of the method, process or outcome of the inquiry. 能專注聆聽同學報告，提出疑問或意見。並能對探究方法、過程或結果，進行檢討。</p> <p>an-II-2 Students can perceive that the scientists use different methods to explore the patterns and laws of the natural and material world. 察覺科學家們是利用不同的方式探索自然與物質世界的形式與規律。</p>	<p>INf-II-6 Earthquakes can cause serious disasters; advance preparation and earthquake protection can normally reduce the damage. 地震會造成嚴重的災害，平時的準備與防震能降低損害。</p>
<p>Chapter 4: Energy and Circuits 能源與電路</p>	<p>4-1 生活中的能源</p>	<p>ah-II-1 透過各種感官了解生活週遭事物的屬性。</p>	<p>INa-II-6 太陽是地球能量的主要來源，提供生物的生長需要，能量可以各種形式呈現。</p> <p>INa-II-8 日常生活中常用的能源。</p>
	<p>4-2 燈泡亮了</p>	<p>po-II-1 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。</p> <p>pe-II-2 能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和記錄。</p>	<p>INa-II-3 物質各有其特性，並可以依其特性與用途進行分類。</p> <p>INb-II-1 物質或物體各有不同的功能或用途。</p> <p>INe-II-8 物質可分為電的良導體和不良導體，將電池用電線或良導體接成通路，可使燈泡發光、馬達轉動。</p>

	<p>4-3 串聯和並聯</p>	<p>pc-II-1 能專注聆聽同學報告，提出疑問或意見。並能對探究方法、過程或結果，進行檢討。</p> <p>pc-II-2 能利用簡單形式的口語、文字或圖畫等，表達探究之過程、發現。</p>	<p>INe-II-9 電池或燈泡可以有串聯和並聯的接法，不同的接法會產生不同的效果。</p>
	<p>4-4 Energy Conservation 節約能源</p>	<p>ah-II-2 Students can communicate their opinions and discoveries with others by systematic classification and expression. 透過有系統的分類與表達方式，與他人溝通自己的想法與發現。</p> <p>po-II-1 Students can make observations from daily experiences, learning activities, and the natural environment, and then they are able to become aware of problems. 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。</p> <p>an-II-3 Students can perceive that innovation and imagination are important elements in science. 發覺創造和想像是科學的重要元素。</p>	<p>INg-II-1 There are many resources in the natural environment. The survival and life of humans depend on various resources in the natural environment. Natural resources are limited; we need to cherish them. 自然環境中有許多資源。人生存與生活需依賴自然環境中的各種資源，但自然資源都是有限的，需要珍惜使用。</p> <p>INg-II-2 Making the resources of the Earth sustainable can be achieved with lowcarbon and watersaving methods in daily life. 地球資源永續可結合日常生活中低碳與節水方法做起。</p> <p>INg-II-3 Methods such as waste reduction, resource recovery, and energy conservation will protect the environment. 可利用垃圾減量、資源回收、節約能源等方法來保護環境。</p>

伍、教學計劃（包含中外師協同 1 節及中師主教 2 節，共 3 節。）

一、三年級上學期課程計劃

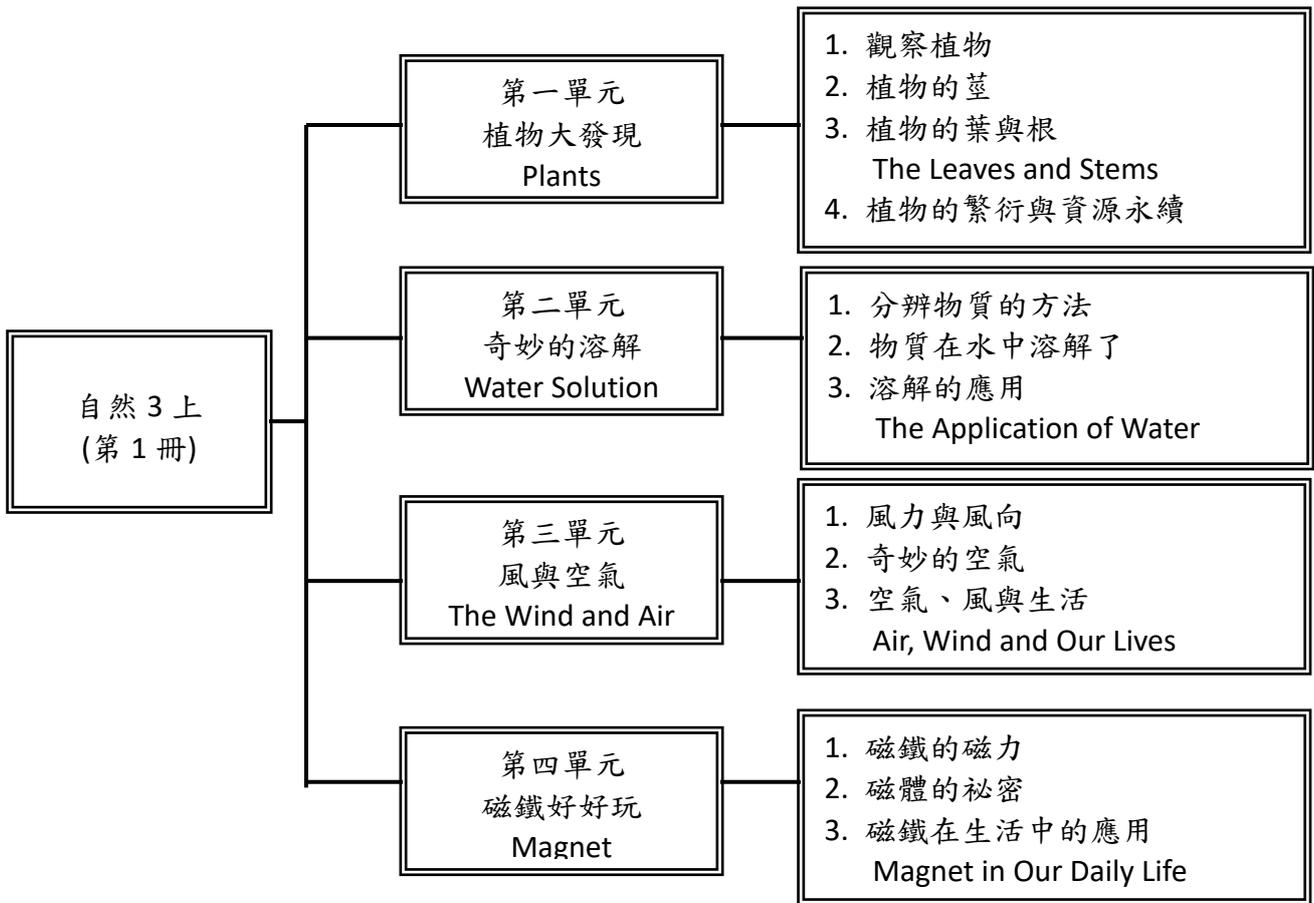
（一）課程目標

課程目標	
自然課程	<ol style="list-style-type: none">1. 觀察植物，並認識植物各部位構造和名稱。2. 能分辨草本莖、木本莖、藤本莖；了解植物的葉片於莖上的生長方式。3. 認識植物葉的構造，葉形、葉緣與葉脈有不同特徵；認識軸根和鬚根。4. 認識植物的花，花可以發育成果實，果實裡面有種子。5. 學習測量與記錄植物的方法。6. 察覺植物的妙用，以及珍惜植物資源的重要。7. 能運用五官觀察與認識物質的特徵及特性。8. 能知道溶解的定義。9. 能知道有的物質能溶在水中，有的物質不能溶在水中。10. 能知道不同物質在等量的水中有不同的溶解量。11. 能知道溫度會影響物質在水中的溶解量。12. 能知道生活中應用溶解的例子。13. 觀察風力與風向。14. 自製風力向計，並實際觀測。15. 透過觀察與操作了解空氣的性質。16. 認識生活中與空氣與風有關的現象或應用。17. 了解研究或製作一樣東西的過程與方法。18. 認識磁鐵的磁力，知道磁力可以隔著物品吸附鐵製品。19. 知道磁極的位置，了解磁極的磁力最強。20. 知道同極相斥、異極相吸的特性。21. 了解磁極可以指出方向。(二十二)知道日常生活中磁鐵的應用。

(二) 課程內涵：

總綱核心素養	學習領域核心素養
<p>依總綱核心素養項目及具體內涵勾選</p> <ul style="list-style-type: none"> ■ A1 身心素質與自我精進 ■ A2 系統思考與解決問題 ■ A3 規劃執行與創新應變 ■ B1 符號運用與溝通表達 ■ B2 科技資訊與媒體素養 □ B3 藝術涵養與美感素養 ■ C1 道德實踐與公民意識 ■ C2 人際關係與團隊合作 □ C3 多元文化與國際理解 	<p>自-E-A1 能運用五官，敏銳的觀察周遭環境，保持好奇心、想像力持續探索自然。</p> <p>自-E-A2 能運用好奇心及想像能力，從觀察、閱讀、思考所得的資訊或數據中，提出適合科學探究的問題或解釋資料，並能依據已知的科學知識、科學概念及探索科學的方法去想像可能發生的事情，以及理解科學事實會有不同的論點、證據或解釋方式。</p> <p>自-E-A3 具備透過實地操作探究活動探索科學問題的能力，並能初步根據問題特性、資源的有無等因素，規劃簡單步驟，操作適合學習階段的器材儀器、科技設備及資源，進行自然科學實驗。</p> <p>自-E-B1 能分析比較、製作圖表、運用簡單數學等方法，整理已有的自然科學資訊或數據，並利用較簡單形式的口語、文字、影像、繪圖或實物、科學名詞、數學公式、模型等，表達探究之過程、發現或成果。</p> <p>自-E-B2 能了解科技及媒體的運用方式，並從學習活動、日常經驗及科技運用、自然環境、書刊及網路媒體等，察覺問題或獲得有助於探究的資訊。</p> <p>自-E-C1 培養愛護自然、珍愛生命、惜取資源的關懷心與行動力。</p> <p>自-E-C2 透過探索科學的合作學習，培養與同儕溝通表達、團隊合作及和諧相處的能力。</p>

(三)課程架構圖：



(四) 教學規劃：

教學 期程	單元/主題名稱與活動內容	節數	教學資源/ 學習策略	評量方式	備註
第一週	<p>一、植物大發現</p> <p>1、觀察植物</p> <p>活動一：觀察植物</p> <p>一、引起動機</p> <p>1. 教師請學生分享：過去日常生活中曾經看過什麼植物？是什麼名字／有什麼特殊的地方？</p> <p>2. 教師請學生分享時，請學生補充（追問）學生是怎樣觀察到的？</p> <p>二、外出的準備</p> <p>1. 教師從課本引導我們可以用哪些觀察方法，例如先使用眼睛觀察、確認安全後可以使用觸摸的方法進行觀察、也可以使用氣味進行觀察。如果有碰觸植物後，必須確實洗手保護安全。</p> <p>(搭配課本引導觀察方法)</p> <p>2. 教師說明外出教室進行校園植物觀察的路線、地點、行進過程的秩序、觀察的地點與時間範圍、小組活動的規範。</p> <p>3. 教師補充說明校園中可能具有危險性的植物、動物。</p> <p>三、校園植物探索</p> <p>1. 教師帶出教室，來到校園。教師限定活動範圍，讓小組進行分組探究。</p> <p>2. 教師進行組間的巡視與指導。</p> <p>3. 教師請學生觀察樹木，並說明樹木的特徵。(樹幹、樹葉、花、果實、樹根、……)</p> <p>活動二：植物的部位或構造</p> <p>一、暖身活動</p> <p>1. 教師先與學生討論如何稱呼植物各部位的方法，例如示範如何查詢網路資料。</p> <p>二、認識植物的身體構造</p> <p>1. 教師準備一盆桌上型盆栽（或校園植物），讓學生說說這盆植物的身體有哪些部位？</p> <p>2. 教師請學生觀察課本圖片，想想看，植物的身體可以分成哪幾個部位呢？</p> <p>3. 教師說明植物可以分為莖、根、葉、花與果實。</p> <p>三、我會認植物的構造</p> <p>1. 教師請學生指出小組桌上的盆栽（或是圖片、掛圖等）各個植物部位。</p> <p>2. 教師播放簡報檔或者照片（其中有教師事前準備的各種植物、各種部位的特寫），</p>	3	課本 電子教科書 或簡報	口頭報告 習作評量	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： <hr/> 2. 協同節數： <hr/>

	<p>請全班一起共同回答這是植物的哪個部位。</p> <p>四、總結</p> <ol style="list-style-type: none"> 1. 教師再次說出並指出植物的各個構造，進行複習。 2. 請學生完成習作。 				
第二週	<p>一、植物大發現</p> <p>2、植物的莖</p> <p>活動一：觀察莖的生長與記錄</p> <p>一、暖身活動</p> <ol style="list-style-type: none"> 1. 教師請學生簡單說出自己認為的大樹、小草、藤蔓的差別。 <p>二、植物的莖與陽光有關係</p> <ol style="list-style-type: none"> 1. 教師說明植物的生長需要爭取陽光，並且請學生思考植物的莖有什麼模樣，來爭取陽光。(這裡請學生先不要舉手回答，全班暫時一起想像約1分鐘，之後小組討論約3~5分鐘) <p>三、提問教學</p> <ol style="list-style-type: none"> 1. 教師說明我們要研究大自然，要先觀察大自然以後，對自然現象進行提問並且研究。 2. 教師說明提問方式：_____的莖有什麼特徵？ <p>請學生在裡面進行語詞替換</p> <ol style="list-style-type: none"> 3. 教師在黑板上列出三排： <ul style="list-style-type: none"> “大樹的莖有什麼特徵” “小草的莖有什麼特徵” “藤蔓的莖有什麼特徵” 4. 教師進一步請學生以小組發表的方式，說明自己認為大樹、小草、藤蔓各有什麼特徵，並且以便利貼/小白板/板書等方式寫在黑板上 5. 教師將學生的提問進一步延伸 <p>四、想像力創造教學</p> <ol style="list-style-type: none"> 1. 教師根據學生提問過的內容進一步請學生想像可能的原因，進行假設。(假設不見得正確，讓學生自由發揮) 2. 教師請學生對於自己的假設再進一步實地觀察尋求證據，來驗證他們的說法。學生可能說法相同，也可能想法有所改變。 3. 教師請學生比較自己的想法是否跟之前有相同，並且請學生驗證自己找的例子是否都能證明自己的想像。 4. 教師請學生發表自己的歸納與總結。 <p>五、統整</p> <ol style="list-style-type: none"> 1. 教師統整上一節課學生們對於植物莖的調查與發現，並且總結為植物可以分為：草本莖、木本莖、藤本莖。 2. 教師進一步說明，樹木堅硬的樹幹讓自己往上生長；小草雖然沒有經驗的莖但也是往上生長，而且不怕強風吹斷；藤蔓則是爬在其他堅硬的物體而向上生長。 3. 教師說明植物的莖具有支撐或者將植物 	3	<p>課本 電子教科書 或簡報 影片 各種輔助觀察用具 捲尺</p>	<p>口頭報告 觀察記錄 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目： _____</p> <p>2. 協同節數： _____</p>

	延伸出去的功能，目的是為了吸收更多陽光得到能量。				
第三週	<p>一、植物大發現</p> <p>2、植物的莖</p> <p>活動一：葉子在莖上的生長方式</p> <p>一、暖身活動</p> <p>1. 教師發下互生、對生、輪生等植物範例，請學生在表格上填入他們數出來、節上的葉片數量，並且簡單的用圖卡畫出來。</p> <p>2. 教師說明依照植物葉片在節上的生長方式與數量，可以分為：互生、對生、輪生。</p> <p>3. 教師請學生想像或者由上往下看植物實體，請學生觀察這樣子植物的葉子能不能擋到桌面。</p> <p>4. 教師說明植物的交互生長在於能夠被更多陽光照到，而利用陽光的能量製造養分。</p> <p>二、辨認植物的葉序</p> <p>1. 教師使用照片螢幕播放，或者實際帶學生進入校園，請學生回答植物的葉序。</p> <p>2. 進行習作習題的書寫。</p>	3	課本 電子教科書 或簡報 植物盆栽	口頭報告 習作評量	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____
第四週	<p>一、植物大發現</p> <p>3、植物的葉與根</p> <p>活動一：觀察葉子</p> <p>一、暖身活動</p> <p>1. 教師帶學生到校園，撿拾落葉。</p> <p>二、認識葉子的構造</p> <p>1. 教師說明葉子的構造，包含葉柄、葉片。葉片裡有脈紋為葉脈、葉片的邊緣為葉緣。</p> <p>2. 教師請每位學生挑選一個他覺得最特別的葉片，在白紙上進行繪畫。讓學生將葉脈用黑色線條表現、葉緣用紅色線條描繪。</p> <p>3. 教師指導學生將課本的觀察完成後，並且以文字(可以寫注音)的方式完成葉子特徵的紀錄。</p> <p>三、總結</p> <p>1. 教師蒐集學生的葉子觀察記錄，並且彙整統整後，教師總結各種不同葉子的特徵</p> <ul style="list-style-type: none"> • 葉子的形狀(葉形)。 • 葉子的邊緣(葉緣)。 • 葉子的脈紋(葉脈)。 • 葉子的大小。 • 葉子的顏色。 • 葉子的厚度、葉子的絨毛與蠟質等其他不同特徵。 <p>2. 教師可以將學生記錄的不同葉子特徵列在黑板上後，一起與學生探討可能的葉子特徵功能。例如有些葉子的尖端比較尖</p>	3	課本 電子教科書 或簡報 影片 圖卡或白紙	小組互動表現 觀察記錄	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____

	<p>長，具有排水的功能。學生也可以想像葉子其他特徵的功能，例如鋸齒狀、長絨毛等可能是為了防止被蟲咬、讓蟲比較不好啃咬葉片，或者蠟質具有防水功能、香氣具有驅趕或者吸引特定動物的能力。</p>				
第五週	<p>一、植物大發現 3、植物的葉與根 活動一：認識植物的根 一、暖身活動 教師準備盆栽（建議為農藝材料行所販售的小盆菜苗），單子葉蔬菜與雙子葉蔬菜各一（如蔥苗、小白菜苗）發給各小組，請學生將蔬菜的盆土於報紙上輕輕拍掉，並且進行觀察。 二、認識植物的根 1. 教師請學生簡單的描繪植物的根。 2. 教師說明植物的根可以分為鬚根、軸根，其中軸根具有明顯較粗的主根；鬚根的每一根根粗細差不多、根比較分散而且生長較淺。 3. 請學生說明小組分到的菜苗，何者為鬚根、何者為軸根。 三、總結 1. 教師複習植物的根的種類。 2. 完成習作習題。</p>	3	<p>課本 電子教科書 或簡報 影片 菜苗盆栽 圖卡</p>	<p>小組互動表現 實驗操作 觀察記錄 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____</p>
第六週	<p>一、植物大發現 4、植物的繁衍與資源永續 活動一：觀察植物的花 一、暖身活動 1. 教師請學生發表、分享他看過怎樣的花，是什麼顏色？有怎樣的氣味？ 2. 教師說明這節課要來觀察植物的花朵構造，而花朵的有些構造非常細小，我們可以使用放大鏡來觀察。 二、使用放大鏡 1. 教師發下放大鏡，請學生嘗試怎樣的距離可以將課本的字放大。 2. 教師請學生抓取放大鏡放大物體最大，要保持怎樣的距離。 三、觀察植物的花朵 1. 教師將花朵、紙發下，請學生使用放大鏡觀察花朵的構造並且描繪出來。 四、各式各樣的花朵 1. 教師使用簡報與照片、圖片，播放許多漂亮的花朵，除了欣賞花朵的美感外，也請學生指出花朵的一些構造。 2. 教師播放瓜果類，花謝後雌蕊慢慢發育成果實的影片。 活動二：觀察植物的果實與種子 一、暖身活動 1. 教師發下已經切好的水果（建議橫面、縱面都切），請學生進行觀察與繪圖紀錄。</p>	3	<p>課本 電子教科書 或簡報 影片 放大鏡 鑷子 紙 果實</p>	<p>小組互動表現 觀察記錄 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____</p>

	<p>特別強調學生要畫出種子的排列方式。</p> <p>二、觀察植物的果實</p> <ol style="list-style-type: none"> 1. 教師以課本電子教科書、照片等方式，說明有些植物的果實膨脹，能夠被動物食用。 2. 教師也可以請學生發表平常吃瓜果類或者芭樂會不會挑出種子，如果沒有挑出種子，那麼種子會跑到哪去呢？ 3. 教師說明很多植物的果實膨脹而且有營養、多汁多甜帶有香味，可以吸引許多動物食用後，隨著糞便排出種子，讓植物的下一代到更遠的地方生長繁殖。 4. 教師說明每一種植物的果實，裡面種子的數量都不見得相同。有些果實裡面只有一顆種子，有些果實裡面有許多排列規則或者不規則的種子。 <p>三、總結</p> <ol style="list-style-type: none"> 1. 教師複習花朵、果實的構造。 2. 完成習作。 <p>活動三：我們生活周遭的植物</p> <p>一、引起動機</p> <ol style="list-style-type: none"> 1. 教師請學生發表、分享在日常生活之中，哪些物質是使用植物製作而成的？ <p>二、植物對我們的生活</p> <ol style="list-style-type: none"> 1. 教師說明植物提供我們食衣住行，例如做為糧食的稻穀玉米小麥、各種蔬菜水果。衣服、繩子、袋子，甚至作為交通工具的木船、木屋等。 2. 植物會吸收太陽的能量，製造養分，給其他的動物吃。比如人類、昆蟲。 3. 想一想，如果有一天全世界都沒有植物，那麼人類還能夠存活嗎？其他動物能不能活下來？我們人類會不會遭受到影響？ 4. 教師舉例同一種植物在不同文化/民族的不同運用(例如構樹)；相同植物也能在不同生活方面進行各種運用(例如木材可以做為永續建材與可再生能源)。 5. 教師請學生思考並想像如何永續利用植物資源，需要做什麼樣的植物資源補救措施，或者減量方法，請學生分享與發表。 				
第七週	<p>二、奇妙的溶解</p> <p>1、分辨物質的方法</p> <p>活動一：如何觀察物質的特徵？</p> <p>一、引起動機</p> <ol style="list-style-type: none"> 1. 連結學生的生活經驗，請學生分享自己最喜歡或曾吃過覺得特別的料理及其味道，並引導學生說出形成此味道可能使用的調味料。 2. 請學生說一說認識的調味料種類，並分享是否有因某種調味料外觀與其他調味料或物質外觀相似而誤認的經驗。 <p>二、探索活動</p>	3	<p>課本及習作 電子教科書 或簡報 教學影片 實驗器材： 食鹽、二 砂、特砂、 細沙、粗粒 黑胡椒、放 大鏡</p>	<p>口頭報告 小組互動表 現 觀察記錄 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目： _____</p> <p>2. 協同節數： _____</p>

	<p>1. 教師拿出食鹽、二砂、特砂、細沙和粗粒黑胡椒，請學生說一說可以用什麼方法分辨它們。</p> <p>2. 操作：請學生先觀察食鹽，再說一說觀察結果（例如：食鹽特徵或特性）。</p> <p>3. 操作：請學生聚焦於觀察食鹽的外觀（例如顏色、形狀等），將眼睛看到特徵說出來。</p> <p>4. 教師引導學生除了用眼睛觀察食鹽的外觀外，還可以運用鼻子聞食鹽、用手摸食鹽。</p> <p>5. 教師引導學生除了上述的觀察方法外，還可以用什麼方法來觀察食鹽。</p> <p>6. 操作：請學生依照觀察食鹽的方法與步驟，運用各種感官觀察二砂、特砂、細沙和粗粒黑胡椒，並將觀察結果記錄在習作中。</p> <p>三、統整活動</p> <p>1. 討論：食鹽、二砂、特砂、細沙和粗粒黑胡椒 5 種物質，其中外觀或特性相似的物質，可以透過哪些方法分辨？</p> <p>2. 歸納：</p> <p>(1) 分辨物質前，要先有系統的觀察與認識所面對物質的外部特徵與特性，我們可以運用五官來觀察物質的外部特徵與特性，但觀察時要注意安全，例如嗅聞或觸摸物質時，要先確認物質的安全性；不隨意將物質放進嘴裡嘗，以免對身體造成傷害。</p> <p>(2) 每種物質都有它的特性，我們也可以依其特性與用途進行分類。</p>				
第八週	<p>二、奇妙的溶解</p> <p>2、物質在水中溶解了</p> <p>活動一：物質都能溶解在水中嗎？</p> <p>一、引起動機</p> <p>1. 根據課本的情境圖，請學生分享生活中家人如何煮蛤蜊湯或自己喝蛤蜊湯的經驗。</p> <p>2. 引導學生思考泡蛤蜊出現的沙子留在碗底，但加入蛤蜊湯中的食鹽為什麼不見了？</p> <p>二、探索活動</p> <p>1. 引導學生探討在湯裡加入食鹽，可能會有什麼變化。</p> <p>2. 教師示範或播放食鹽溶於水的影片，透過觀察食鹽在水中顆粒大小的變化，引導學生認識「溶解現象」。</p> <p>3. 教師提問並引導學生思考所有的物質都可以溶解在水中嗎？</p> <p>4. 師生共同準備燒杯、玻璃棒、小茶匙、水、二砂、特砂、細沙和粗粒黑胡椒。</p> <p>5. 預測：請學生預測二砂、特砂、細沙和粗粒黑胡椒，哪些物質會溶解在水中？哪些物質不會溶解在水中？</p> <p>6. 操作：引導學生依照課本中《物質的溶</p>	3	<p>課本及習作 電子教科書 或簡報 實驗影片 實驗器材： 燒杯、玻璃棒、小茶匙、水、二砂、特砂、細沙、粗粒黑胡椒</p>	<p>口頭報告 小組互動表現 實驗操作 習作評量</p>	<p><input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目： _____</p> <p>2. 協同節數： _____</p>

	<p>解情形》實驗步驟操作，並將觀察結果記錄在習作中。</p> <p>三、統整活動</p> <p>1. 討論：引導學生根據課本中的問題進行討論。</p> <p>2. 歸納：有些物質可以溶解在水中，稱為可溶物，例如食鹽、砂糖；有些物質不能溶解在水中，稱為不可溶物，例如細沙、粗粒黑胡椒。</p>				
第九週	<p>二、奇妙的溶解</p> <p>2、物質在水中溶解了</p> <p>活動一：食鹽和特砂的溶解量相同嗎？</p> <p>一、引起動機</p> <p>1. 教師引導學生思考食鹽和特砂都是常見的調味料，而且外觀相似，所以要如何分辨它們呢？</p> <p>二、探索活動</p> <p>1. 鼓勵學生發表分辨食鹽和特砂的方法。</p> <p>2. 鼓勵學生發表如何測量與比較食鹽和特砂在水中的溶解量時，引導學生學習控制變因。</p> <p>3. 為了要固定每次加入水中的食鹽或特砂量，以及固定每次的水量，教師引導學生學習刮成平匙的方法及正確讀取量筒內水量的方法。</p> <p>4. 師生共同準備燒杯、玻棒、量匙、量筒、水、食鹽及特砂。</p> <p>5. 預測：請學生預測食鹽和特砂，哪一種溶解量比較多？</p> <p>6. 操作：引導學生依照進行探究實驗，並將觀察結果記錄在習作中。</p> <p>三、統整活動</p> <p>1. 討論：引導學生根據課本中的問題進行討論。</p> <p>2. 歸納：</p> <p>(1)食鹽和特砂都是可溶物，但是它們在等量的水中，溶解的匙數卻不相同（特砂溶解的匙數較食鹽多），所以不同的物質在水中有不同的溶解量，這是物質的重要特性。</p> <p>(2)食鹽、特砂和水一樣占有空間，所以加入水中後，水位會上升。</p>	3	<p>課本及習作 電子教科書 或簡報 實驗影片 實驗器材： 燒杯、玻棒、量匙、量筒、水、食鹽及特砂</p>	<p>口頭報告 小組互動表現 實驗操作 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目： _____</p> <p>2. 協同節數： _____</p>
第十週	<p><期中考></p> <p>二、奇妙的溶解</p> <p>2、物質在水中溶解了</p> <p>活動一：如何讓砂糖繼續溶解？</p> <p>一、引起動機</p> <p>1. 教師提問並引導學生思考當水中的砂糖不能再溶解時，可以利用什麼方法繼續溶解？</p> <p>2. 師生共同準備已有砂糖沉澱的砂糖水、玻棒、溫度計、盆子、冷水、熱水。</p> <p>二、探索活動</p>	3	<p>課本及習作 電子教科書 或簡報 實驗影片 實驗器材： 燒杯、玻棒、盆子、冷水、熱水和砂糖</p>	<p>口頭報告 小組互動表現 實驗操作 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目： _____</p> <p>2. 協同節數： _____</p>

	<p>1. 預測：請學生預測若燒杯中裝有砂糖沉澱的砂糖水，加入一些水後，杯底沉澱的砂糖是否會溶解？</p> <p>2. 操作：引導學生依照課本中《讓砂糖繼續溶解-方法一：增加水量》實驗步驟操作，並將觀察結果記錄在習作中。</p> <p>3. 預測：請學生預測若燒杯中裝有砂糖沉澱的砂糖水，其浸入熱水後，杯底沉澱的砂糖是否會溶解？</p> <p>4. 操作：引導學生依照課本中《讓砂糖繼續溶解-方法二：提高水溫》實驗步驟操作，並將觀察結果記錄在習作中。</p> <p>三、統整活動</p> <p>1. 討論：引導學生根據課本中的問題進行討論。</p> <p>2. 歸納：當水中的砂糖不能再溶解時，可以透過增加水量或提高水溫，讓原本沉澱在杯底的砂糖繼續溶解，所以水量和水溫均會影響砂糖的溶解量。水量多，砂糖的溶解量多；水溫高，砂糖的溶解量也多。</p> <p>3. 閱讀充電站《溶解「蜜」方》，並請學生說一說「已結晶的蜂蜜為什麼用溫水比用冷水容易泡開？」。</p>				
第十一週	<p>二、奇妙的溶解</p> <p>3、溶解的應用</p> <p>活動一：生活中有哪些利用溶解的例子？</p> <p>一、引起動機</p> <p>1. 連結學生的生活經驗，請學生說一說生活中常見的溶解現象。</p> <p>二、探索活動</p> <p>1. 教師引導學生討論查詢資料的方法，並鼓勵學生蒐集更多生活中應用溶解的例子。</p> <p>2. 分組報告所蒐集到應用溶解的例子。</p> <p>3. 將生活中利用溶解的例子分類，除了飲食外，清潔物品時也有溶解現象的應用。</p> <p>4. 鼓勵學生查詢與蒐集其他利用溶解的方法來清潔物品的例子，並向同儕分享。</p> <p>三、統整活動</p> <p>1. 總結：生活中，將鹽、糖等調味料溶解在湯或飲料中調味，或是將清潔劑溶解在水中來清潔物品，都是常見的溶解現象，這些溶解的應用，讓我們的生活變得更多元、更便利。</p> <p>2. 閱讀科學百科——神奇又便利的洗衣膠囊，並讓學生想一想、說一說課本中動動腦的問題。</p>	3	課本及習作 電子教科書 或簡報 教學影片	口頭報告 資料蒐集 習作評量	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____
第十二週	<p>三、風與空氣</p> <p>1、風力與風向</p> <p>活動一：判斷風的強弱？</p> <p>一、引起舊經驗</p> <p>1. 教師可以讓學習者發表在低年級時，關於「風」的舊經驗，接著請學習者討論</p>	3	課本 電子教科書 或簡報 旗幟 風車 指北針	口頭評量 紙筆評量 實作評量	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____

	<p>「有什麼方式可以知道風的存在」。如：颱風時的感受。</p> <p>二、觀察實物與發表經驗</p> <p>1. 請學習者發表風力強弱會造成什麼生活上的影響，接著請學習者觀察圖片或是實物，觀察風強或風弱時，物品會有什麼變化。</p> <p>2. 教師再由兩個風力接近程度的圖片提問：「那要怎麼判斷哪一個狀況下的風比較強呢？」</p> <p>三、討論——要怎麼判斷風力強弱</p> <p>1. 請學習者發表他們判斷風力強弱的標準如：草彎曲程度、雲飄動快慢等等。</p> <p>四、形成性評量——習作練習</p> <p>1. 習作撰寫時，可觀察學習者對於不同風力吹到物體後，對物體造成的變化，在未來有關「力」的單元中，可讓學習者產生舊經驗的連結。</p> <p>活動二：風從哪裡來？</p> <p>一、連結先前經驗</p> <p>1. 教師可先嘗試預設風由學習者的某個方向吹過來，接著請學習者發表風是由什麼方向吹過來。</p> <p>二、使用指北針</p> <p>1. 教師可由課本詞句引導學習者發現方向要看面向的方向做決定，所以若要溝通「正確的風向」時，就必須得用方位作為描述風向的辦法，而方位指的是「東南西北」四個方位。</p> <p>三、討論——判斷風向？</p> <p>1. 在能夠正確判斷方位後，教師可以直接明示風向的定義，接著讓學習者討論風向的畫記該怎麼記錄。</p> <p>2. 教師可以由文字上的描述讓學習者嘗試轉錄成圖像，再讓學習者討論圖像的正確性，如：教師可以提問「若風從西方吹過來，該怎麼表示？」</p> <p>四、結論——</p> <p>1. 風來的方向稱為風向，物品被風吹起的方向與風向相反，風向使用方位作為表示。</p> <p>五、形成性評量——習作練習</p> <p>1. 習作撰寫時，主要觀察學習者對於風向的定義以及指北針的使用是否有清楚的認識，在繪圖上因為需要清楚的辨認風向的直線，可讓學生思考使用容易辨認的方式繪出。</p>	習作		<p>2. 協同節數：</p> <hr/>
第十三週	<p>三、風與空氣</p> <p>1、風力與風向</p> <p>活動一：自製風力風向計</p> <p>一、引起舊經驗</p> <p>1. 教師可先對學習者提問風力怎麼判斷以及風向怎麼判斷，確認學習者都對風力與</p>	3 課本 電子教科書 或簡報 風力風向計 材料 習作	實作評量	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目：

	<p>風向有一定的了解時，再進行實作。</p> <p>二、觀察實物或圖（影）片構造以及比對功能</p> <p>1. 教師透過影片、圖片或實物，讓學習者了解風力風向計需要的功能並觀察其構造，像是「能夠隨著風向旋轉」、「能夠利用某個條件判斷風力」。接著再請學習者思考可以什麼材料或是生活中的實體可以製作出類似的功能（在此可參考課本內圖片）。</p> <p>三、製作風力風向計</p> <p>1. 教師可先透過先前的引導，使學習者模仿其功能製作類似的風力風向計，做好後可利用教室中能製造風的器物測試功能是否正常後固定在方位盤上，再透過同儕或是教師評量功能性，最後帶領學習者練習使用方位盤尋找正確方位。</p> <p>四、討論——哪裡可以測量正確的風力與風向？</p> <p>1. 教師帶領學習者到戶外判斷風向與風力前，可參考以下氣象局對風向風力計的說明，讓學習者討論要在何處才能得到較準確的觀察結果。</p> <p>2. 「風速風向儀：風速風向儀用來測量地面風的速度及方向。風向主要受到大範圍的天氣系統及地形等自然或地理現象的影響，但是接近地面的風向、風速則會受到建築物的影響而改變，我們常說的大樓風就是一個明顯的例子。為了更準確的觀測風速風向，風速風向儀通常會設置在離地面約 10 公尺高的位置。」</p> <p>五、延伸遊戲——紙飛機在不同風力及風向的飛起情況</p> <p>1. 透過此單元學過的風力及風向概念，試著讓學生進行風的遊戲，比較紙飛機在哪一種風力及風向的情況下會飛得較順利，並可藉由此活動和此單元的科學閱讀內容作連結，了解側風對飛機飛行的影響。</p> <p>六、形成性評量——習作練習</p> <p>1. 習作撰寫時，除了觀察學習者對於操作觀測工具的程序性概念正確性外，可引導學習者在觀測記錄上思考「風力與風向」的變化。需要注意的是，因為風的改變與氣壓有關，所以在此並不需要詢問學習者「為何會改變」。</p>				<p>2. 協同節數：</p> <hr/>
<p>第十四週</p>	<p>三、風與空氣</p> <p>2、奇妙的空氣</p> <p>活動一：生活中的物質</p> <p>一、觀察引導——各式各樣的物質</p> <p>1. 教師可引導學習者先觀察身邊的物品，簡單定義「物質」，像是筆、紙，再到更遠一點的教室、植物都是物質。最後，引導學習者至「看不見空氣也是一種物質嗎？」作為核心問題進行之後的學習。</p>	<p>3</p>	<p>課本 電子教科書 或簡報 含空氣的物品 塑膠袋</p>	<p>口頭評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目：</p> <hr/> <p>2. 協同節數：</p> <hr/>

【自編課程】

1. 來回揮動塑膠袋，捏住袋口，再用點力，擠壓塑膠袋。
2. 捏住塑膠袋袋口，放入水中再稍微鬆開袋口並壓塑膠袋。



二、討論——空氣在哪裡？

1. 由教師提問「要怎麼知道周圍都是空氣呢？」
2. 觀察實物與發表經驗：從學習者回答上一個問題後，透過觀察圖片以及實物，教師可再進階問：「為什麼得透過這些現象來觀察空氣的存在？」

三、討論——為什麼我們要透過這些現象來觀察空氣的存在呢？

1. 教師此時可以引導學習者嘗試提出稍微完整的解釋，像是「因為空氣沒有顏色，所以看不見，必須得用其他方法觀察」。

四、歸納

1. 空氣無色、無味，雖然看不見，但能透過一些方法觀察它，能發現空氣就在我們的周圍。

活動二：空氣流動形成風？

一、連結先前經驗

1. 建立經驗——要做什麼才能產生風呢？教師與學習者討論此問題時，盡量以身邊就能找到的器材且以真正能夠產生風為主。例如：颱風雖然有風，但無法立即用器材呈現成因。

二、討論與發表——

1. 透過多種的器材產生風後，可引導學習者觀察在使用工具產生風的時候，工具形狀的變化或移動，使周圍的空氣產生移動，引導學習者得到「空氣流動形成風」的概念。

三、實驗驗證——空氣與風的關係

1. 教師由空氣流動形成風的概念引導學習者思考「空氣的流動快慢會不會影響風的強弱呢？」透過不同的方法進行想法的驗證。

(1) 預測：空氣流動的愈快/慢，代表風也愈強/弱。

(2) 觀察：透過演示或是親自操作觀察快慢的空氣流動與紙條飄動高度或是泡泡數量的影響。

(3) 解釋：空氣流動的愈快，紙條飄的愈高、泡泡愈多，風也愈強。

(4) 討論：可以請學習者討論「觀測風力時，如果紙片飄的較高或是泡泡愈多，就代表當時的空氣流動也比較快」的教學，使學習者產生學習聯結。

	<p>四、進階討論——空氣一定要流動才會產生風嗎？</p> <p>1. 接續上面的討論，學習者在提出方法時，或許會提到拿著風車奔跑或是車輛行駛時會感受到風。此時可以將「相對」概念帶入課程中，當空氣沒有流動時，透過物體在空氣中移動，也會感受到空氣的流動進而形成風，而物體速度愈快，感受的風愈強。</p>				
<p>第十五週</p>	<p>三、風與空氣</p> <p>2、奇妙的空氣</p> <p>活動一：空氣有固定形狀、占有空間嗎？</p> <p>一、連結先前經驗</p> <p>1. 由教師拿出空瓶或海綿並再次提問：「這兩個物品都含有空氣嗎？」。</p> <p>二、觀察與比較物品狀態與發表經驗</p> <p>1. 教師一樣拿出海綿與空瓶提問：「你認為這兩個物品內的空氣形狀會一樣嗎？如果不一樣，請說說不一樣的地方。」</p> <p>三、討論——空氣有固定形狀嗎？</p> <p>1. 教師可拿出多種硬質或軟質容器，引導學習者進行空氣形狀的討論，也可將軟質容器，如課本提及的游泳圈等等消氣，觀察消氣前後，游泳圈狀態的改變，討論是什麼造成游泳圈形狀的改變，而在容器內有空氣時，空氣會是什麼形狀，最後引導至各種物體內的空氣都有不同的形狀。</p> <p>四、深入討論——為什麼空氣沒有固定形狀呢？</p> <p>1. 因為空氣在上一個活動學習者已經可以理解空氣是看不見的，故在此活動中，可藉由類比的方式找出跟空氣性質類似的物質觀察到「空氣是流動的物質，跟水一樣，所以會隨著容器形狀改變自己的形狀」。讓學習者嘗試做出科學解釋。</p> <p>五、空氣占有空間嗎？——杯內紙團會濕嗎？</p> <p>1. 教師先由袋子鼓鼓的現象，引導學生「看得見的物體」占有空間，再詢問學習者「看不見的空氣」也占有空間嗎？此時可讓學習者使用水杯、紙團以及水盆一樣進行簡易的預測、觀察、解釋的學習。</p> <p>2. 結論——杯內的空氣占有空間，所以水碰不到紙團。</p> <p>活動二：空氣具有重量嗎以及物質性質的歸納</p> <p>一、空氣具有重量嗎？</p> <p>1. 二年級數學學生已學過天平的概念從，從可見的物品(如水與沙)都能使用天平知道水與沙都是具有重量的物質，並引導學習者思考「看不見」的空氣有重量嗎？</p> <p>2. 教師可透過和天平相似的方式，來比較氣球未充氣和充滿空氣後，兩者的重量變</p>	<p>3</p>	<p>課本 電子教科書 或簡報 氣球 吸管天平</p>	<p>口頭評量 紙筆評量 實作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目：</p> <hr/> <p>2. 協同節數：</p> <hr/>

	<p>化。操作中可發現充滿氣的氣球會變重，證明空氣也具有重量。</p> <p>二、空氣性質的歸納</p> <p>1. 教師可帶領學習者，再次重新回顧空氣性質，並嘗試使用表格，讓學習者進行空氣與其他物質性質的歸納。</p>				
第十六週	<p>三、風與空氣</p> <p>3、空氣、風與生活</p> <p>活動一：生活中的空氣與風</p> <p>一、引起舊經驗</p> <p>1. 教師可由學習者先備經驗討論生活中何處能看到空氣與風的應用。</p> <p>二、觀察實驗後發表</p> <p>1. 由生活中的應用後，教師可引導學習者至「大自然也是生活的一部分」，教師可透過影片或是實驗演示，讓學習者觀看沙被風吹拂後產生的變化。</p> <p>2. 讓學習者更能夠體會風在大自然中扮演的角色。</p> <p>三、討論</p> <p>1. 在學習者觀察空氣的性質與風能讓環境產生變化後，可讓學習者嘗試討論「能利用空氣特性解決遇到的生活問題」或是「沙塵暴、空汙的科學閱讀」，以及「風向袋」的科學閱讀。</p> <p>2. 【自編課程】</p> <p>(1) 影片欣賞與討論</p> <p>https://www.youtube.com/watch?v=e6iDlkPLWgM</p> <p>沙塵暴為東亞沙漠區春季相當活躍天氣現象，伴隨有長程輸送現象的沙塵暴系統僅佔每年沙暴現象中的一小部份，其中能嚴重影響我國空氣品質的個案機率不大。但因可能造成我國大規模空氣品質短時間惡化，因此環保署相當重視。為加強污染物長程傳輸現象的驗證，環保署除了進行相關研究外，自 88 年起設置馬祖測站，以提早掌握沙塵影響我國的時間，根據部分個案監測結果發現，當馬祖測站懸浮微粒受沙塵暴影響濃度上升後，約在數小時內可以影響到我國。</p> <p>(2) 討論沙塵暴來襲時，應對生活中有的措施。</p>	3	課本 電子教科書 或簡報	口頭評量	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____
第十七週	<p>四、磁鐵好好玩</p> <p>1、磁鐵的磁力</p> <p>活動一：磁鐵可以吸引什麼物品？</p> <p>一、引起動機</p> <p>1. 教師準備幾個磁鐵玩具或利用課本圖片，請學生觀察並發表這些玩具中的磁鐵有什麼作用。</p> <p>2. 請學生說說看，磁鐵靠近其他物品也都能吸住？磁鐵可以吸引什麼物品？</p> <p>二、觀察實作</p>	3	課本 電子教科書 或簡報 數個磁鐵玩具	口頭報告 實驗操作 習作評量	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____

	<p>1. 引導學生利用科學探究的過程與方法，進行實驗探究磁鐵可以吸引什麼物品。</p> <p>(1) 觀察：引導學生發現磁鐵玩具(磁鐵跳棋)可以吸住下面的鐵製品(棋盤)，但沒辦法吸住紙製品(棋盤)。</p> <p>(2) 提出問題：引導學生提出什麼材質的物品可以被磁鐵吸引呢？</p> <p>(3) 蒐集資料：引導學生觀察磁鐵玩具或物品，並發現磁鐵飛鏢可以吸在鐵製的鏢靶上、磁鐵可以吸在鐵質的冰箱門上等，磁鐵可以吸附的物品都是鐵製品。</p> <p>(4) 提出假設：引導學生發現並提出假設，磁鐵可以吸附鐵製品。</p> <p>(5) 設計實作：引導學生提出實驗設計，如準備各種不同材質的東西，用磁鐵來試試看哪些物品可以被磁鐵吸引。</p> <p>(6) 分析結果並驗證假設：引導學生設計表格，將可以被磁鐵吸引的物品和不可以被磁鐵吸引的物品，依實驗結果記錄在表格中。引導學生從實驗紀錄中發現，被磁鐵吸附的物品，如鐵罐、鐵夾等都是鐵的材質，證明提出的假設是正確的。</p> <p>(7) 結論：引導學生說出磁鐵可以吸附鐵製品。</p>				
<p>第十八週</p>	<p>四、磁鐵好好玩</p> <p>1、磁鐵的磁力</p> <p>活動一：磁鐵隔著物品可以吸引鐵製品</p> <p>一、引起動機</p> <p>1. 想一想，圖片為什麼可以利用磁鐵吸附在黑板上？說說看，可以被磁鐵吸引的物品，一定要接觸到磁鐵才能產生作用嗎？</p> <p>二、觀察活動</p> <p>1. 觀察生活中的用品如窗簾磁吸綁帶、磁性漱口杯架等物品，發現磁鐵隔著物品可以吸附鐵製品。</p> <p>活動二：磁鐵的磁極</p> <p>一、討論</p> <p>1. 想一想，為什麼使用長條形磁鐵時，經常會用兩端去接觸物品，而圓形磁鐵則會用兩面去接觸物品呢？</p> <p>二、實作</p> <p>1. 利用各種不同形狀的磁鐵，實際測試磁鐵的哪個位置磁力最強。</p> <p>三、歸納</p> <p>1. 科學探究的過程為觀察、提出問題、蒐集資料(了解原理)、接著提出假設、設計實作、準備材料，進行實際操作、最後依據結果進行歸納分析、驗證假設，得到結論。</p> <p>2. 磁鐵可以吸附鐵製品，這種力量稱為磁力，磁力是一種超距力，隔著物品可以吸引鐵製品。</p> <p>3. 磁鐵的兩端稱為磁極，磁力最強。</p>	<p>3</p>	<p>課本 透明片 迴紋針 磁鐵</p>	<p>口頭報告 小組互動表 現 觀察記錄 實驗操作 習作評量</p>	<p><input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目： _____</p> <p>2. 協同節數： _____</p>

<p>第十九週</p>	<p>四、磁鐵好好玩 2、磁鐵的祕密 活動一：磁鐵的相吸和相斥 一、引起動機 1. 請學生說一說，磁力套圈圈的磁鐵，為什麼可以懸浮而沒有互相吸住呢？ 二、觀察實作 1. 磁鐵可以吸附鐵製品的力量稱為磁力，磁力除了可以吸附鐵製品，還可以吸引其他的東西嗎？ 2. 從磁力套圈圈和磁鐵收納，可以發現磁鐵有互相排斥和吸引的現象，想一想，這些現象和什麼有關係呢？ 三、歸納 1. 同極相斥，異極相吸。 2. 閱讀充電站：磁鐵的保存方法。介紹磁鐵正確保存方法，避免磁鐵消磁。</p> <p>活動二：磁鐵可以指出方向 一、引起動機 1. 想一想，使用指北針時，為什麼要避免磁鐵靠近指北針？ 2. 請學生觀察指北針中間的小磁鐵，提出問題：指北針可以指引方向和中間的磁鐵有關係嗎？ 二、實驗設計與操作 1. 設計實驗證明磁鐵的磁極可以指引方向。 2. 將不同形狀放在塑膠淺盤或保麗龍上，再放在水面上。靜止後觀察磁極的方向，接著轉動盤子，靜止後再觀察磁極的方向。（提醒學生圓形磁鐵的磁極位置，並思考該如何擺放才能觀察磁極的方向。） 3. 利用指北針確認方向，說說看，磁鐵的磁極靜止時指向什麼方向？想想看，指北針利用磁鐵的哪個特性指引方向？ 三、歸納 1. 磁鐵靜止時，磁極會指向南北方向。指北針利用磁鐵的磁極受到地磁的影響，指向南北方向。 2. 閱讀充電站：指北針的原理。了解指北針的指針會指向 N、S 極和地磁有關。</p>	<p>3</p>	<p>課本 磁鐵 習作 指北針 圓盤或保麗龍 水盆 水</p>	<p>口頭報告 小組互動表現 觀察記錄 實驗操作 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____</p>
<p>第二十週</p>	<p><期末考> 四、磁鐵好好玩 2、磁鐵的祕密 活動一：磁鐵加鐵片的作用 一、引起動機 1. 觀察櫃子門或門擋上的磁鐵，說說看有什麼發現？ 2. 想一想，磁鐵加上鐵片有什麼作用？ (1)讓學生實際操作發現，磁鐵加鐵片，拉開門的時候感覺門被吸得很緊。提出假設：是不是加鐵片可以讓磁力變強呢？ 二、實驗設計與操作</p>	<p>3</p>	<p>課本 磁鐵有加鐵片的置物盒 或鉛筆盒 磁鐵 鐵片 磁鐵玩具或用品 習作</p>	<p>口頭報告 小組互動表現 觀察記錄 實驗操作 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____</p>

	<p>1. 引導學生利用磁鐵隔著物品可以吸引鐵製品的特性，設計裝載物品的裝置，再利用畫線或其他方式觀察承載限度，同時選擇相同重量的物品來作測試。</p> <p>2. 依照學生討論出的實驗方法操作實驗，比較磁鐵加鐵片和沒有加鐵片，所能承載的物品數量有什麼不同？</p> <p>(1)磁鐵加鐵片可以將磁力集中，增加承載的力量。</p> <p>活動二：磁鐵的特性</p> <p>一、討論</p> <p>1. 請學生根據前面的實驗結果，說一說，磁鐵有哪些特性？</p> <p>(1)磁鐵的磁力是一種超距力，可以吸引鐵製品，磁鐵間有同極相斥、異極相吸的力量；磁極的磁力最大、可以指引方向；在磁鐵兩旁各加上一塊鐵片，可以將磁力集中，增加承載的力量。</p> <p>二、歸納與應用</p> <p>1. 將不同形狀的磁鐵放在圓盤上轉動，靜止時都會指向同一個方向，表示磁鐵可用來指引方向，例如：指北針就是利用磁鐵的這項性質製作而成。</p> <p>2. 磁鐵旁附加鐵片是為了增加承載的力量，例如：門擋、鉛筆盒等。</p>				
<p>第二十一週</p>	<p>四、磁鐵好好玩</p> <p>3、磁鐵在生活中的應用</p> <p>活動一：磁鐵在生活中的應用</p> <p>一、引起動機</p> <p>1. 磁鐵在生活中的應用很廣泛，想一想，你曾經在哪些地方看過磁鐵的應用？它們應用了磁鐵的什麼特性呢？</p> <p>二、觀察實作</p> <p>1. 想一想，除了玩具，生活中有哪些地方應用到磁鐵？</p> <p>三、討論</p> <p>1. 說說看，它們應用了磁鐵的哪些特性？</p> <p>2. 磁鐵在生活中有許多應用，說說看磁鐵是怎麼發現的？未來還有什麼發展？</p> <p>3. 閱讀文章「磁鐵哪裡來？」，並讓學生發揮創意自由發表。</p> <p>四、歸納</p> <p>1. 磁鐵具有磁力可以吸引鐵製品、磁力是一種超距力、磁極的磁力最大、可以指引方向、同極相斥異極相吸、在磁鐵兩旁加鐵片可以集中磁力，增加承載的力量。生活中我們會利用磁鐵讓生活便利，隨著科技的發展，磁鐵的應用也越來越多、越來越廣。</p>	<p>3</p>	<p>課本 圖片 習作</p>	<p>口頭報告 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目： _____</p> <p>2. 協同節數： _____</p>

二、三年級下學期課程計劃

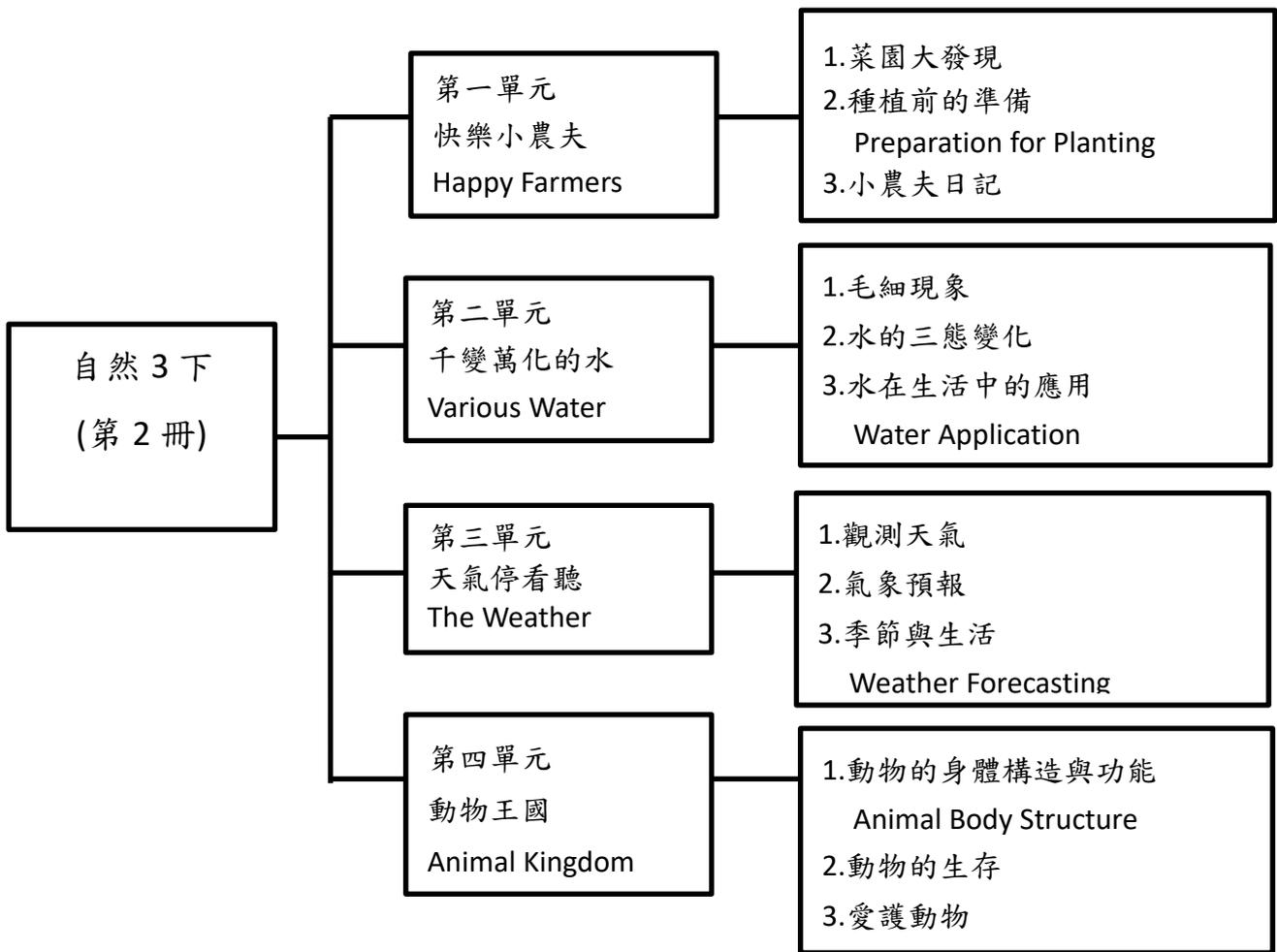
(一) 課程目標

課程目標	
自然課程	<ol style="list-style-type: none">1. 為了加深兒童對植物成長過程的了解，而安排兒童親自種菜，希望兒童透過蒐集蔬菜的種植資料，知道種菜前需要做哪些準備工作。2. 希望透過實際種植，明瞭植物體的生長階段，得知生物從出生、成長到死亡有一定的壽命，透過生殖繁衍下一代。3. 透過兒童在種植期間發現的現象，例如：植株有向光性、缺水會枯萎、種植密集長不大、蟲害等，進而培養兒童解決問題的能力。4. 透過觀察、蒐集資料、提問、假設、操作、歸納與驗證假設等探究過程，讓兒童能從中發現毛細現象以及水的三態變化。5. 察覺水在生活中的重要性，找出節約用水的方法，進而懂得珍惜水資源。6. 透過觀測、測量、記錄與實作等方式進行，兒童能學會觀測天氣的變化、氣溫計的使用方法及製作簡易雨量器，並進行操作與紀錄。7. 了解天氣對生活的息息相關，並能運用科技查詢氣象預報，以便於天氣變化時，做好因應措施。8. 藉由氣象局的資料，了解臺灣四季溫度變化，對生活與環境的影響，進而體會四季之美。9. 透過觀察、蒐集資料與記錄等過程，能辨識動物的身體構造與功能。10. 了解生物需要能量（養分）、陽光、空氣、水和土壤，維持生命、生長與活動。11. 透過對於保育的認知，培養珍愛生命的關懷心與行動力。

(二) 課程內涵：

總綱核心素養	學習領域核心素養
<ul style="list-style-type: none"> ■ A1身心素質與自我精進 ■ A2系統思考與解決問題 ■ A3規劃執行與創新應變 ■ B1符號運用與溝通表達 ■ B2科技資訊與媒體素養 ■ B3藝術涵養與美感素養 ■ C1道德實踐與公民意識 ■ C2人際關係與團隊合作 □ C3 多元文化與國際理解 	<p>自-E-A1 能運用五官，敏銳的觀察周遭環境，保持好奇心、想像力持續探索自然。</p> <p>自-E-A2 能運用好奇心及想像能力，從觀察、閱讀、思考所得的資訊或數據中，提出適合科學探究的問題或解釋資料，並能依據已知的科學知識、科學概念及探索科學的方法去想像可能發生的事情，以及理解科學事實會有不同的論點、證據或解釋方式。</p> <p>自-E-A3 具備透過實地操作探究活動探索科學問題的能力，並能初步根據問題特性、資源的有無等因素，規劃簡單步驟，操作適合學習階段的器材儀器、科技設備及資源，進行自然科學實驗。</p> <p>自-E-B1 能分析比較、製作圖表、運用簡單數學等方法，整理已有的自然科學資訊或數據，並利用較簡單形式的口語、文字、影像、繪圖或實物、科學名詞、數學公式、模型等，表達探究之過程、發現或成果。</p> <p>自-E-B2 能了解科技及媒體的運用方式，並從學習活動、日常經驗及科技運用、自然環境、書刊及網路媒體等，察覺問題或獲得有助於探究的資訊。</p> <p>自-E-B3 透過五官知覺觀察周遭環境的動植物與自然現象，知道如何欣賞美的事物。</p> <p>自-E-C1 培養愛護自然、珍愛生命、惜取資源的關懷心與行動力。</p> <p>自-E-C2 透過探索科學的合作學習，培養與同儕溝通表達、團隊合作及和諧相處的能力。</p>

(三)課程架構圖：



(四) 教學規劃：

教學 期程	單元/主題名稱與活動內容	節數	教學資源/ 學習策略	評量方式	備註
第一週	<p>一、快樂小農夫</p> <p>1. 菜園大發現 活動一：我們平常吃的蔬菜是從哪裡來？</p> <p>一、暖身活動：一起回想蔬菜佳餚</p> <p>1. 教師詢問學生最近有吃什麼蔬菜？</p> <ul style="list-style-type: none"> 讓學生依據自己經驗自己回答，並分享自己的經驗。 <p>二、發展活動：買蔬菜到料理</p> <p>1. 教師追問學生所食用的這些蔬菜料理是從哪邊來？</p> <ul style="list-style-type: none"> 學生簡單發表、分享自己所參與過的買菜、料理經驗。 教師在詢問的鋪陳與學生回答分享的提示中，可包含獲得蔬菜的地點與方式、料理的過程與方式等，幫助學生回答。 <p>2. 蔬菜主要來自於農田</p> <ul style="list-style-type: none"> 教師請學生依據經驗，或者使用想像力，思考或回憶蔬菜從販售店家到餐桌的過程可能是怎樣而來。若有學生發表蔬菜是親戚、家人自種，教師也可以請學生分享自種的運送的過程，進行學生經驗與想像的串聯。 教師透過示範生鮮蔬菜的「產品履歷」標籤，上課實際使用網路查詢蔬菜的運送過程。 教師也可以請學生透過網路查詢，利用文字、影片等方式，再次比較實際蔬菜運送的過程與同學分享的想像或經驗。 <p>3. 教師歸納：蔬菜來自於農田</p> <ul style="list-style-type: none"> 透過學生的分享，教師歸納通常蔬菜來自於農田，並且提問農田的蔬菜是怎樣生長出來？ <p>三、總結活動：我們要來種植蔬菜，並且有規劃的種好蔬菜</p> <p>1. 教師總結：通常大部分的蔬菜都是來自於農田。</p> <p>2. 教師說明可能情境：如果今日發生意外，我們就可能無法運輸蔬菜；當一些蔬菜很少見時，我們也可能需要自己種植；或者可以把種菜當作是休閒活動，甚至我們未來也可能成為種菜人。許多原因我們可能需要種菜，因此我們先來試試看如何成功地種植蔬菜。</p> <p>3. 教師說明種植蔬菜前，也要有實際種植前的準備，更要先注意種植蔬菜可能會發生的問題。因此我們必須先進行各種調查。</p> <p>4. 教師說明下一次上課到農田進行戶外觀察要注意的地方：準備紙筆、準備適宜的衣物與開水等。</p>	3	課本 電子教科書 或簡報 具有網路查詢功能之 3C 投影產品 含有履歷蔬菜標章的蔬菜紀錄表	口頭發表 習作評量 觀察紀錄	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____ 【校本課程】 龍埔開心蔬果園丁

活動二：菜園的環境有哪些條件、這些條件與蔬菜生長有什麼關係？

一、暖身活動：教師說明參觀農田的目的與規範

1. 教師說明參觀農田的規範，例如：規定活動範圍、注意不要碰觸農作設施或工具、不要踩踏到農作物、注意有危險的毛蟲、毒蜂等。

2. 教師說明參觀農田的原因，在於觀察農田中的各種環境。

3. 教師帶領全班檢核戶外教育應攜帶物品，例如：紙、筆等。

【校本課程】龍埔開心蔬果園丁

1. 教師帶領學生參觀龍埔菜園裡的植物和環境。

2. 介紹百香果、地瓜葉、大陸妹、辣椒等學校志工們種植的蔬果，讓學生對於植物種植和生長型態有基本的認識。

3. 學生需記錄菜園中所見到的物質與非物質，並將觀察到的植物記錄在本子上，也可以使用繪圖等方式補充說明。

二、發展活動：調查農田中的環境因子

1. 教師請學生記錄各種環境中所見到的物質與非物質，例如：是物質的「泥土」、「蝴蝶」等不是物質的「陽光」。

• 教師可以明顯暗示；有些環境因子不見得能夠被看到。有些物質可能看不到，例如：空氣。有些物質不見得是固體，例如：水。

• 建議教師可以在舉例引導時，直接以最抽象的非物質—陽光進行舉例。

• 教師可以多鼓勵學生尋找各種屬於物質類的物體，例如：非生物的空气、水，以及農田中的各種生物。

• 教師多鼓勵學生將所見所聞多記錄在紙筆上，亦可以使用注音、繪圖等方式，以自己或小組能夠理解為主。初步的紀錄不必盡善盡美，但要鼓勵學生能將自己所觀察的確實記錄下來。

• 教師可以鼓勵學生以多種方式觀察，比如以不破壞農作物的力氣觀察蔬菜的葉片背後、莖、與土壤等。或者可以翻開農地的磚塊觀察土壤中的小生物（需復原）。以嗅覺來探討農地的氣味，並提示可能與肥料有相關。

• 教師鼓勵學生觀察蔬菜生長狀況，推論可能原因。例如：當蔬菜有一兩株比較小株的狀況，可以觀察是否有樹木等遮蔽（通常會出現在農地週邊）、被蟲蛀蝕。當葉子有被蛀蝕的狀況，可以觀察周遭是否有昆蟲。當蔬菜葉片偏向枯黃時，可以記錄生長的狀況、高度、土壤的顏色與是否有澆水痕跡等。

• 探討的環境因子不包含農作器具，但亦可請學生記錄，做為以後種植的參考。

2. 教師請學生以小組為單位，蒐集每個人所觀

	<p>察到的環境因子，條列式的整理小組所見到的環境因子。</p> <p>※建議教師可以多使用組織圖來進行教學，輔助學生理解。</p> <p>三、討論活動：環境因子對蔬菜的影響</p> <p>1. 教師提問：在戶外教學時，學生是否有看到生長狀況較好、較為不好的蔬菜？如果他們生長狀況比較好／不好，有可能是怎樣的環境造成的。並且將學生所想像蔬菜可能受到影響的環境因子列出。</p> <ul style="list-style-type: none"> • 此部分僅需帶到簡單的想像即可，學生的猜想可能是不正確或者有猜想錯誤，但也暫且保留列舉學生們想到的可能因子。學生亦可以認為某些因子對植物生長不構成影響。 • 如果在戶外參訪農田並無看到明顯的蔬菜生長差異現象，教師可以以課本的圖片，請學生去猜想，並且發表。 • 學生發表猜想時，教師可以因授課時間彈性延伸探究。當學生提出猜想，可以請全班一起探討如何做實驗。 <p>2. 教師引導學生思考： 影響蔬菜生長，並且讓蔬菜呈現枯黃的原因，有許多種因素，大部分都是缺乏營養、喪失生理功能而導致。</p> <ul style="list-style-type: none"> • 乾皺的枯黃貌，通常是因為缺乏水分。 • 溼軟爛偏黑的枯黃，可能是水分過多、根部無法呼吸或者染病。 • 白且細長的枯黃，主因可能是光照不足。 • 斑狀或者邊緣的發黃，可能是病毒感染或者特定營養素不足。 <p>四、統整活動：蔬菜生長的條件</p> <p>1. 教師說明植物生長不良就有可能枯黃、細長、破損或者矮小等現象。</p> <p>2. 教師總結蔬菜生長，通常需要肥沃的土壤、充足的日照、適當的水分和空氣流通的環境。</p> <p>3. 教師請學生繼續思考，在種植蔬菜時，我們要怎樣準備或者模擬菜園的環境，來種植蔬菜呢？教師說明接下來我們將要進行蔬菜種植前的準備。</p> <p>※學生在生活課二年級時多半具有種植豆芽的經驗，教師可以請學生以豆苗或者剩餘的蔬菜種子進行探究。</p>				
<p>第二週</p>	<p>一、快樂小農夫</p> <p>2. 種植前的準備</p> <p>活動一：選擇種子</p> <p>一、暖身活動：選擇小組想要共同種植的蔬菜</p> <p>1. 教師說明接下來課堂的專案，是以小組能夠成功種植蔬菜。</p> <p>2. 教師介紹，我們通常以種子來大規模的種植蔬菜，植物的種子從發芽到開花結果，最後產生種子，完成一個生命循環。最常見的種植方法，就是使用種子種植蔬菜。</p> <p>※蔬菜的無性生殖不在此單元的探討中，不建議教師選用無性生殖的繁殖方法種植蔬菜，之</p>	<p>3</p>	<p>課本 電子教科書 或簡報 A5 白紙 種子包裝與 種子</p>	<p>口頭發表 習作評量 小組偕同 完成的種 植資訊摘 要列表</p>	<p><input type="checkbox"/>實施跨領域 或跨科目協同 教學(需另申 請授課鐘點 費)</p> <p>1. 協同科目： _____</p> <p>2. 協同節數： _____</p>

後學生必須觀察蔬菜成長過程並且觀察整個生命史的狀態。未來將在高年級單元中呈現。

3. 教師帶領學生討論小組想要共同種植的蔬菜，小組以民主的方式進行討論與表決，選定種植蔬菜。

4. 學生可以從自己的偏好做選擇，也可以搭配時令蔬菜進行種植。

• 學生選擇的蔬菜種子，必須是老師本身備有或者學生能夠自己取得。

• 學生自己取得的方法，包括到農業材料行、較大規模的花店或者生活用品批發賣場購買。

• 學生自己取得的方法，亦可以請學生從老熟的果實類蔬菜（如青椒、茄子、瓜果類）取得成熟的種子，教師也要跟學生討論學生取用的果實如何判定種子成熟。

• 建議教師可以先預備幾種常見蔬果的種子包裝，以供學生有更多選擇可能性。教師也可以多鼓勵帶學生探討各種取得種子的管道。

二、發展探究：選擇種植的種子

1. 當小組選擇好蔬菜後，教師進一步請學生查詢蔬菜種植的資訊，包含「適合種植的季節」、「收成時間」等資訊，是否可以完成探究。

• 教師可以提供多種種類的文本，如農民曆、網路問答資訊、農業局官方網站資料、種子包裝說明書等。

• 教師亦可向學生詢問一想想看有無其他方式可以得到資訊，例如問其他師長、家人、社區耆老、當地農夫、農業材料行老闆，或者有種植經驗的學長姐／成年人等。

• 部分蔬菜是屬於一年四季皆可種植，教師亦可推薦學生選用這類蔬菜種植較為容易。

※大部分臺灣產蔬菜是偏好氣溫較高的環境，僅有少數蔬菜（如香菜、蘆筍）要避免南臺灣春轉夏季的強日照與溫暖氣候。

2. 學生選用的種子能夠確定有種子現貨，或者學生已經規劃拿到種子的方式，則可以進行下一個教學活動。

3. 學生選用的種子無法取得、沒有現貨，或者並不適合春季種植，則建議學生可以選擇其他種類的蔬菜。

三、統整活動：種子的事前準備

1. 教師再度檢核學生是否能夠有把握在下節課拿到蔬菜種子。若是學生自行採買，盡量選用有種子廠商出品包裝的市售種子。

活動二：種子資訊的整理

一、引起活動：種子的展示

1. 教師可以請學生展示他們將要種植的種子，觀察種子的外表、大小，並跟其他小組同學分享。

2. 教師說明接下來準備要種植蔬菜，必須先得到種植蔬菜所需要的資訊。

二、發展活動：種植資訊的整理

1. 請學生從種子包裝中整理相關的資訊。

<p>• 如名稱、適合種植季節／氣溫、發芽時間、採收時間、追肥、注意事項等。</p> <p>• 有些種子包裝會建議播種方式，若無則是依照種植需求而定。</p> <p>• 有些種子包裝會說明加肥時機，也建議請學生列出，避免過度施肥或者生長不良。</p> <p>※不便購買肥料，或者偏好使用自然肥料，可以使用自然發酵的廚餘與落葉堆肥作為基肥或者葉肥；以含有硝酸鉀的蚊香灰替代根莖肥與果肥；以蛋殼粉代替花肥。</p> <p>※肥料添加適量即可，自然肥料的添加量可以稍多，但是需注意充分發酵才可施肥。</p> <p>• 有些種子包裝會說明間拔移植時機，或者分枝、摘芽、疏葉、花或果。</p> <p>2. 閱讀種子包裝書</p> <p>教師可以依照學生狀況，使用網路查詢為主或者閱讀種子包裝書。</p> <p>• 教師亦可以將種子包裝作為跨語文科的閱讀理解教學。</p> <p>※如「定植」兩字，可以擴寫成「固定種植」，代表之後建議不再進行移植、間拔以避免生長；「花肥」可以擴寫為「開花時使用的肥料」；以閱讀理解的增字或者上下文推敲等策略理解意思，再將真正理解的白話文意思以學生自己的方式進行摘要紀錄。</p> <p>• 通常種子包裝書的文字都較為艱澀難懂，此時教師可以事先閱讀種子包裝書進行備課，可以查詢網路。</p> <p>※種子包裝書常見的困難詞彙如光照時數（全日照／半日照／遮陰／耐陰）、土質需求（壤土／黏土／砂土）、減低蔬菜種植密度（疏苗如間拔／移植／定植／疏枝／拔尖）、肥料種類（基肥或根肥／菜肥或者葉肥／花肥／果肥）。</p> <p>3. 教師請學生將摘要的內容，以彩色筆方式呈現在 A5（A4 對折大小）的白紙上，並字寫稍大，以小組報告的方式列舉說明他們蔬菜種植所需的注意事項。</p> <p>三、發展活動：準備種植材料</p> <p>1. 蔬菜盆栽種植的器具</p> <p>請學生回憶過去在菜園所看見的農具，討論這些農具有什麼用途。而如果我們要以盆栽方式種菜，可能需要什麼器具？</p> <p>(1) 教師請學生想像如何模擬農地的環境：蔬菜生長可能需要一陽光、空氣、土壤、水等環境元素。</p> <p>(2) 教師列出這些元素後，與學生探討課本上這些常見的材料可能具有什麼功能？</p> <p>(3) 土壤或培養土提供種子發芽後根部固定與生長，並以鏟子進行挖掘。請學生發表：如果無法使用鏟子，日常生活中有什麼東西可以替代？</p> <p>(4) 教師請學生觀察澆花器的特徵，並進行提問：</p> <p>• 教師請學生發表，植物除了陽光、空氣、土</p>				
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壤以外，還需要什麼環境因子才能生長？（引導學生回答水。）

• 教師請學生發表自己會怎樣澆水、使用什麼器具、使用什麼方法？

• 教師請學生從課本的種植器材中，找出可能與水分有關的器材。

• 教師請學生觀察澆花器的外表，說說看這跟學生原本想用來澆花的物品有什麼差異？請學生以自己原本想像的器具與澆花器的差異，對功能提問。

※教師引導到主要是開口的大小差異，教師可以引導學生提問—為什麼澆花器的開口是細小的。並且教師引導這樣的器具有什麼樣澆水的好處？

• 教師請學生對他們的提問進行假設。學生可能假設這樣子可以節省水、減少水流力道、讓澆水散佈得比較均勻。

• 教師再請學生拿寶特瓶打洞進行實驗驗證。

• 打洞大的水柱比較強，可能沖散土壤；打洞較小的水柱弱。

(5) 教師請學生想像：紗網的可能功能是什麼？

• 學生可能從經驗中得知，紗網可以把灰塵與土壤擋住，進而聯想到與盆底的洞有關。

(6) 教師在黑板、電子書螢幕上呈現一文字：

盆子、有洞，與課本的圖片，教師請學生使用這兩個字，對種植器具的功能想出一個問題。

• 問句可能為：為什麼種植盆栽的底部需要有洞？盆子有洞是為了讓土壤流出嗎？盆子如果沒有洞會怎樣？

• 教師請學生對盆子有洞的功能進行假設，假設可能為：為了讓水分流出、為了讓空氣進入，為了讓植物的根可以長出來等。

• 教師請學生用瓶蓋做出微型實驗（或由學生自己設計），例如：

一個瓶蓋加土讓、加水到土壤溼潤飽和，並在土壤中種植綠豆。

一個瓶蓋與上個瓶蓋相同，但是以大頭針打出許多小洞，讓過多的水分可以緩慢流出。經過三天後，請學生用視覺、觸覺、嗅覺，

觀察兩個瓶蓋的差異，通常兩者都能發芽，但前者可能會發臭、

甚至種子腐爛。兩者土壤都還能保持些微溼潤。

• 請學生分析他們對盆底有無打洞的假設，說明他們所觀察到的現象，與可能是受到什麼原因影響。

• 最後請學生嘗試將寶特瓶或其他的物體打洞後，是不是能夠替代澆花器？也請學生探討自己製作比較方便，還是直接購買澆花器？兩者的澆水有什麼樣的差異？

四、統整活動：預備種植器具

1. 教師總結：種植蔬菜前，我們可以透過閱讀資料來讓種植蔬菜更加順利，並且可以透過摘

	<p>要的方法來提醒我們以後種植時候要做的事項、注意的事項。</p> <p>2. 教師請學生準備種植材料尚缺的材料。</p> <ul style="list-style-type: none"> • 教師說明部分材料可以在安全範圍內使用資源回收的物品，例如以其他塑膠或者陶製容器底部穿洞來製成盆子。 				
<p>第三週</p>	<p>一、快樂小農夫</p> <p>2. 種植前的準備</p> <p>活動一：播種資訊的整理</p> <p>一、暖身活動</p> <p>1. 教師說明課堂將要設置盆栽。</p> <p>2. 教師說明在動手填土之前，要先思考盆栽點土的鋪設與種子的播種方法，不同的鋪設與播種方法可能會影響蔬菜的生長。</p> <p>二、發展活動：認識播種方法</p> <p>1. 在進行種植之前，回憶查詢種植資料的播種方式。</p> <p>2. 播種方式包含：點播、撒播。</p> <p>3. 點播：將土壤以手指或者筆桿押出凹洞，裡面置入 1~3 顆種子。 (視發芽率、種子數量與大小而定。)</p> <p>4. 撒播：直接將種子撒在泥土上。</p> <p>三、發展活動：探討播種方法的使用時機</p> <p>1. 教師引導學生探討要使用哪些播種方法，與播種方法可能的使用時機。</p> <p>2. 教師引導學生思考並想像，種子大小與播種法的關係，請學生說出原因。</p> <ul style="list-style-type: none"> • 撒播適用於種子過小、不好拿的時候。通常點播與撒播的習慣，以 5mm (綠豆大小) 作為分界。 • 點播適用在種子較大、較重，難以使用揮散的方式播種，或者種子稀少、昂貴的情況。 <p>3. 教師引導學生思考，可能與種子重量大小沒有關係，跟種子數量相關的播種法選擇狀況。</p> <ul style="list-style-type: none"> • 點播用在種子較為昂貴、持有種子數量稀少的情況。 • 撒播用在種子比較便宜、播種土地大的時候。 <p>4. 教師引導學生思考使用播種法對我們日後照顧的優缺點：</p> <ul style="list-style-type: none"> • 點播可以控制播種的距離，方便日後移植、不太需要間拔。 • 撒播則無法控制播種的密度與距離，必須進行間拔後才能移植。 <p>※芽菜蔬菜(如豆芽菜、苜蓿芽、豌豆苗、空心菜)則通常利用撒播後蔬菜生長過密，而生長細長的特性來取食。</p> <p>四、發展活動：盆栽內填土的擺設方式</p> <p>1. 教師引導學生，盆栽的內部填土要能夠保持水分的同時，讓底部也能良好的排水與透氣，並且避免土壤流失。</p> <p>2. 教師可以請學生思考避免土壤從排水孔流出的方法。可以使用紗網作為鋪設，避免土塊外流。</p>	<p>3</p>	<p>課本 電子教科書 或簡報 影片 種子包裝與 種子 種植器材</p>	<p>口頭發表 習作評量 小組偕同 完成的種 植資訊摘 要列表</p>	<p><input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目： _____</p> <p>2. 協同節數： _____</p>

	<p>3. 教師請學生探討盆栽底部放石頭的功能。盆栽底部放小石頭，除了可以避免過多土壤往下流失，也能夠增加透氣與排水的功能。</p> <p>4. 教師探討播種後進行覆土的好處與壞處。</p> <ul style="list-style-type: none"> • 好處：避免水分散失、防止鳥類啄食。 • 壞處：種植過深，將會是菜苗無法突破土壤生長。在覆土時要讓上層土壤保持鬆軟。 <p>活動二：實際種植</p> <p>一、發展活動：進行盆栽填土與播種實作</p> <ol style="list-style-type: none"> 1. 建議事先透過教師分配或者小組成員協調共識，安排小組各組員工作。 2. 可以教師內預設操作範圍，或者實作時鋪設報紙，方便清潔。 3. 不建議全部使用培養土，將會有肥度過高與礦物質缺乏的情況，可以先鋪設較無肥份的土壤後，上層在混有培養土較為理想，也更加省錢。教師亦可以引導學生觀察不同土壤的顏色差異、氣味、觸感。 <p>※本節課的種植，是貫穿整個單元，以種植出可採收蔬菜為目標的專案課程。建議此時種植時，選用大盆來種植，讓植物的根系能夠伸展、使蔬菜能夠成長；如果一開始學生使用小盆種植，可以後續整盆以根帶土的方式，將整個小盆移植到大盆中。</p> <ol style="list-style-type: none"> 4. 實際種植後，整理環境，請小組安排學生澆水的時間。 				
<p>第四週</p>	<p>一、快樂小農夫</p> <p>3. 小農夫日記</p> <p>活動一：蔬菜成長紀錄</p> <p>一、暖身活動</p> <ol style="list-style-type: none"> 1. 教師請學生想想看，要如何記錄種植蔬菜的生長過程？為什麼我們要做紀錄？需要記錄哪些內容與項目。 2. 記錄蔬菜成長的原因是考量未來蔬菜生長的過程中，我們可能發現新的現象或者問題，從而認識新知，亦可以從過去遭遇的困難中，再次找尋解決方法，並且運用在以後的種植經驗中，下次種植時能夠更容易順利成功。 <p>※後續小節的種植過程中，教師可以提醒學生，我們在有系統的記錄裡可以從失敗中反思與尋找解決方法，以後才能夠成功。教師可以輔導學生要面臨預期可能發生的失敗，與面對失敗後正向超越的心態。</p> <ol style="list-style-type: none"> 3. 教師可以請學生自由發想，種植蔬菜時要怎樣進行記錄觀察？ <p>二、發展活動：製作蔬菜成長紀錄表</p> <ol style="list-style-type: none"> 1. 教師請學生探討進行觀察記錄時，所應該記錄的方向，並把這些方向條列出來。 <p>※教師引導學生將所想到的事項進行條列、排序，可以避免學生實際繪製表格時有缺漏、時常更改。條列項目可以輔助學生探究的思考產出，能夠順利地運用在問題解決上。 2. 教師請學生用作業簿或者白紙，以直尺畫出 </p>	<p>3</p>	<p>課本 電子教科書 或簡報 紀錄表 直尺 盆栽 澆水器 紙箱 鏟子</p>	<p>小組互動表現 觀察紀錄 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目：</p> <hr/> <p>2. 協同節數：</p> <hr/>

表格，並且表格裡面要有學生要記錄的項目，必須資料有：日期、蔬菜名稱、記錄者、生長情形等。

※建議教師可以讓學生實際的「繪製表格」，中年級學生可以藉此單元來練習從無到有的表格繪製經驗，後續單元才能具有畫表格的能力。

•其餘的項目有：照片或圖片、記錄葉片數量或高度、顏色變化、天氣、氣溫，亦建議蔬菜照顧的記錄過程，如間拔與移植、澆水與施肥等。

3.教師與學生討論記錄詳細內容的方法，例如：手繪、照片、文字紀錄等。教師繼續與學生深入討論：手繪與拍照要注意什麼細節？

4.教師與學生討論如何測量蔬菜，直尺要怎樣擺放與設置。

※教師可以向學生說明，生長的高度可以做為是否採收，或者是否要進行分支、摘葉、追肥、摘芽等種植照顧行動的參考依據。

※蔬菜高度的生長速度變化，也同時暗示植物在需鈣、需氮鉀的養份需求變化，在不同時期可能要使用不同種肥料。

三、綜合活動：進行種植蔬菜的記錄

1.教師請學生開始實際記錄蔬菜的成長。

2.教師請學生小組合作、分配任務。

※教師可以引導學生安排：制定工作表的時間，將負責組員的姓名與日期填上，並且布置在教室容易見到的地方，以打勾方式作為檢核。以工作表的方式，輔助學生小組合作與貫徹執行工作的意志力，並能透過當責夥伴的提醒使小組組員接能確實參與種植蔬菜的專案活動。

3.教師提醒小組依照原訂計畫進行紀錄與照顧蔬菜，若有發現種植問題，可以記錄起來、日後全班一起探討原因與解決方法。

活動二：觀察探究種植過程中的問題(1)

一、暖身活動

1.教師請學生探討種植蔬菜的過程中發生了什麼問題或看到什麼現象，應該做哪些處置？

二、發展活動

1.進行種植的照顧措施：

(1)進行間拔。

(2)進行移植。

(3)進行追肥、自製肥料。

(4)進行疏果、疏葉等種植有建議的措施。

※此部分活動，因為蔬菜生長需等待時間，建議教師可以先進行後續單元的授課活動，等到蔬菜須要有特殊照顧需求時在進行實作活動。

※列舉後續照顧蔬菜活動有：間拔（建議種植一週後發芽時就要盡早完成）、移植（建議種植滿三週或根系已經佈滿盆土時完成），並中間可以安插布網與自製肥料等活動。

2.探討葉片枯黃問題：

(1)教師引導學生對於他們的生長過程提出問

題：為什麼葉片會有枯黃的問題，或其他生長不良情形。

(2)教師可以請學生假設猜想可能原因。

(3)教師請學生進一步的設計簡易實驗進行探究。

(4)經過一段時間，教師請學生向全班分享他們的實驗結果，是否會造成類似的結果，驗證假設是否成真。並請全班一起討論補救或者日後改進的措施方法。

※探討澆水注意事項：教師請學生探討如何解決澆水的問題，如何適量的澆水、適量是什麼程度、如何解決假日沒人澆水的問題、澆水有什麼注意事項。

(1)大致上土壤表面保持潮溼即可停止澆水。

(2)避免中午澆水，才能防止蔬菜凍傷或者晒傷。

(3)可以使用排班方法來輪流照顧，或者事先多交一點水、菜盆底下放置集水碟，來撐過短暫缺水的狀況。

(4)水分過多時，可能會造成幼苗葉子沒有變黃，但莖會很細、彎曲且難以支撐的徒長現象。

3. 探討蔬菜生長彎向一側問題：

(1)教師帶領學生探討蔬菜彎向一側的原因。

(2)彎向一側長，代表光線較為不足、植物偏向有陽光的地方生長，如果不會影響到植物生長，可以不必理會，如果有明顯的傾倒現象，則可以添加支柱。

※番茄、四季豆長到 30 公分，通常都需要添加支柱。四季豆或其他豆類超過 30 公分，不論有無陽光都會傾倒，此時可以給予爬藤，並且也同時代表花期將至、可以準備施肥。空心菜種植時如果發生傾倒，還會從原本主幹上再長出新的直立枝幹，不必理會。

4. 探討生長太密集問題：

(1)教師討論蔬菜生長的大小問題，如果沒有足夠的生長空間，將會導致蔬菜長不大；蔬菜之間也會互相競爭水分與養分。

(2)間拔：將密集生長的幼苗，只留下強壯的植株。

• 間拔通常發生在幼苗剛發芽時，就先選取發育較好的留下。

• 間拔後的幼苗通常根部已經受損，不會再移植，就算移植也難以存活。

• 間拔後土壤已經鬆動了，所以要再澆水來使土壤密合。

(3)移植：將整株幼苗移動到較大的地方種植，或者將生長較密集的幼苗、分散到其他地方。

• 通常移植晚於間拔。

• 移植時要使用鏟子將幼苗周遭的土壤一起移動搬移，避免傷到根部。

(4)教師帶領學生進行間拔、移植的實作。

<p>第五週</p>	<p>一、快樂小農夫 3. 小農夫日記 活動一：觀察探究種植過程中的問題(2) 一、暖身活動 1. 延續上週教學活動，教師請學生探討種植蔬菜的過程中還發生了什麼問題或看到什麼現象，應該做哪些處置？ 二、發展活動 1. 探討蟲咬問題： (1) 教師引導學生蔬菜被蟲咬可能會產生的問題，例如蔬菜營養不良、生長緩慢，進而被傳播細菌病毒等。 (2) 教師帶領學生探討各種創意的解決蟲咬問題，事先實作紗網進行防護，使用各種創意來架設，例如：竹筷作為支架、用橡皮筋來固定聯結。 (3) 請學生用軟毛刷將害蟲、蟲卵移除。 (4) 可以參考網路資料，自製天然無毒的驅蟲劑。 2. 若有其他蔬菜生長問題，不須侷限課本探究的實驗，亦可請學生探究其他可能的原因。 例如：探討養分不足的狀況 (1) 需要依照種子包裝書或者查詢資料，在適當的時機來追肥，才能促進開花結果，或者使葉片生長茁壯。 (2) 天然肥料如：蚯蚓糞、碎蛋殼等。不建議使用茶葉、咖啡渣、廚餘直接堆肥，反而會破壞土壤性質，天然堆肥需要經過長期發酵處理。 (3) 可以查詢農業局的網站，對於各種蔬菜所需肥料種類有許多介紹，學生也可以自製肥料。 三、統整活動：蔬菜的生長過程 1. 教師請學生回顧種植蔬菜的過程，發現蔬菜也會完成生命史，產生下一代的種子而死亡。 2. 採收蔬菜，請學生回顧並分享種植蔬菜的發現與心得。 3. 閱讀科學閱讀《有機農業》，並請學生說一說「有機農產品為什麼對環境更友善呢？」。</p>	<p>3</p>	<p>課本 電子教科書 或簡報 紀錄表 盆栽 紗網 支架 軟毛刷 噴水瓶 辣椒</p>	<p>小組互動表 現 觀察紀錄 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____</p>
<p>第六週</p>	<p>二、千變萬化的水 1. 毛細現象 活動一：水在物品中的移動情形 一、引起動機 1. 連結學生的生活經驗，鼓勵學生說一說水滴在衣服上時，會發生什麼現象？ 2. 引導學生思考並說一說，水滴在不同的物品上，會發生什麼相同或不同的現象呢？ 二、探索活動 1. 教師提問並引導學生思考為什麼水會滲進某些物品並且在其中移動，而有些物品不會有這樣的現象？ 2. 分組討論與發表：水滴在廚房紙巾、衣服、抹布、雨衣、玻璃等物品上時，會發生什麼現象？觀察這些物品，它們有什麼相同或不同的</p>	<p>3</p>	<p>課本及習作 電子教科書 或簡報 影片 實驗器材： 能製造細縫的材料(例如：玻璃片、透明墊板、塑膠尺、透明文件夾等)、水盤、水和染料 平板</p>	<p>口頭發表 小組互動表 現 實驗操作 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____</p>

	<p>特徵？若要將這些物品分類，你會怎麼分？</p> <p>三、統整活動</p> <p>1. 歸納：有細縫的物品可以讓水滲進去並在其中移動，例如：廚房紙巾、衣服和抹布，沒有細縫的物品水不會滲進去並在其中移動，例如：雨衣和玻璃。</p> <p>活動二：水在細縫中的移動情形</p> <p>一、引起動機</p> <p>1. 教師提問並請學生回答：塑膠桌墊上的水打翻了，為什麼桌墊下和桌面間會有水呢？</p> <p>2. 引導學生針對問題蒐集資料，並提出假設。 ※此處應指導學生蒐集資料的方法，包含透過不同管道查詢資料，例如：科學百科或上網搜尋，同時也應指導學生學習運用適當的關鍵詞來搜尋資料。</p> <p>二、探索活動</p> <p>1. 教師提問並引導學生根據假設，設計實驗及選擇合適的實驗材料。</p> <p>2. 預測：請學生預測水在哪種裝置中會移動。</p> <p>3. 操作：引導學生參考課本中基本的實驗步驟進行操作，並將實驗結果記錄在課本及習作中。</p> <p>4. 引導學生運用表格整理與歸納實驗結果，並檢視是否與假設相符，若實驗結果與假設相符，則可提出結論。 ※此處融入科學方法的學習，運用觀察、提出問題、蒐集資料、形成假設、設計實驗、記錄結果、驗證假設及形成結論來探究問題。學生透過觀察發現「塑膠桌墊沒有細縫，但桌墊下卻有水」，接著提出「桌墊和桌面間為什麼會有水」的問題，然後經由蒐集資料，提出「水會沿著細縫移動」的假設，接著透過設計與實驗獲得實驗結果，並檢視實驗結果是否與假設相符，若二者相符則可形成「水會沿著細縫移動」的結論。</p> <p>三、統整活動</p> <p>1 結論：水會沿著細縫移動。</p> <p>2 學生自行閱讀充電站內容，教師依據充電站內容提問與解說。</p>				
第七週	<p>二、千變萬化的水</p> <p>2. 水的三態變化</p> <p>活動一：冰融化成水</p> <p>一、引起動機</p> <p>1. 教師提問並鼓勵學生根據平時的觀察與了解回答下面的問題。(1)河水、雨水及湖面的冰，它們有什麼相同和不同的地方？(2)生活中常見的水和冰塊，它們有什麼相同和不同的地方？</p> <p>二、探索活動</p> <p>1. 示範將水和冰塊分別倒入不同形狀的容器，並請學生觀察與發表水和冰塊在性質上的差異。 ※此處可引導學生練習將對水和冰的觀察結</p>	3	課本 習作 電子教科書 或簡報 實驗影片 實驗器材： 燒杯、溫度計、溫水、冷水、冰塊	口頭發表 小組互動表 現 實驗操作 習作評量	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____

	<p>果，製作成表格來比較。</p> <p>2. 結論：液態的水會流動，沒有固定形狀，可以隨著容器的形狀改變；冰是固態的水，會有一定的形狀，不會流動。</p> <p>※此處可透過認識水和冰的性質，讓學生了解何謂「液態」和「固態」。</p> <p>3. 連結學生的生活經驗，請學生回憶自己冰敷或看到同學冰敷的經驗，並想一想冰袋裡的冰塊，經過一段時間後，會發生什麼變化？</p> <p>4. 請學生說一說冰塊為什麼會變成水？什麼情況下，冰塊會變成水？</p> <p>5. 引導學生了解冰塊離開原本低溫的環境或受熱，就會變成水。</p> <p>6. 總結：水由固態的冰變成液態的水，這個過程稱為「融化」。</p> <p>7. 教師提問並鼓勵學生發表，冰塊在夏天和冬天融化的快慢相同嗎？影響冰塊融化快慢的因素是什麼？</p> <p>※此處可讓學生自由發表，教師再透過學生提出的答案，引導學生歸納出「溫度」因素。</p> <p>8. 教師提問並引導學生思考冰塊加進飲品中，冰塊融化得快慢和飲品的溫度有關係嗎？</p> <p>9. 引導學生針對問題蒐集資料，並提出假設。</p> <p>※此處應指導學生蒐集資料的方法，包含透過不同管道查詢資料，例如：科學頻道或上網搜尋，同時也應指導學生學習運用適當的關鍵詞來搜尋資料。</p> <p>10. 師生共同準備燒杯、溫度計、溫水、冷水及冰塊。</p> <p>11. 預測：請學生預測將冰塊放入等量的溫水及冷水，哪一杯中的冰塊比較快融化。</p> <p>12. 操作：引導學生依照課本中「溫度對冰塊融化快慢的影響」實驗步驟操作，並將觀察結果記錄在習作中。</p> <p>※此處可引導學生建立控制變因的概念，例如：準備大小相同的冰塊、等量的溫水和冷水等。</p> <p>13. 引導學生運用表格整理與歸納實驗結果，並檢視是否與假設相符，若實驗結果與假設相符，則可提出結論。</p> <p>※此處融入科學方法的學習，運用觀察、提出問題、蒐集資料、形成假設、設計實驗、記錄結果、驗證假設及形成結論來探究問題。</p> <p>三、統整活動</p> <p>1. 結論：冰塊在溫度較高的環境下，融化得較快。</p>				
<p>第八週</p>	<p>二、千變萬化的水</p> <p>2. 水的三態變化</p> <p>活動一：水凝固成冰</p> <p>一、引起動機</p> <p>1. 教師引導學生思考冰受熱會融化成水，水是否還可以變回冰？請學生發表將水變回冰的方法。</p> <p>二、探索活動</p>	<p>3</p>	<p>課本及習作 電子教科書 或簡報 實驗影片 實驗器材： 裝水容器 (例如：夾鏈袋)、燒</p>	<p>口頭發表 小組互動表 現 實驗操作 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目：</p> <hr/> <p>2. 協同節數：</p>

	<p>1. 教師提問並請學生回答：水在什麼溫度下才會結冰？</p> <p>2. 引導學生針對問題蒐集資料，並提出假設。 ※此處指導學生蒐集資料時，需引導學生蒐集讓水結冰的方法，並知道除了將水放入冰箱中一段時間後會結冰外，也可以將裝有水的容器埋入灑上食鹽的冰塊中，經過一段時間後，容器中的水也會結冰。</p> <p>3. 教師提問並引導學生根據假設設計實驗及選擇合適的裝水容器。</p> <p>4. 師生共同準備裝水的容器、燒杯、溫度計、冰塊、食鹽及水。</p> <p>5. 操作：引導學生參考課本中基本的實驗步驟操作，並將觀察結果記錄在課本及習作中。</p> <p>6. 引導學生運用表格整理與歸納實驗結果，並檢視是否與假設相符，若實驗結果與假設相符，則可提出結論。 ※此處融入科學方法的學習，運用觀察、提出問題、蒐集資料、形成假設、設計實驗、記錄結果、驗證假設、形成結論來探究問題，並可藉此指導學生運用平板，查詢讓水降溫形成冰的方法，再依據蒐集到的資料進行實驗設計，最後可引導學生比較自己與課本的實驗設計。</p> <p>三、統整活動</p> <p>1. 結論：當溫度低於 0°C 以下時，水才會變成冰。水由液態變成固態的過程，稱為「凝固」。</p> <p>2. 學生自行閱讀充電站內容，教師依據充電站內容提問與解說。</p> <p>活動二：水蒸發成水蒸氣</p> <p>一、引起動機</p> <p>1. 連結學生的生活經驗，請學生回想是否曾看過下雨後的籃球場，地上的積水經過一段時間慢慢變乾，並說一說地上的積水到哪裡了？ ※此處可先讓學生自由發表各種想法。</p> <p>二、探索活動</p> <p>1. 引導學生歸納出地面上的水變成看不見的水蒸氣，散布在空氣中，並說明水蒸氣是氣態，所以不容易察覺。</p> <p>2. 教師提問並與學生共同討論，日常生活中還有哪些水變成水蒸氣的例子。 ※此處除了課本提供的例子外，教師可補充更多的例子，或請學生回家蒐集後，再於課堂上分享；或於課堂上請學生利用平板搜尋更多的例子，再進行個人發表或小組發表。</p> <p>三、統整活動</p> <p>1. 總結：水在自然的情況下，或是受熱後會變成水蒸氣，並說明水由液態變成氣態的過程稱為「蒸發」。</p>		杯、溫度計、冰塊、食鹽和水平板		
第九週	<p>二、千變萬化的水</p> <p>2. 水的三態變化</p> <p>活動一：水蒸氣凝結成水</p> <p>一、引起動機</p>	3	課本及習作 電子教科書 或簡報 影片	口頭發表 小組互動表 現 實驗操作	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點)

<p>1. 連結學生的生活經驗，請學生回想是否有從冰箱中拿出一瓶冰水的經驗，並回憶冰水剛從冰箱中拿出來，及放置一段時間後，瓶子的外觀有什麼不同？</p> <p>2. 請學生觀察課本上冰水剛從冰箱中拿出來，及冰水已放置一段時間的二張照片，說一說瓶子表面有什麼不同？</p> <p>3. 教師提問並請學生思考，冰水瓶子表面的小水滴是從哪裡來的？如果是由空氣中的水蒸氣變成的，要如何證明？</p> <p>※此處可引導學生學習設計實驗，先確認實驗目的，再進行實驗設計，在設計實驗的過程中，須考量變因（環境因素）的控制，教師也可以在學生設計完實驗後，引導學生比較自己與課本的實驗設計。</p> <p>二、探索活動</p> <p>1. 說明：冰箱裡拿出來的空玻璃杯，經過一段時間後，表面會出現許多小水滴，這是因為空氣中的水蒸氣，遇到溫度較低的玻璃杯而形成小水滴。</p> <p>2. 連結學生的生活經驗，請學生回想是否有掀開熱湯鍋蓋的經驗，並說一說從熱湯鍋蓋內側可觀察到什麼現象？這個現象是什麼原因造成的呢？</p> <p>3. 引導學生針對問題蒐集資料，並提出假設。</p> <p>※此處應指導學生蒐集資料的方法，包含透過不同管道查詢資料，例如：科學百科或上網搜尋，同時也應指導學生學習運用適當的關鍵詞來搜尋資料。</p> <p>4. 教師提問並引導學生根據假設，設計實驗及選擇合適的實驗材料。</p> <p>5. 預測：請學生預測分別蓋住冷水和熱水的蓋子內側有無小水滴產生。</p> <p>6. 操作：引導學生參考課本中基本的實驗步驟進行操作，並將實驗結果記錄在課本及習作中。</p> <p>7. 引導學生運用表格整理與歸納實驗結果，並檢視是否與假設相符，若實驗結果與假設相符，則可提出結論。</p> <p>※此處融入科學方法的學習，運用觀察、提出問題、蒐集資料、形成假設、設計實驗、記錄結果、驗證假設、形成結論來探究問題。</p> <p>8. 結論：水蒸氣遇到溫度較低的物體，會凝結成小水滴。水由氣態變成液態的過程，稱為「凝結」。</p> <p>三、統整活動</p> <p>1. 教師提問並與學生共同討論，日常生活中還有哪些水蒸氣凝結成小水滴的例子。</p> <p>※此處除了課本提供的例子外，教師可補充更多的例子，或請學生回家蒐集後，再於課堂上分享；或於課堂上請學生利用平板搜尋更多的例子，再進行個人發表或小組發表。</p> <p>2. 總結：空氣中的水蒸氣遇冷凝結成小水滴，形成白煙或附著在物品上。</p>		<p>實驗器材： 裝水容器 (例如：茶杯、便當盒、燒杯等)、蓋子 (例如：杯蓋、便當蓋、墊板、玻璃片等)、 熱水 平板</p>	<p>習作評量</p>	<p>費)</p> <p>1. 協同科目：</p> <hr/> <p>2. 協同節數：</p> <hr/>
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	<p>活動二：溫度對水的影響</p> <p>一、引起動機</p> <p>1. 請學生說出水的三種形態。</p> <p>二、探索活動</p> <p>1. 教師引導學生知道冰遇熱會融化成水，水遇熱會蒸發成水蒸氣，水蒸氣遇冷會凝結成水，水遇冷會凝固成冰，溫度會造成水形態上的改變，並且水形態上的改變是可逆的。</p> <p>三、統整活動</p> <p>1. 總結：固態的冰、液態的水及氣態的水蒸氣都存在於自然界中，冰、水及水蒸氣是水的三種形態，水會隨著溫度的改變，產生形態的變化。</p> <p>2. 學生自行閱讀充電站內容，教師依據充電站內容提問與解說。</p>				
第十週	<p>二、千變萬化的水</p> <p>3. 水在生活中的應用</p> <p>活動一：水的應用</p> <p>一、引起動機</p> <p>1. 連結學生的生活經驗，請學生說一說生活中應用不同形態水的例子。</p> <p>二、探索活動</p> <p>1. 鼓勵學生蒐集更多生活中應用不同形態水的例子。</p> <p>2. 分組報告所蒐集到應用不同形態水的例子。</p> <p>三、統整活動</p> <p>1. 引導學生歸納各組的報告，了解液態的水、固態的冰及氣態的水蒸氣在生活中的應用。</p> <p>活動二：珍惜水資源</p> <p>一、引起動機</p> <p>1. 播放水資源匱乏之相關影片。</p> <p>二、探索活動</p> <p>1. 討論缺水所帶來的影響及節水的方法。</p> <p>2. 鼓勵學生蒐集更多節水的做法。</p> <p>3. 分組報告所蒐集到節水的做法。</p> <p>三、統整活動</p> <p>1. 總結：水是人類和其他生物賴以生存的必要資源，缺水會造成生活上的不便，甚至可能引發旱災，所以我們要養成節約用水及愛護水資源的習慣。</p> <p>2. 閱讀科學閱讀《省水標章》，並請學生說一說「省水標章的圖樣包含哪些意義呢？及生活中該如何節約用水呢？」。</p> <p>3. 教師可鼓勵學生運用前面所學的概念，自行利用課餘時間進行科學大挑戰內容。</p> <p>◎期中考</p>	3	課本及習作 電子教科書 或簡報 教學影片 平板	口頭發表 專題報告 習作評量	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： <hr/> 2. 協同節數： <hr/>
第十一週	<p>三、天氣停看聽</p> <p>1. 觀測天氣</p> <p>活動一：天氣和雲</p> <p>一、引起動機</p> <p>1. 教師詢問：今天的天氣如何？現在是晴天還是雨天？</p>	3	課本 習作 電子教科書 或簡報 氣溫計	口頭發表 實驗操作 觀察記錄 習作評量	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： <hr/>

<p>• 學生依當天天氣狀況發表，引導學生說出除了直接觀測外面的景象，也可以利用天氣預報知道天氣狀況。</p> <p>• 利用天氣預報的資料引導學生發現天氣狀況有晴天、多雲、陰天、雨天等。</p> <p>二、討論</p> <p>1. 想想看，我們怎麼知道天氣會不會改變？我們要如何觀測天氣呢？</p> <ul style="list-style-type: none"> • 學生自由發表，合理即可。 • 引導學生說出可以利用氣象報告知道天氣的變化，並利用氣象報告的內容，引導學生討論各項資料測量的方式。 <p>2. 想一想，我們怎麼判斷晴天、陰天、雨天等天氣狀況？</p> <ul style="list-style-type: none"> • 學生依據自己的想法回答，合理即可。 • 引導學生發現不同天氣狀況，天空中的雲量、顏色、形狀會有所不同。 • 引導學生發現，天氣不一樣的時候，雲量、氣溫、雨量、風向和風力等都會不同。 • 引導學生說出影響天氣的因素有陽光、空氣（風）、水（雲和雨...）。 <p>3. 假如天空有很多雲，太陽正好在雲的縫隙中露出來，這樣算是晴天嗎？ 如果天空中雲很少，而太陽正好被雲遮住，這樣算是陰天嗎？</p> <ul style="list-style-type: none"> • 引導學生說出天氣狀況是以雲量的多寡來定的。 <p>4. 想一想，天氣和雲有什麼關係呢？</p> <ul style="list-style-type: none"> • 引導學生了解晴天時雲很少，通常是白色、一朵一朵或一絲一絲的；多雲天的雲較多，陽光可以透過雲層照射下來，有時候可以看見太陽；陰天的雲幾乎遮住整個天空，常常會遮住陽光；雨天時常看到一大片灰黑色的雲。 • 利用氣象報告的資料讓學生了解，晴天、多雲、陰天和雲量有關。雨天則是天空有降雨（降水）的現象。 <p>活動二：如何測量氣溫</p> <p>一、觀察實作</p> <p>1. 起風了，天色變暗，感覺也變冷了！除了身體能感覺氣溫變化，還有什麼方法能夠知道呢？</p> <ul style="list-style-type: none"> • 引導學生說出冷熱用溫度來表示，水的溫度叫水溫、身體的體溫叫體溫，氣溫應該是指空氣的溫度。 • 測量體溫會用體溫計（水溫會用溫度計），測量氣溫要用氣溫計。 <p>2. 氣溫計和一般的溫度計有什麼不同呢？使用時要注意什麼事項呢？</p> <ul style="list-style-type: none"> • 介紹氣溫計的使用方法。 • 我們可以利用氣溫計來測量氣溫，在臺灣主要以攝氏溫度來表示氣溫。 <p>3. 介紹氣溫是指離地 125 ~ 200 公分，陰涼通風環境的空氣溫度。通常會在室外空曠的地方設置百葉箱，再將氣溫計放在裡面測量氣</p>				<p>2. 協同節數：</p> <hr/>
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溫。

二、探究實作

1. 觀察：引導學生回想天氣很熱時，中午感覺更熱，到了晚上會變得比較涼快。

2. 提出問題：引導思考：中午感覺熱代表氣溫怎麼樣？（較高），晚上涼快代表氣溫怎麼樣？（較低），氣溫有高低，表示溫度怎麼樣？（有改變）。

- 提問：一天中的氣溫會有改變嗎？

3. 蒐集資料：引導學生觀察周遭現象與查詢資料，提出相關的現象或資料。

- 氣象報告中有最高溫與最低溫的項目。
- 中午吃飯時間到下午第一節課感覺很熱。
- 雨天或陰天時感覺氣溫變化不是很明顯。

4. 提出假設：引導學生提出假設。

- 中午很熱，我認為中午的氣溫比早上高。
- 一天中的氣溫會發生改變。

5. 設計實驗：引導學生討論如何設計實驗。

(1) 測量時間與次數

- 引導學生討論出一天的測量時間應該包含上午、中午、下午和晚上，不同時段，實驗才完整。

- 測量地點必須同一個地點，但是晚上無法到學校測量。

- 在學校必須配合上下課時間及學校活動，有時候無法測量很多次。

(2) 測量地點

- 想一想，依據氣溫的定義，我們應該選擇什麼地點來測量氣溫呢？

- 依據定義氣溫是指離地 125 ~ 200 公分陰涼通風環境的空氣溫度，所以選擇的地點要符合這個條件。引導學生說出空氣流通、沒有被陽光直射的地點。並利用課本圖片讓學生選擇樹蔭下、通風的走廊，適合測量氣溫。

- 引導學生說出一天中氣溫的改變要在同一地點測量比較。

- 引導學生綜合討論結果，選定一個適合的地點，依據當天作息規劃測量時間並進行測量，將結果記錄下來。

(3) 實驗設計

- 想一想，如何設計一個表格來記錄測量的氣溫呢？

- 引導學生討論出紀錄表的名稱、項目及位置的安排。

- 引導學生說出要有觀測地點、日期、天氣狀況、測量時間及氣溫紀錄等項目。

6. 分析結果並驗證假設：依據實驗記錄討論，假設是否與結果符合，若符合則提出結論；若不符合，則重新提出假設，再設計實驗，分析結果，直到假設得到印證。依據實驗記錄討論，假設是否與結果符合，若符合則提出結論；若不符合，則重新提出假設，再設計實驗，分析結果，直到假設得到印證。

7. 結論：一天中的氣溫會發生改變。

<p style="text-align: center;">第十二週</p>	<p>三、天氣停看聽</p> <p>1. 觀測天氣</p> <p>活動一：測量雨量</p> <p>一、觀察實作</p> <p>1. 下雨了，如何判斷雨下得有多大呢？</p> <ul style="list-style-type: none"> • 學生自由發表，如雨滴小是小雨，雨滴大是大雨，合理即可。 • 引導學生從氣象預報的項目中有豪大雨特報，讓學生思考豪大雨是用什麼標準區分的呢？從區分的標準，發現雨量的單位是毫米。 <p>2. 充電站「雨量分級表」，依照氣象局的定義：</p> <ul style="list-style-type: none"> • 大雨：24 小時累積雨量達 80 毫米以上，或時雨量達 40 毫米以上之降雨現象。 • 豪雨：24 小時累積雨量達 200 毫米以上，或 3 小時累積雨量達 100 毫米以上之降雨現象。 • 大豪雨：24 小時累積雨量達 350 毫米以上，或 3 小時累積雨量達 200 毫米以上之降雨現象。 • 超大豪雨：24 小時累積雨量達 500 毫米以上之降雨現象。 <p>3. 想一想，雨量是怎麼測量的呢？要選擇什麼樣的儀器或器具來測量呢？</p> <p>4. 利用課本圖片介紹下雨的多寡通常利用雨量器來測量，雨量器包括收集雨水與記錄降雨量的部分，記錄雨量的部分是經過換算過的。雨量的單位是 mm。</p> <p>二、探究活動</p> <p>雨量器是經過設計的儀器，想一想，我們能不能利用身邊的容器當作雨量器，收集雨量，測量雨量的多寡？測量雨量時，雨量器應該擺在哪裡比較恰當呢？</p> <p>1. 觀察：氣象觀測時，利用雨量器來測量雨量。</p> <p>2. 提出問題</p> <p>(1) 引導思考：</p> <ul style="list-style-type: none"> • 引導學生思考氣象站使用的雨量器構造複雜且較昂貴，可以利用簡易的容器來測量雨量嗎？ • 引導學生說出，適合測量雨量的容器，在同一個時間、地點，測量的雨量應該相同。 <p>(2) 提問：什麼樣的容器適合測量雨量？</p> <p>3. 蒐集資料：引導學生觀察周遭現象與查詢資料，提出相關的現象或資料。</p> <p>(1) 查詢書本知道雨量是指一定時間內，雨量器累積的雨水高度……。</p> <p>(2) 查詢網路資料發現可以利用平底直筒的容器來測量雨量……。</p> <p>4. 假設：在相同地點，一定時間內，不同形狀的平底直筒容器收集到的雨水高度相同，適合用來測量雨量。</p> <p>5. 實驗操作：引導學生討論如何設計實驗。</p> <p>(1) 容器選擇</p> <ul style="list-style-type: none"> • 除了平底直筒的容器，還要準備其他樣子的容器來做實驗嗎？（需要，這樣才能比較。） 	<p>3</p>	<p>課本及習作 電子教科書 或簡報 數個大小、 形狀不同的 平底容器 直尺</p>	<p>口頭發表 實驗操作 觀察記錄 習作評量</p>	<p><input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目：</p> <hr/> <p>2. 協同節數：</p> <hr/>
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	<p>(2)擺放位置</p> <ul style="list-style-type: none"> • 測量雨量時，容器要選擇平底容器才不易傾倒。測量地點要選擇空曠沒有遮蔽、平坦、安全的地方。 <p>(3)如何觀察驗證實驗結果</p> <ul style="list-style-type: none"> • 收集完雨水後，觀察雨水高度相同的容器，是不是平底直筒的容器？（是，表示平底直筒的容器適合當作雨量器測量雨量。） <p>(4)操作步驟</p> <ul style="list-style-type: none"> • 下雨時，將不同形狀的容器，放在適合的地點，一段時間後，觀察並比較各個容器收集到的雨水高度。 <p>6. 分析結果並驗證假設</p> <p>(1)引導學生根據實驗結果討論，發現平底直筒的容器收集到的雨水高度相同，適合當作雨量器。而口小底大的容器收集的雨水高度較低，口大底小的容器，收集的雨水高度較高，兩者均不適合當作收集雨量的容器。</p> <p>(2)實驗結果和假設「在相同地點，一定時間內，不同形狀的平底直筒容器收集到的雨水高度相同，適合用來測量雨量。」（一樣。）</p> <p>7. 結論：平底直筒的容器適合用來當作雨量器測量雨量。</p> <p>三、討論</p> <p>1. 用下雨天將數個大小、形狀不同的平底容器，放在適當的地點收集雨量後，發現有些容器收集到的雨水高度相同，這些容器都是平底直筒的容器。</p> <p>2. 同地點，相同時間，開口大的容器收集到的水位會較高，開口小的容器收集的水位較低，不同的平底直筒容器，在相同的地點和時間，收集到的雨水高度都一樣，所以平底直筒的容器最適合當作簡易雨量器。可以用來當作雨量器，而筒內的雨水高度就代表雨量。</p> <p>四、歸納</p> <p>1. 天氣狀況依雲量的多寡，分為晴天、多雲、陰天；下雨了就是雨天。</p> <p>2. 天氣的冷熱用氣溫表示，氣溫用氣溫計測量，氣溫計有攝氏和華氏兩種溫標，在臺灣大多以攝氏溫標來表示氣溫。</p> <p>3. 一天中的氣溫會發生改變。晴天時，白天的氣溫，從清晨到中午逐漸升高，中午過後氣溫最高，下午後氣溫逐漸下降。整天下雨時，氣溫變化不大。一天內的氣溫會受到天氣變化的影響。</p> <p>4. 我們通常利用雨量器來測量雨量。測量雨量要在空曠沒有遮蔽、平坦、安全的地方測量。</p> <p>5. 平底直筒的容器可以用來當作簡易的雨量器測量雨量。</p>				
<p>第十三週</p>	<p>三、天氣停看聽</p> <p>2. 氣象預報</p> <p>活動一：天氣與生活</p> <p>一、引起動機</p> <p>1. 我們要怎麼決定今天要穿什麼衣服出門呢？</p>	<p>3</p>	<p>課本及習作 電子教科書 或簡報 氣象局網站</p>	<p>口頭發表 實驗操作 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p>

<p>出門時需要攜帶什麼物品呢？</p> <ul style="list-style-type: none"> • 我們可以觀察外面的天氣狀況決定。 • 晴天時要注意防晒，需要攜帶帽子、防晒乳等防晒用具。 • 多雲天和陰天要注意天氣可能轉變，需要多帶衣物禦寒或雨衣、雨傘預防下雨。 • 雨天要攜帶雨具出門。 <p>2. 天氣除了會影響我們的穿著，和我們的生活還有什麼關係呢？</p> <ul style="list-style-type: none"> • 晴天適合晒衣物、進行戶外活動，但要注意防晒。 • 多雲天、陰天適合出遊、進行戶外活動。 • 雨天適合室內活動，外出要使用雨具，並小心低窪地區會淹水。 <p>二、觀察實作</p> <p>1. 透過實際觀測，可以知道現在的天氣，想想看，要怎樣才能知道未來幾天的天氣呢？</p> <ul style="list-style-type: none"> • 引導學生說出觀看氣象報告、報紙上的氣象預報、查詢氣象局網站、撥打 166 或 167 氣象錄音專線電話、廣播、APP、社群軟體等方式獲得氣象預報資訊。 <p>2. 利用氣象局的網站可以查詢今明兩天的天氣狀況、氣溫、降雨機率等天氣預報。</p> <ul style="list-style-type: none"> • 引導學生發現網站上的地圖，藉由點選地圖位置可以查詢各地今明兩天的天氣預報。 • 利用課本圖片或氣象局網站，引導學生說出今明兩天各縣市天氣預報，有最高溫、最低溫、降雨機率、天氣狀況等。 • 教師依據學生說出的項目，適時說明其意義。 • 介紹氣象局常見的天氣狀況圖示。 <p>活動二：如何查詢天氣預報？(1)</p> <p>一、探索活動</p> <p>1. 想一想，進行各項活動前，如何了解天氣的變化做行前準備呢？</p> <ul style="list-style-type: none"> • 引導學生說出，如果會下雨要準備雨具，紫外線指數太高要準備防晒用具等。 • 如果事先知道天氣會變冷，就能事先準備禦寒衣物（外套）。 • 氣象局網站可以提供各種與天氣相關的資料，可以依據地點、時間長短進行資料查詢。 <p>2. 如果想規劃旅遊、出差、訪友、農作等活動，需要知道較長時間的天氣預報，氣象局也有提供相關的資料嗎？</p> <ul style="list-style-type: none"> • 我們可以依據中央氣象局的分類查詢，例：休閒旅遊、海象及國際都市等，查詢該地的天氣狀況。 • 引導學生發現點選天氣概況及 1 週預報，可以了解臺灣各地 1 週天氣概況。 • 利用網站或課本圖片，讓學生回答某一天的天氣資訊。 				<p>1. 協同科目：</p> <hr/> <p>2. 協同節數：</p> <hr/>
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<p style="text-align: center;">第十四週</p>	<p>三、天氣停看聽</p> <p>2. 氣象預報</p> <p>活動二：如何查詢天氣預報？(2)</p> <p>一、暖身活動</p> <p>1. 延續上週教學活動，請學生實際查詢明天的氣象資料，根據氣象資料決定要穿著或攜帶的衣物、雨具、防晒用品或決定明天的活動是否適合進行，需要準備什麼用品。例如：</p> <p>(1) 依據天氣狀況和降雨機率決定是否應該攜帶雨具。</p> <p>(2) 依據紫外線指數</p> <ul style="list-style-type: none"> • 低、中量級不需要做防護措施，所以中量級不需要準備防晒用品。 • 高量、過量及危險級，有晒傷的危險，需要準備防晒用品。 <p>(3) 依據氣溫及體感溫度決定穿著或攜帶的衣物或用具。</p> <p>(4) 依據進行的活動選擇需要的資訊，判斷是否能進行活動，或需要為活動準備什麼用品或措施。</p> <p>2. 氣象預報的資料中包括了空氣品質監測資料，想一想，空氣品質監測資料為什麼會出現在氣象預報資料中？它對生活有什麼影響呢？</p> <ul style="list-style-type: none"> • 空氣汙染物會受到天氣的影響，所以空氣品質預報必須結合天氣的變化，因此 AQI 會出現在氣象預報資料中。 • 利用充電站說明 AQI 對生活的影響及歷年來中大的空氣汙染事件。 • 引導學生了解空氣汙染會受天氣的影響。 • 實際查詢居住地的 AQI，了解居住地的空氣品質狀況。 <p>二、討論</p> <p>1. 利用網站或圖片，詢問學生周末想去某一地點遊玩、放風箏、騎腳踏車等戶外活動適合嗎？</p> <ul style="list-style-type: none"> • 學生依據天氣資料與活動性質判斷是否適合進行。 <p>2. 除了一周預報，網站上還有哪些位置可以查詢天氣資訊呢？</p> <ul style="list-style-type: none"> • 引導學生發現網站上還有休閒旅遊、農業、漁業等不同分類可供查詢天氣狀況。 <p>3. 如果週末想到某一風景名勝或國家公園遊玩，需要準備雨具或防晒物品嗎？</p> <ul style="list-style-type: none"> • 引導學生查詢資料回答。 <p>4. 如果想去花蓮賞鯨，要看哪一種氣象氣預報呢？</p> <ul style="list-style-type: none"> • 引導學生利用網站上的臺灣近海漁業可以查到花蓮沿海漁業氣象。 <p>5. 想一想，除了賞鯨需要利用漁業氣象，還有什麼活動需要利用漁業氣象呢？</p> <ul style="list-style-type: none"> • 引導學生說出在海上活動，要看漁業氣象預報，才能知道風力與海浪大小，判斷從事海上活動是否安全。 <p>6. 如果想要出國，要如何查詢國際都市天氣預報呢？</p>	<p>3</p>	<p>課本及習作 電子教科書 或簡報 氣象局網站</p>	<p>口頭發表 實驗操作 習作評量</p>	<p><input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目：</p> <hr/> <p>2. 協同節數：</p> <hr/>
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	<ul style="list-style-type: none"> 查詢國際都市天氣預報要先知道想查詢的都市位在哪個區域。 <p>三、歸納</p> <ol style="list-style-type: none"> 利用觀看氣象報告、報紙上的氣象預報、查詢氣象局網站、撥打 166 或 167 氣象錄音專線電話、廣播、APP、社群軟體等方式獲得氣象預報資訊。 氣象局可以查詢今明兩天天氣預報，預報中有最高溫、最低溫、降雨機率、天氣狀況、降雨機率等資訊。 點選天氣概況及 1 週預報，可以了解臺灣各地 1 週天氣概況。 利用網站上休閒旅遊、農業、漁業等不同分類也可以查詢天氣狀況。 外出、出國、從事各項活動時，可以依據天氣預報的資料，準備防晒用品、雨具、外套等物品。 AQI 可以作為戶外活動參考，並採取適當防護措施。空氣汙染會影響空氣品質，也讓民眾生活受到影響。 				
<p>第十五週</p>	<p>三、天氣停看聽</p> <p>3. 季節與生活</p> <p>活動一：天氣與季節</p> <p>一、引起動機</p> <ol style="list-style-type: none"> 想一想，臺灣一年中的氣溫會怎麼變化呢？ <ul style="list-style-type: none"> 引導學生說出，夏天通常很熱、冬天卻很冷，春天和秋天舒適涼爽。 <p>二、觀察實作</p> <ol style="list-style-type: none"> 想一想，有沒有什麼方法可以確切的知道，臺灣一年中氣溫變化的情形呢？ <ul style="list-style-type: none"> 利用氣象局網站進行資料查詢，讓學生發現可以在氣候分類中，查詢到氣候月平均溫度的資料，了解臺灣四季氣溫的變化情形。 引導學生發現，一年中一月最低溫，七月最高溫，南部地區一年四季的氣溫變化較小。 藉由資料中出現「氣候」的名詞，引導學生討論，天氣與氣候的不同，再利用氣象局的資料說明，天氣是指能親身體驗感受的變化，氣候是指長時間累積的經驗。 引導學生自由發表四季的區分方式，再藉由資料查詢了解北半球常用的四季區分為，3~5 月春季、6~8 月夏季、9~11 月秋季、12~2 月冬季。 想一想，四季對我們的生活有什麼影響呢？ <ul style="list-style-type: none"> 引導學生說出四季氣溫、晝夜長短不同，影響我們的穿著、飲食與活動，例如：春天天氣回暖，大家會去踏青賞花；炎熱的夏天盛產芒果，大家會穿短袖、吃冰、吃西瓜；秋天盛產柚子，所以中秋節時大家會賞月，吃月餅、柚子；冬天會穿厚重的外套、喝熱飲。冬天白天較短，所以從事戶外活動的時間會較短。 四季除了對生活有影響，對環境有什麼影響呢？ <ul style="list-style-type: none"> 利用木棉春季開花、夏季果實成熟、秋季葉 	<p>3</p>	<p>課本 電子教科書 或簡報 氣象局網站</p>	<p>口頭發表 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目：</p> <hr/> <p>2. 協同節數：</p> <hr/>

	<p>子變黃、冬季落葉的現象，讓學生發現氣候會影響植物的生長，並讓植物呈現不同的面貌。</p> <ul style="list-style-type: none"> 引導學生依據生活經驗，或曾經學過的知識回答。例如：春天天氣變溫暖，許多植物開始發芽或長出新葉；夏天炎熱，植物長得更茂密；秋天慢慢變涼爽，許多果實成熟，有些樹木開始掉葉子；冬天寒冷，樹木的葉子變少了。 不同季節的天氣影響植物的生長，也影響動物的生活，因此我們可以看到環境在不同季節所呈現的樣貌也不相同。 引導學生欣賞因不同季節所呈現的環境之美。 <p>4. 利用科學閱讀介紹臺灣的雨季。</p> <ul style="list-style-type: none"> 臺灣的雨季為2~4月的春雨、5~6月的梅雨和7~9月的颱風季。 梅雨會造成衣物不易曬乾、物品發霉、食物保存不易、過敏體質的人容易引起過敏症狀等。 				
<p>第十六週</p>	<p>四、動物王國</p> <p>1. 動物的身體構造與功能</p> <p>活動一：動物在哪裡？</p> <p>一、引起舊經驗</p> <p>1. 由教師提問：還記得低年級的時候有學過關於動物課程嗎？</p> <ul style="list-style-type: none"> 教師的答案可從學生對於問題的回饋修正，若學生對於低年級的動物課程有印象則可繼續追問學生還記得哪些課程的內容；反之，若學生有遺忘的現象，可引導在課本單元首頁中提及的「我學過了」的內容，來引起舊經驗。 <p>二、觀察與發表經驗</p> <p>1. 引導學生透過課本中的圖片以及生活經驗，發表在什麼樣的環境中看過什麼動物？</p> <ul style="list-style-type: none"> 在此教師可透過此問題讓學生練習發表較為完整的描述，例如：在動物園的草地上看過牛，牛有四隻腳，頭上有牛角。另外對於環境的描述也可透過引導讓學生觀察動物生活的環境其中具備的條件，如：陽光、空氣、水等。最後，若學生對於課本內容中提到的環境產生疑問時，可適度舉例說明。 <p>2. 引導學生注意不同動物的外形，並嘗試引導讓學生提出問題或是描述外形，如：「不同動物的外形一樣嗎？」或是「某種動物的外形長什麼樣。」</p> <ul style="list-style-type: none"> 教師在此可以讓學生盡量提出觀察到的動物外形特徵，可以用這些想法作為下個活動的先備經驗。 <p>3. 評量撰寫：在習作的撰寫上，可讓學習者討論在校園或是家中觀察到何種動物以及牠們的外形特徵與生活環境的條件。</p> <p>活動二：動物的身體構造</p> <p>一、引起舊經驗</p> <p>1. 教師可以從低年級的生活課程引起學生的先</p>	<p>3</p>	<p>課本及習作 電子教科書 或簡報 影片</p>	<p>口頭發表 習作評量</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目： _____</p> <p>2. 協同節數： _____</p>

	<p>備知識，像是動物的基本外觀與行為。</p> <p>二、討論——動物身體的構造名稱</p> <p>1. 教師可先從人體分為頭、軀幹、四肢作為先備知識，並請學生討論人體構造的功能，再引導學習者由「肢體」的概念建立動物的手腳也稱為「肢」的概念，以及引入其他各部位之名稱。接著觀察課本中猴子的圖片，藉由近似人類的動物觀察構造的異同並討論功能的差異。如：猴子的尾巴可能有平衡的功用、人類的腳掌拇指長在前端而不是側邊。</p> <p>三、討論——動物的外形特徵</p> <p>1. 搭配課本圖片辨識不同動物的身體構造，並嘗試將前一頁的幾種動物的頭、軀幹、肢圈出，與同學討論後上台報告。</p> <p>2. 教師除課本外可以提供更多脊椎動物的圖片，讓學生嘗試說明這些動物的外形構造，此時學生不一定可以說出正確的答案，但鼓勵學生對於動物外形的特徵多加觀察與區分。最後可以讓學生討論先前學到的人與猴子的外形與何種動物相似，產生「外觀相似的動物是否有什麼關係」的問題。</p> <p>• 注意事項：無脊椎動物通常不以頭、軀幹、肢為身體構造命名，可以鼓勵學生利用找尋資料的方式，了解像是昆蟲身體構造的命名。</p>				
<p>第十七週</p>	<p>四、動物王國</p> <p>1. 動物的身體構造與功能</p> <p>活動一：動物的身體構造與功能有關嗎？</p> <p>一、引起舊經驗</p> <p>教師可以引導學生之前學到的身體部位，讓學生觀察進行更細部的觀察，例如：頭部有什麼構造、是否有尾巴、翅膀、鰭等，使學生更能清楚描述動物的構造。</p> <p>二、觀察並討論——構造與功能的關係</p> <p>1. 引導學生對於某種動物的肢體觀察，如：課本中的狗與兔子的肢，讓學生發現雖然兩種肢的數量相同，但肢體的形態卻不太一樣並透過運動的方式讓學生思考運動與肢體形態的可能關係。最後讓學生比較有無其他運動方式或是肢的形態相似的動物。</p> <p>三、探究活動——內、外部構造與環境的關係</p> <p>1. 教師引導學生思考動物會透過肢的活動來運動，那麼動物的肢，外形、功能與內部構造有關嗎？</p> <p>2. 此探究活動透過手指與腳趾的功能與外形比較，引導學生查詢內部構造相關的資料並透過實際摸手指與腳趾的分節，了解手指與腳趾的外形不同，雖然內部骨骼都分為 3 節，但長短不一樣，造成功能的不同。</p> <p>3. 討論：教師透過此探究活動引導學生思考動物的肢會因為內部形態的不同而讓外形有不同的構造，這些構造也能讓動物擁有不同的能力，像是飛翔、奔跑、游水等。</p> <p>四、觀察與再次討論——其他構造的功能</p> <p>1. 引導學生說說看動物的特殊構造和功能的關</p>	<p>3</p>	<p>課本 電子教科書 或簡報 影片</p>	<p>口頭發表</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目：</p> <hr/> <p>2. 協同節數：</p> <hr/>

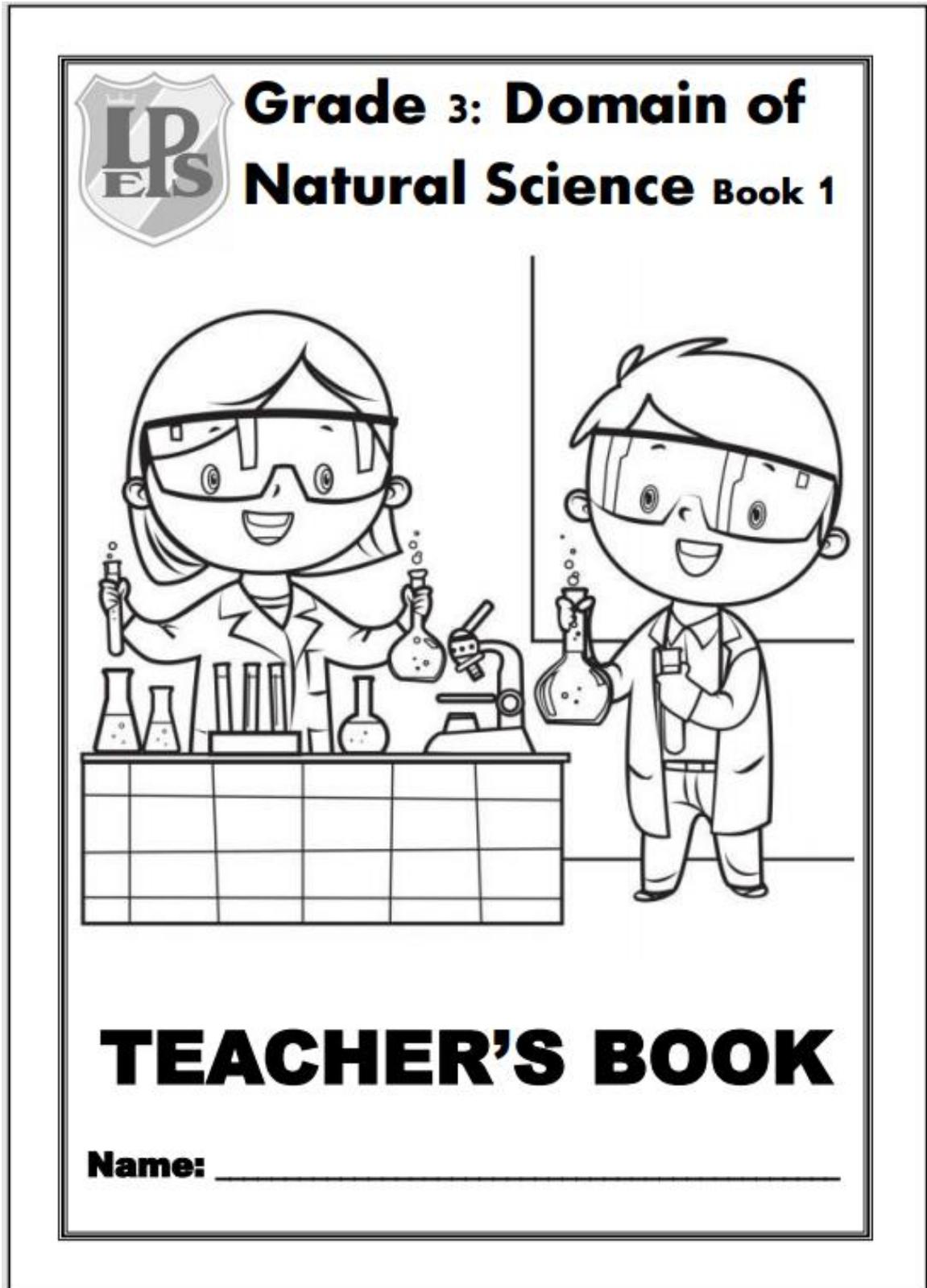
	<p>係，例如：鴨子有蹼的構造，牠的功能可能是什麼？魚的鰭會一直擺動，功能是什麼？</p> <p>2. 教師引導學生觀察昆蟲的翅膀和鳥類的翅膀有什麼不同？引導學生發現牠們的翅膀雖然都有飛行的功能，構造也可能不一樣。</p> <p>3. 此處不需讓學生記憶動物各有哪些構造，目的在了解不同構造會有不同的功能。</p>				
第十八週	<p>四、動物王國</p> <p>2. 動物的生存</p> <p>活動一：動物獲取養分的方式</p> <p>一、引起動機</p> <p>1. 教師可從人類從出生時需要喝奶、長大後要攝取各種食物等，引導學生知道我們需要攝取食物來獲取養分。</p> <p>2. 進而請學生思考，其他動物是否也需要攝取食物？牠們會如何攝取食物？讓學生分享他的想法與發現。</p> <p>二、討論與比較</p> <p>1. 透過課本中的舉例說明，不同動物有不同的覓食方法，目的都是為了獲取養分。</p> <ul style="list-style-type: none"> • 此處可補充說明食物有不同的類別，有的動物會吃植物類的食物、有的會吃動物類的，或是雜食性。 • 教師也可引導學生和前面所學到的動物構造做連結，不同的動物構造有不同的覓食方法，這部分的概念在高年級還會再做深入的教學。 <p>活動二：動物適應環境的方法</p> <p>一、引起動機</p> <p>1. 教師先引起舊經驗，在天氣單元有學過臺灣的環境會有四季的變化，我們在四季會有不同的生活方式，並請學生思考，我們會有哪一些因應季節改變的做法呢？</p> <ul style="list-style-type: none"> • 教師可說明，我們會改變衣著和飲食來適應季節的溫度變化。 <p>二、教學活動</p> <p>1. 請學生想想看，其他動物會用什麼方式來適應環境的改變？</p> <ul style="list-style-type: none"> • 北極狐換毛除了因為較厚的皮毛可以禦寒以外，和環境的雪地顏色也有相關，因此冬季為較濃厚的白色皮毛。 • 除了課本所提的例子，教師也可請學生查詢資料，找出其他有類似適應方式的動物。 	3	課本 電子教科書 或簡報	口頭發表	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____
第十九週	<p>四、動物王國</p> <p>2. 動物的生存</p> <p>活動一：觀察瞳孔的變化</p> <p>一、觀察活動</p> <p>1. 先以貓的瞳孔變化觀察現象引入，請學生想想看人的瞳孔是否也會有一樣的變化。</p> <ul style="list-style-type: none"> • 可請學生回想，在進出電影院時（從黑暗環境到明亮環境，或從明亮環境到黑暗環境），眼睛有什麼感受？ <p>2. 請學生兩兩一組，進行人的瞳孔觀察活動。</p>	3	課本 電子教科書 或簡報	口頭發表 小組互動 表現 觀察記錄	<input type="checkbox"/> 實施跨領域或跨科目協同教學(需另申請授課鐘點費) 1. 協同科目： _____ 2. 協同節數： _____

	<p>• 先請學生關燈（或在較暗的環境），先觀察瞳孔大小，再開燈（較亮的環境），再觀察瞳孔大小的變化。這樣可以避免從亮的環境突然到暗的環境時，眼睛會有短暫看不到的現象。</p> <p>二、結論歸納</p> <p>1. 引導學生歸納觀察結果，瞳孔大小會隨著環境明暗改變而變化。</p> <p>2. 教師補充，人類除了眼睛受到光線刺激而有瞳孔變化的反應，皮膚也會因應冷熱刺激而有反應。這些變化也是適應環境的方式，可以保護自己不受傷害。</p> <p>◎期末考</p>				
<p>第二十週</p>	<p>四、動物王國</p> <p>3. 愛護動物</p> <p>活動一：動物的繁衍</p> <p>一、引起動機</p> <p>1. 教師先引導學生想一想，我們媽媽懷胎生下來的，在生活中是否有看過其他動物也會生小寶寶？</p> <p>二、教學活動</p> <p>1. 教師舉例說明不同動物繁衍的例子。</p> <ul style="list-style-type: none"> • 此處不用說明胎生和卵生的差異，只需讓學生知道動物都會繁衍，不同動物的生長過程不同。動物的生殖方式在高年級會再進行深入的教學。 • 昆蟲的一生不需讓學生知道完全變態和不完全變態的差異，避免淪為考試背誦的內容。 <p>2. 教師總結：動物都會繁衍下一代，讓生命生生不息傳承下去，並說明生命的可貴。</p> <p>活動二：愛護動物的做法</p> <p>一、引起動機</p> <p>1. 教師詢問學生，是否有飼養過小動物，分享彼此的經驗。</p> <p>2. 教師引導學生思考，飼養動物對牠們會有什麼影響？</p> <p>二、教學活動</p> <p>1. 教師先向學生說明動物的生命和我們一樣珍貴，請學生思考我們可以用哪些做法或行為，來愛護這些小動物。</p> <p>2. 教師說明課本上的各種做法，可以搭配影片或網路新聞資料等，協助學生了解各項做法的細節。</p> <p>三、總結歸納</p> <p>1. 環境和動物生存有很大的關係，我們要愛護動物也要愛護環境，讓各種動物都能自然的生存下去。</p> <p>2. 閱讀科學閱讀《向動物借些點子》，並請學生想一想「你還知道哪些和動物有關的發明呢？」。</p>	<p>3</p>	<p>課本 電子教科書 或簡報 影片</p>	<p>口頭發表</p>	<p><input type="checkbox"/>實施跨領域或跨科目協同教學(需另申請授課鐘點費)</p> <p>1. 協同科目： _____</p> <p>2. 協同節數： _____</p>

陸、雙語自然課程

一、雙語自然課程內容(含教師手冊及教學簡報)

(一) 三年級上學期

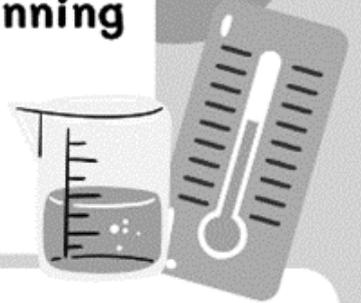


Experiment Rules

1

No eating, drinking, playing or running in the science classroom.

自_レ然_ル教_シ室_ノ內_ニ不_レ可_シ以_テ飲_ム食_ヲ、
嬉_シ戲_ス及_ビ奔_ル跑_ス。



2

Don't touch lab equipment until the teacher tells you.

經_ル過_キ老_シ師_ノ指_シ示_ス、才_レ能_ク使_フ用_ス實_シ驗_シ器_ノ具_ヲ或_ハ材_ヲ料_ヲ。



3

If something goes wrong, quickly ask your teacher for help.

有_レ任_レ何_ノ突_ニ發_ス狀_ノ況_ヲ、請_ヒ尋_ヒ求_ム老_シ師_ノ協_シ助_ス。



4

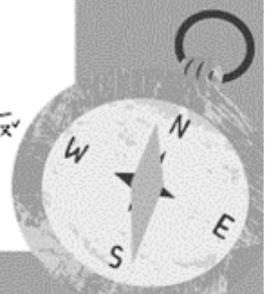
Never eat or smell science materials.

不_レ可_シ食_ム用_ス或_ハ直_ニ接_シ聞_ク實_シ驗_シ材_ノ料_ヲ。

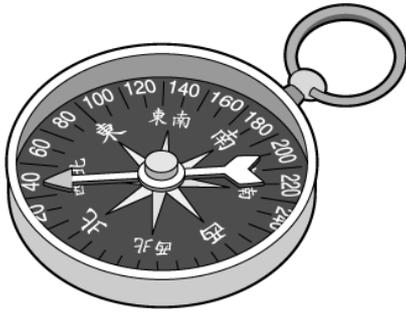
5

Make sure all your equipment is clean before you put it away.

實_シ驗_シ操_シ作_シ完_ル畢_ス、務_ク必_ク清_ク潔_ニ所_ノ有_ル實_シ驗_シ器_ノ具_ヲ、並_ニ放_リ回_ス原_ノ位_ニ。



My Science Tools



compass

指北針



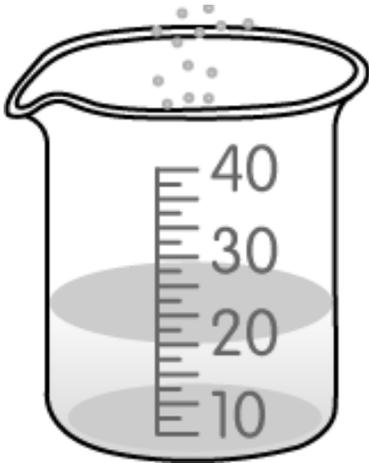
syringe

塑膠注射筒



magnifying glass

放大鏡



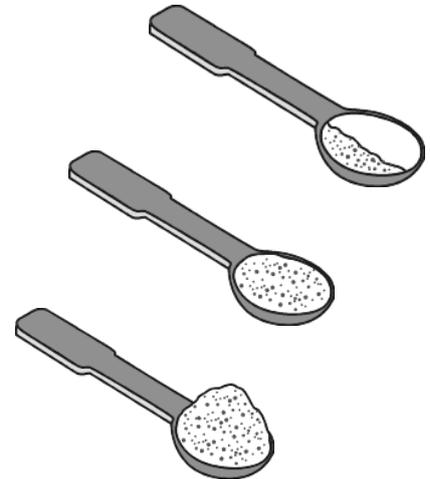
beaker

燒杯



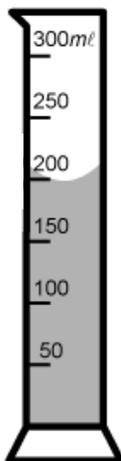
glass rod

攪拌棒



measuring spoons

量匙



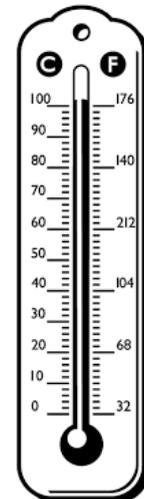
measuring cylinder

量筒



liquid thermometer

溫度計



air thermometer

氣溫計

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Chapter 1: Plants and Their Leaves

All About Leaves



Parts of a Plant

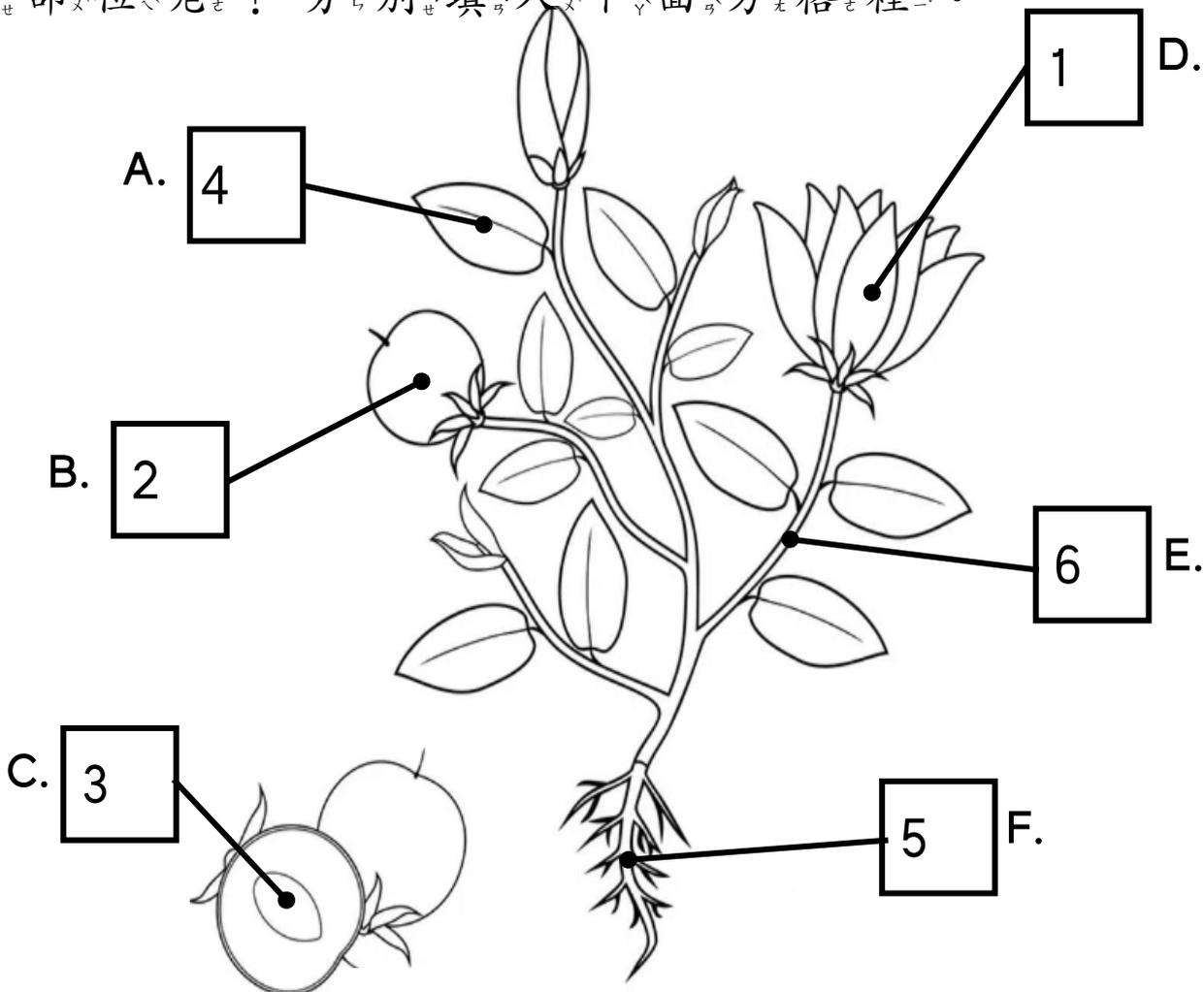
Time to Read

1. **Flowers:** make fruits and seeds.
2. **Fruits:** a part of a plant that has seeds inside.
3. **Seeds:** grow into new plants.
4. **Leaves:** use the sun to make food.
5. **Roots:** take water and food from the soil.
6. **Stem:** moves water from the roots to the leaves.

Time to Write

Match the words with the parts of the plant. Write the correct

number in each box. 植物的身體構造可以分成哪一些部位呢？分別填入下面表格裡。



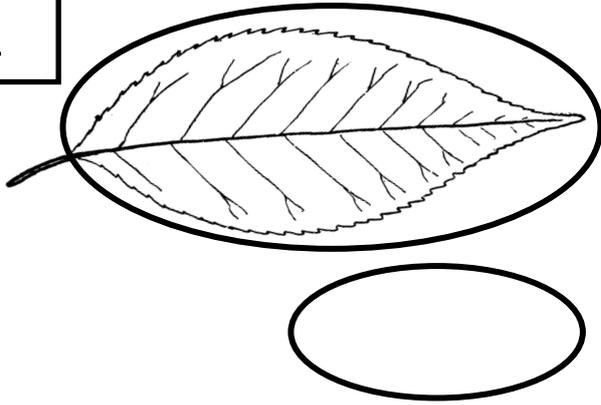
Describing Leaves



Leaf Shapes

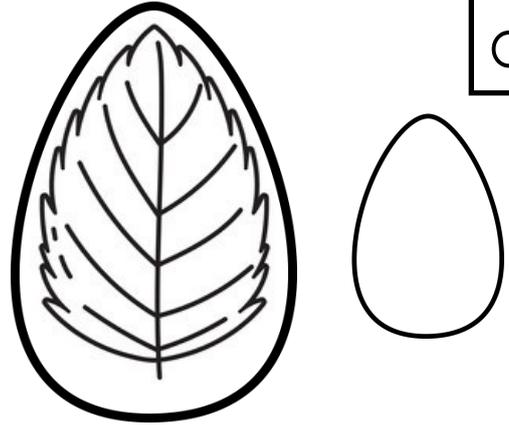
Leaves are many different shapes (形¹/₂狀²/₃). Different (不¹/₂同²/₃一⁴/₅樣⁶/₇的⁸/₉) plants will have different shaped leaves.

E



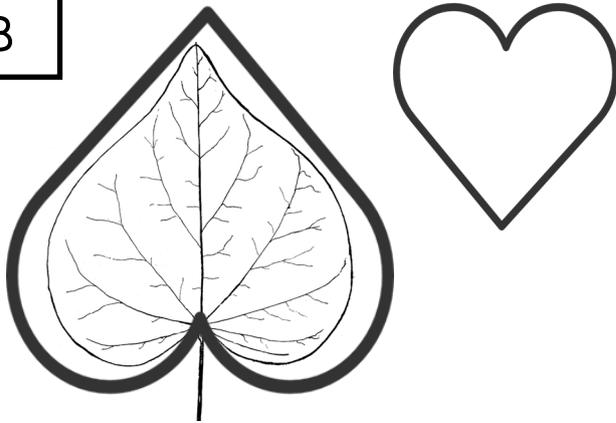
1. narrow oval (長¹/₂橢³/₄圓⁵/₆形⁷/₈)

C



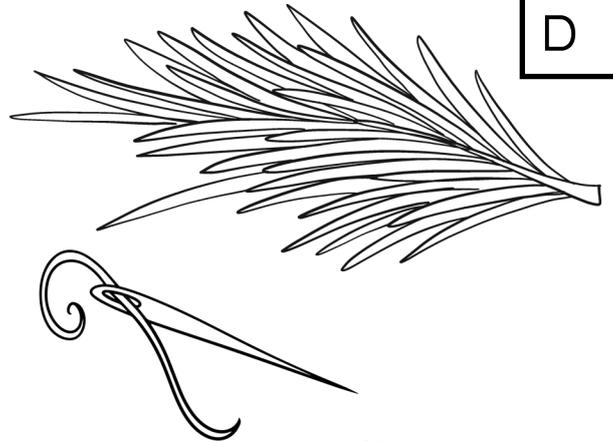
2. egg shaped (卵¹/₂形³/₄)

B



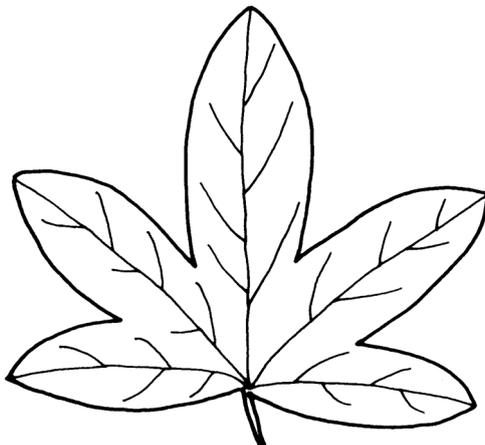
3. heart shaped (心¹/₂形³/₄)

D



4. needle shaped (針¹/₂形³/₄)

A

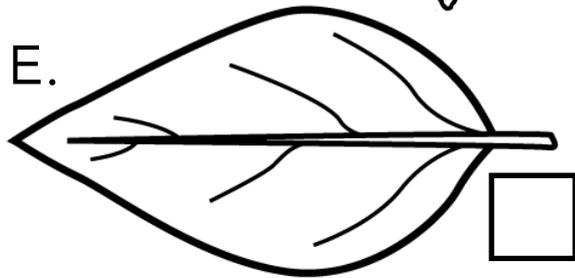
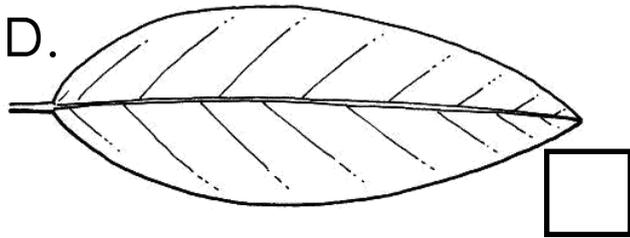
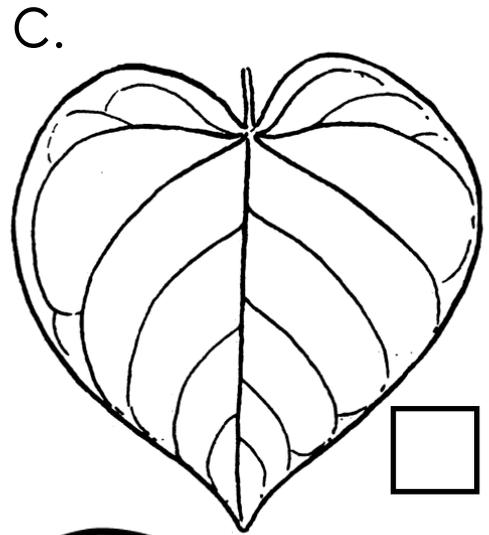
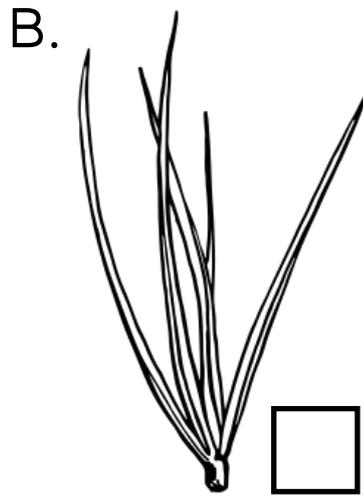
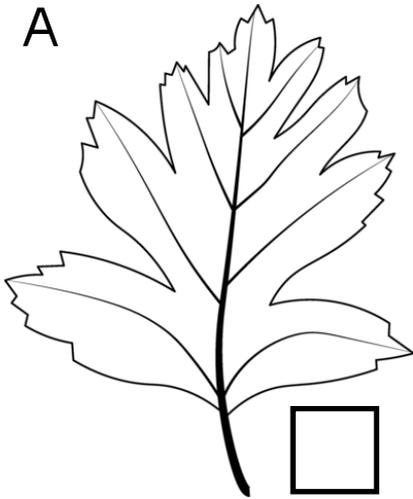


5. hand shaped (掌¹/₂形³/₄) or lobed



 **Time to Speak**

What shape is each leaf? 這些葉子分別是什麼形狀的呢?



narrow oval / egg shaped / hand shaped / needle shaped / heart shaped

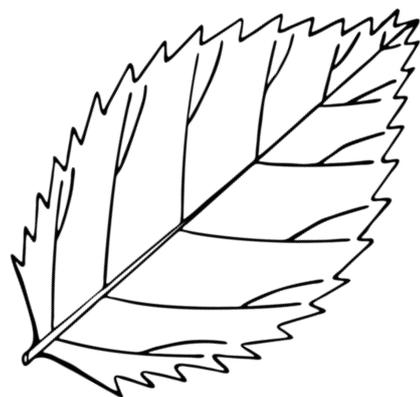
 **Time to Read**

Edges

The outside part of the leaf is called the edge (邊緣). Leaves have different edges.



These leaves have smooth (平滑的) edges.

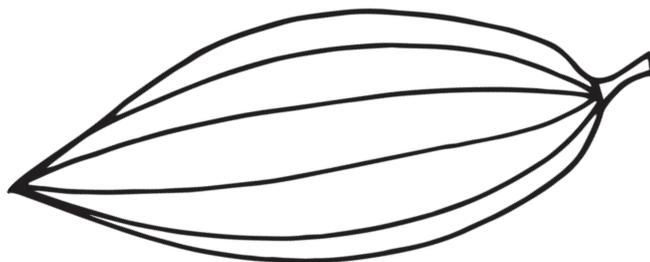


This leaf has jagged (鋸齒狀的) edges.

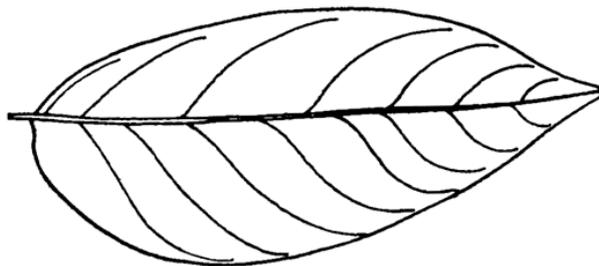
Venation Patterns

Leaves have veins (葉脈). They make different patterns (紋路). These are called venation patterns (脈紋).

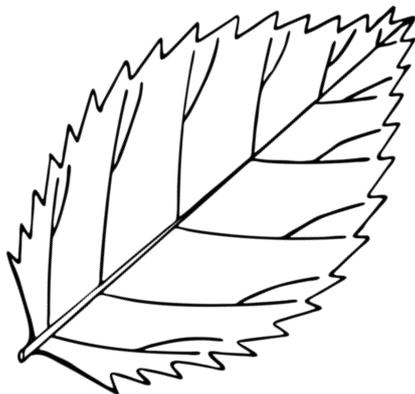
This leaf has a parallel venation pattern (平行脈).



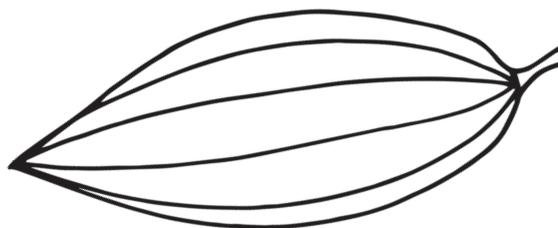
These leaves have a net venation pattern (網狀脈).



1. Draw a leaf with a **jagged edge** and a **net venation pattern**.



2. Draw a leaf with a **smooth edge** and a **parallel venation pattern**.



Word List:  Write each English word one time.

1. flower 花 ハナ

2. fruit 水 スイ 果 カ

3. seeds 種 タネ 子 コ

4. leaf 葉 ハ 子 コ

5. stem 莖 ヒゲ

6. roots 根 ネ

7. narrow oval 長 ナガ 橢 ダマシ 圓 マダラ 形 カタ

8. egg shaped 卵 タマゴ 形 カタ

9. heart shaped 心 ココロ 形 カタ

10. needle shaped 針 ハリ 形 カタ

11. hand shaped 掌 テ 形 カタ

12. edge 邊 ヘリ 緣 ヘリ

13. smooth 平 タラシ 滑 カワ 的 カタ

14. jagged 鋸 ノコギリ 齒 ノコギリ 狀 カタ 的 カタ

15. parallel venation 平 タラシ 行 タラシ 脈 ノコギリ

16. net venation 網^メ狀^ノ脈^ノ

17. banyan tree 榕^ノ樹^ノ

18. tomato 番^ノ茄^ノ

19. bamboo 竹^ノ子^ノ

20. flame tree 鳳^ノ凰^ノ木^ノ

21. water spinach 空^ノ心^ノ菜^ノ

22. Shanghai bok choy 青^ノ江^ノ菜^ノ

Self Assessment: How Am I Doing?

Choose the best one to describe you.

小朋友，這個單元的學習告一段落了，請你想想看，自己在這個單元裡的學習狀況和下面哪一個敘述類似吧！

4



I've Got It! I understand and I can help my classmates.

我都能理解上課的內容，而且我還可以幫助同學。

3



Almost There! I've got it, and I only make small mistakes.

我大部份都能了解，但有時會不小心出錯。

2



Working on It. Sometimes I need help, I'm starting to understand.

我覺得我有愈來愈進步，只是有時需要別人的幫助。

1



Beginner. I don't understand yet and I need a lot of help.

我還需要努力，因為常常需要老師和同學的幫助，但我會加油的！

Choose 1 face for each sentence.

 Yes, I do it all the time. 是^的的^分，我^一一^直這^樣做[。]。

 Sometimes I do this. 有^時時^我會^這這^樣做[。]。

 I don't do this, I need to improve. 我^不不^會這^樣做[，]我^需需^要改^進。

1. I follow the teacher's directions.



我^聽聽^從老^師的^指指^示。

2. I listen when others are talking.



別^人人^說說^話的^時時^候我^會會^注注^意聽[。]。

3. I work nicely with others.



我^和和^別別^人相^處處^得得^很很^好。

4. I can do my work by myself.



我^可可^以自^己己^做我^的的^工工^作。

5. I like to share ideas with the class.



我^喜喜^歡與^全全^班分^享想^法。

6. I try my best on all my work.



我^盡盡^力做^好我^所所^有的^工工^作。

7. I ask for help if I don't understand.



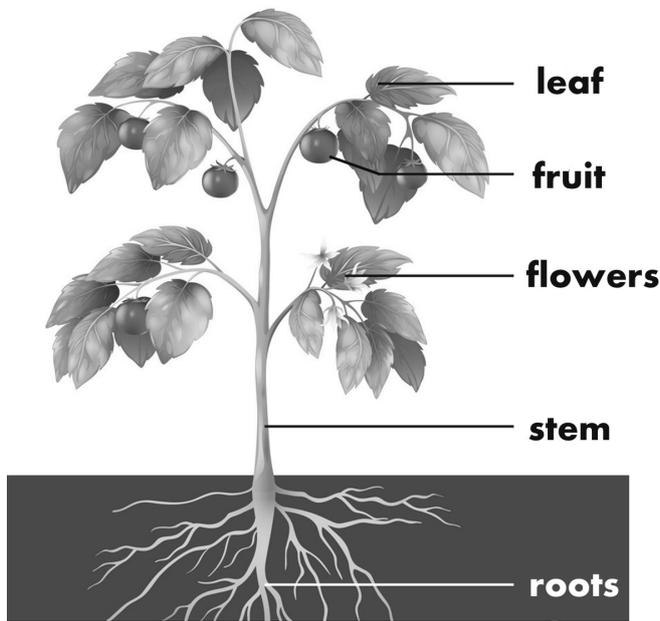
如^果果^我不^明明^白，我^會會^尋尋^求幫^助。



Plants and their Leaves

All About Leaves

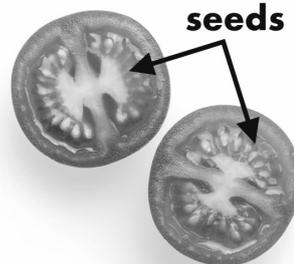
1.



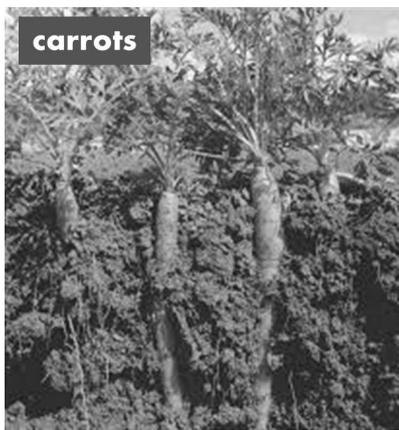
Parts of a Plant

Where are the seeds?

They are inside the fruit.



2.



carrots



radish

strawberry



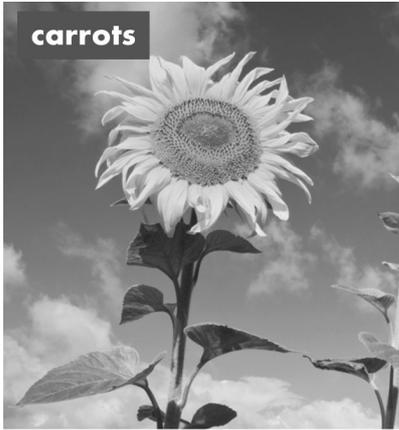
daffodils



banyan tree

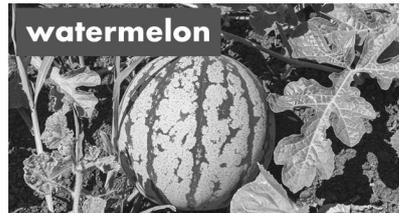
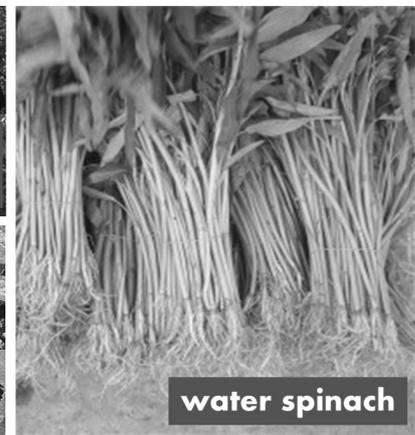
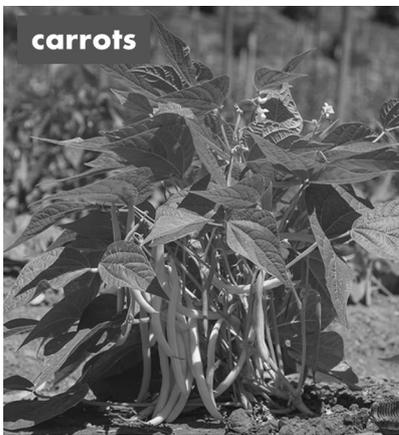
Show me the Roots

3.



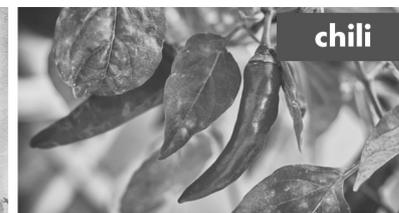
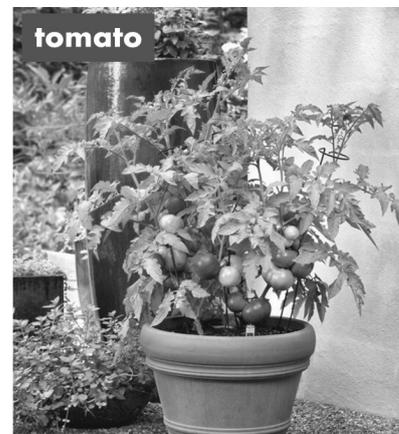
Show me the Stem

4.



Show me the Leaves

5.



Show me the Fruit

6.



tomato



chili



apple tree



mango tree



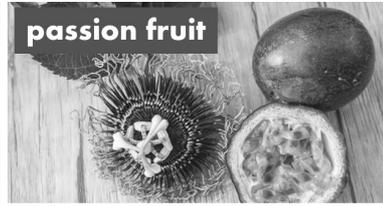
cucumber

Show me the Fruit

7.



longan



passion fruit



coconut tree



okra



dragon fruit

Where are the seeds?

8.



Leaves are different shapes.



egg shaped

卵形



narrow oval

長橢圓形



heart shaped

心形



needle shaped

針形

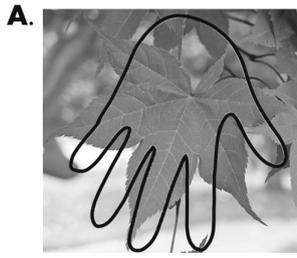


hand shaped

掌形

9.

What shape is each leaf?



10.

What shape is each leaf?



11.

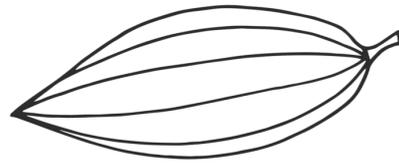
Leaves have different edges (邊_の縁_の).



12.



Leaves have veins (葉脈).
They make different patterns (紋路)
called venation patterns (脈紋).



**parallel venation
 pattern**

平行脈



13.



**Venation
 Patterns**

net venation pattern

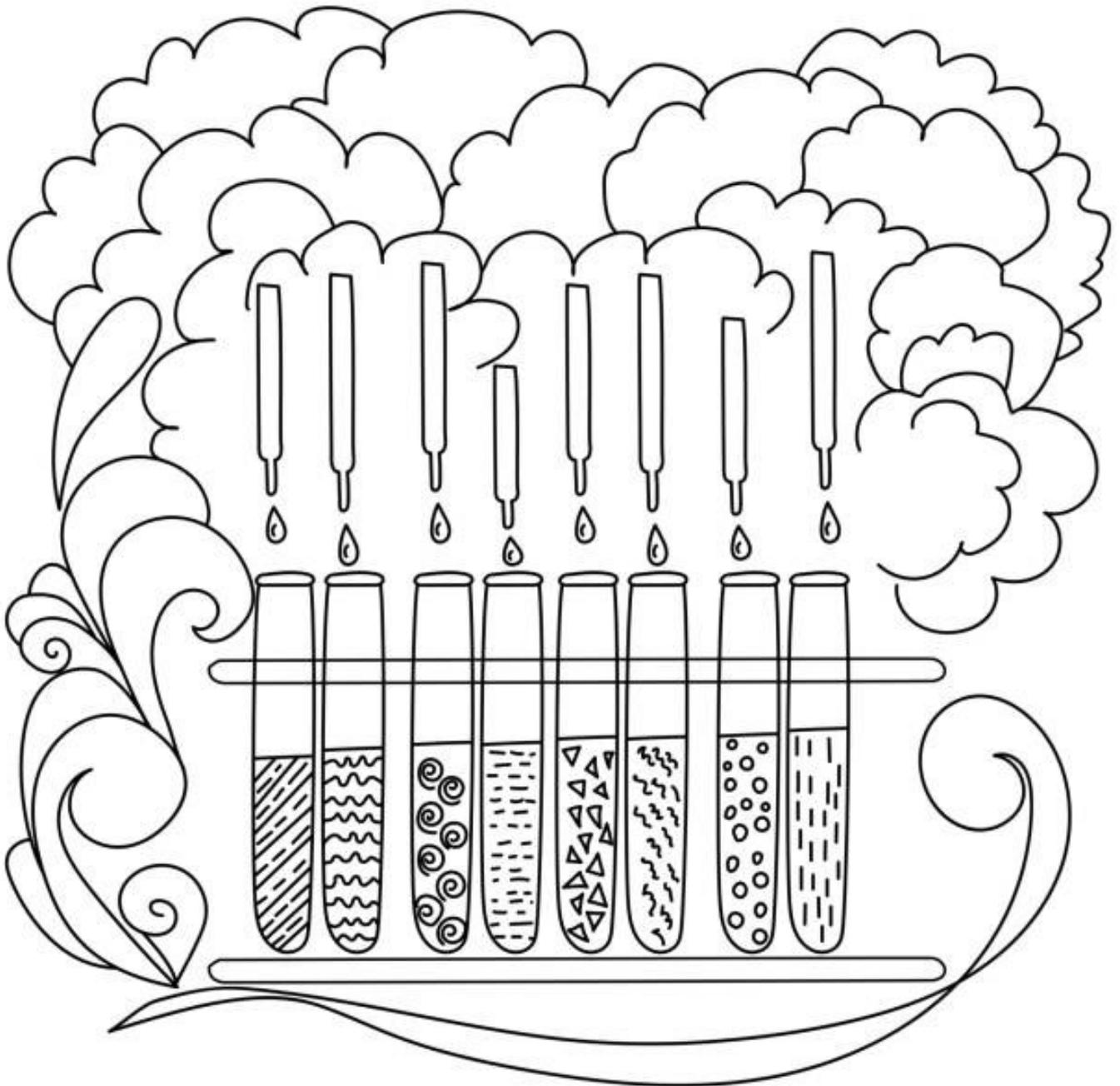
網狀脈



11.

Chapter 2: Dissolving

Acids, Neutrals and Alkalis



Acid, Neutral, or Alkali?

Time to Read

Things you will use:

baking soda solution 蘇打粉水

lemon juice 檸檬汁

sugar solution 糖水



beaker



pipette

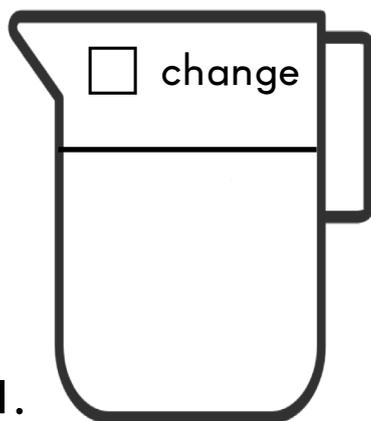


test tube

Purple Cabbage Juice Test

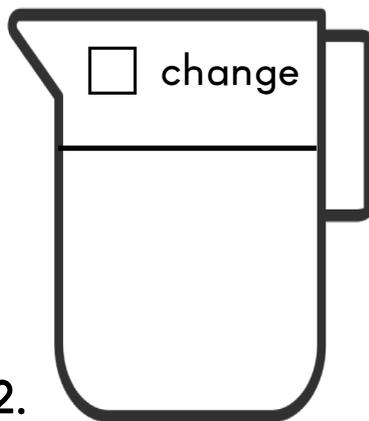
Time to Experiment!

Add the purple cabbage juice (紫高麗菜汁). Does the liquid change color? What color is it? Color the beakers to match your results.



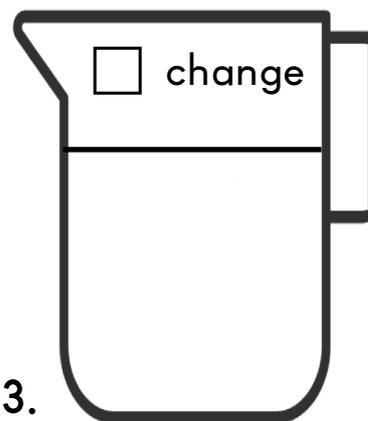
1.

baking soda
solution



2.

lemon
juice



3.

sugar
solution

Is it an acid, neutral or an alkali? Circle the correct answer.

baking soda solution

acid / neutral / alkali

lemon juice

acid / neutral / alkali

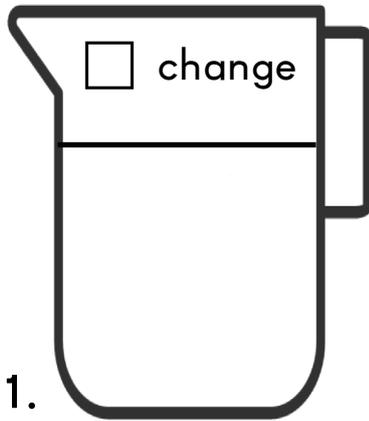
sugar solution

acid / neutral / alkali

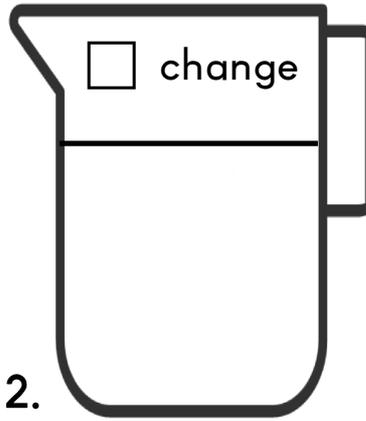
Butterfly Pea Flower Tea Test

Time to Experiment!

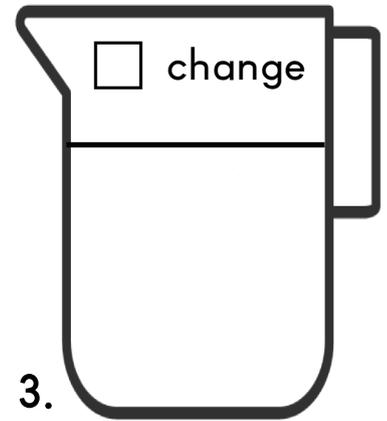
Add the butterfly pea flower tea (蝶豆花茶). Does the liquid change color? What color is it? Color the beakers to match your results.



baking soda
solution



lemon
juice



sugar
solution

Is it an acid, neutral or an alkali? Circle the correct answer.

baking soda solution

acid / neutral / alkali

lemon juice

acid / neutral / alkali

sugar solution

acid / neutral / alkali

What Color Is It?

Time to Read

The liquids will change color when you add the **purple cabbage juice** or the **butterfly pea flower tea**.

Acids: red family

--	--

Neutrals: do not change color

Alkalis: blue or green family

--	--

Word List:  Write each English word one time.

1. acid 酸^{くさく}性^{せい} _____

2. acidic 酸^{くさく}性^{せい}的^{てき} _____

3. neutral 中^{ちゆう}性^{せい} _____

4. alkali 鹼^{かん}性^{せい} _____

5. alkaline 鹼^{かん}性^{せい}的^{てき} _____

6. sour 酸^{くさく}的^{てき} _____

7. slippery 滑^か滑^か的^{てき} _____

8. pipette 滴^た管^{かん} _____

9. beaker 燒^や杯^{はい} _____

10. test tube 試^し管^{かん} _____

11. purple cabbage juice 紫^{むら}色^{しき}高^{たか}麗^か菜^{さい}汁^{じゆ} _____

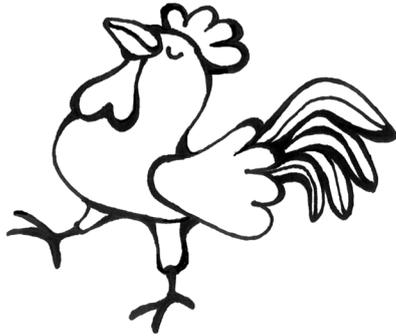
12. butterfly pea flower tea 蝶^か豆^せ花^{はな}茶^{ちや} _____

Self Assessment: How Am I Doing?

Choose the best one to describe you.

小朋友，這個單元的學習告一段落了，請你看，自己在這個單元裡的學習狀況和下面哪一個敘述類似吧！

4



I've Got It! I understand and I can help my classmates.

我都能理解上課的內容，而且我還可以幫助同學。

3



Almost There! I've got it, and I only make small mistakes.

我大部份都能了解，但有時會不小心出錯。

2



Working on It. Sometimes I need help, I'm starting to understand.

我覺得我有愈來愈進步，只是有時需要別人的幫助。

1



Beginner. I don't understand yet and I need a lot of help.

我還需要努力，因為常常需要老師和同學的幫助，但我會加油的！

Choose 1 face for each sentence.

 Yes, I do it all the time. 是^レ的^カ，我^ニ一^ニ直^ニ這^ニ樣^ニ做^ル。

 Sometimes I do this. 有^レ時^ク我^ニ會^ル這^ニ樣^ニ做^ル。

 I don't do this, I need to improve. 我^ニ不^ク會^ル這^ニ樣^ニ做^ル，我^ニ需^ハ要^ス改^メ進^ム。

1. I follow the teacher's directions.



我^ニ聽^ク從^テ老^シ師^ノ的^カ指^シ示^ス。

2. I listen when others are talking.



別^ノ人^ノ說^ク話^ス的^カ時^ク候^ニ我^ニ會^ル注^シ意^シ聽^ク。

3. I work nicely with others.



我^ニ和^テ別^ノ人^ノ相^チ處^ル得^ル很^ク好^ク。

4. I can do my work by myself.



我^ニ可^ク以^テ自^ラ己^ニ做^ル我^ノ的^カ工^ク作^ス。

5. I like to share ideas with the class.



我^ニ喜^ム歡^ム與^テ全^ク班^ノ分^シ享^ス想^フ法^ヲ。

6. I try my best on all my work.

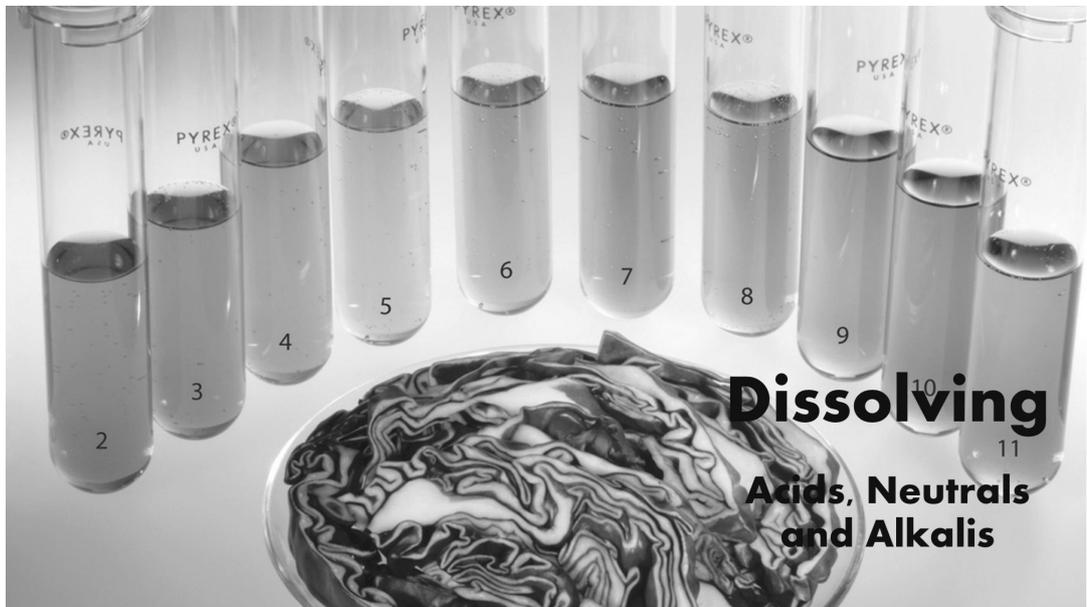


我^ニ盡^ス力^ヲ做^ル好^ク我^ノ所^ノ有^ル的^カ工^ク作^ス。

7. I ask for help if I don't understand.



如^シ果^ク我^ニ不^ク明^ク白^ク，我^ニ會^ル尋^ヒ求^ク幫^カ助^ス。



Dissolving

Acids, Neutrals and Alkalis

1.

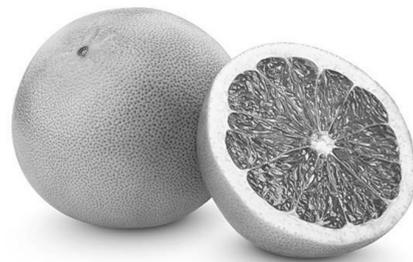
ACIDS 酸性

These are acidic 酸性的.

Acids taste sour 酸的 and can burn 灼傷 you.

vinegar drink 醋飲料

grapefruit 葡萄柚



2.

ALKALIS 鹼性

These are alkaline 鹼性的.

Alkalis feel slippery 滑滑的 and can clean things

shampoo 洗髮精

body wash 沐浴乳

bleach 漂白水



3.

NEUTRALS 中性

A Neutral is not an acid or an alkali.



mouthwash
漱口水

This is neutral.

4.

Are they acidic, neutral or alkaline?

baking soda solution

蘇打汽水



lemon juice

檸檬汁



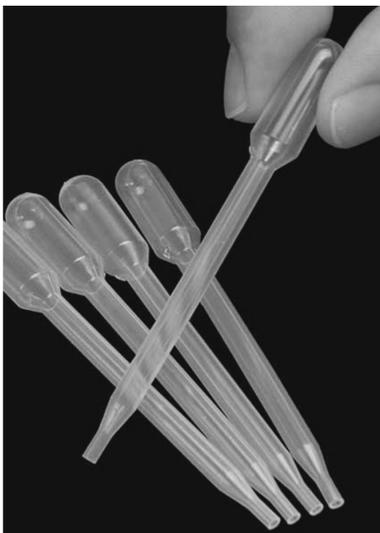
sugar solution

糖水



5.

pipettes 滴管



Things you will use today:



beaker 燒杯

6.

test tube 試管



These will change color when added to an acid or alkali. 加_レ入_ル酸_ク性_ト或_ハ鹼_ク性_ト中_ニ會_フ變_ル色_ス

purple cabbage juice

紫_ノ色_ノ高_ク麗_ク菜_ノ汁_ト



butterfly pea flower tea

蝶_ノ豆_ノ花_ノ茶_ト



7.

Add the cabbage juice and butterfly pea flower tea. The liquids will change color.



加_レ入_ル紫_ノ色_ノ高_ク麗_ク菜_ノ汁_ト和_シ蝶_ノ豆_ノ花_ノ茶_ト，液_一體_ニ會_フ變_ル色_ス。

8.

ACIDS will be in the **red family** 紅_ノ色_ノ系_ト.

NEUTRALS do not change color.

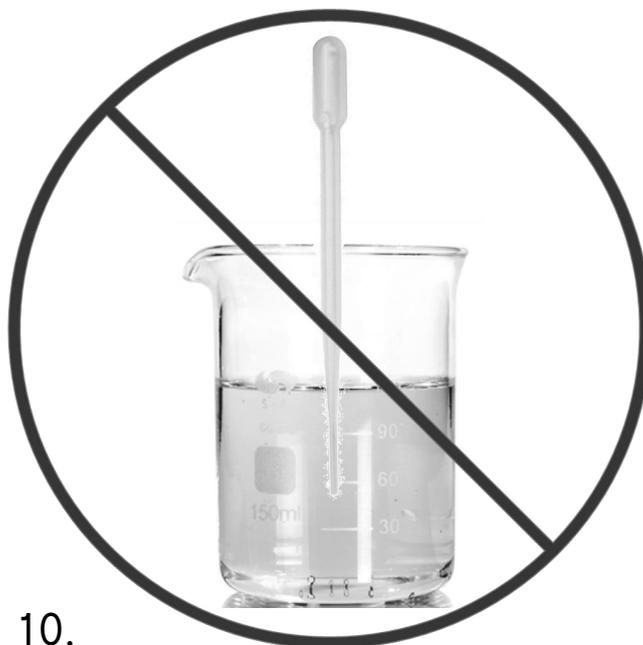
ALKALIS will be in the **blue or green family** 藍_ノ綠_ノ色_ノ系_ト.

9.



Don't put the pipette in the baking soda solution, the lemon juice or the sugar solution.

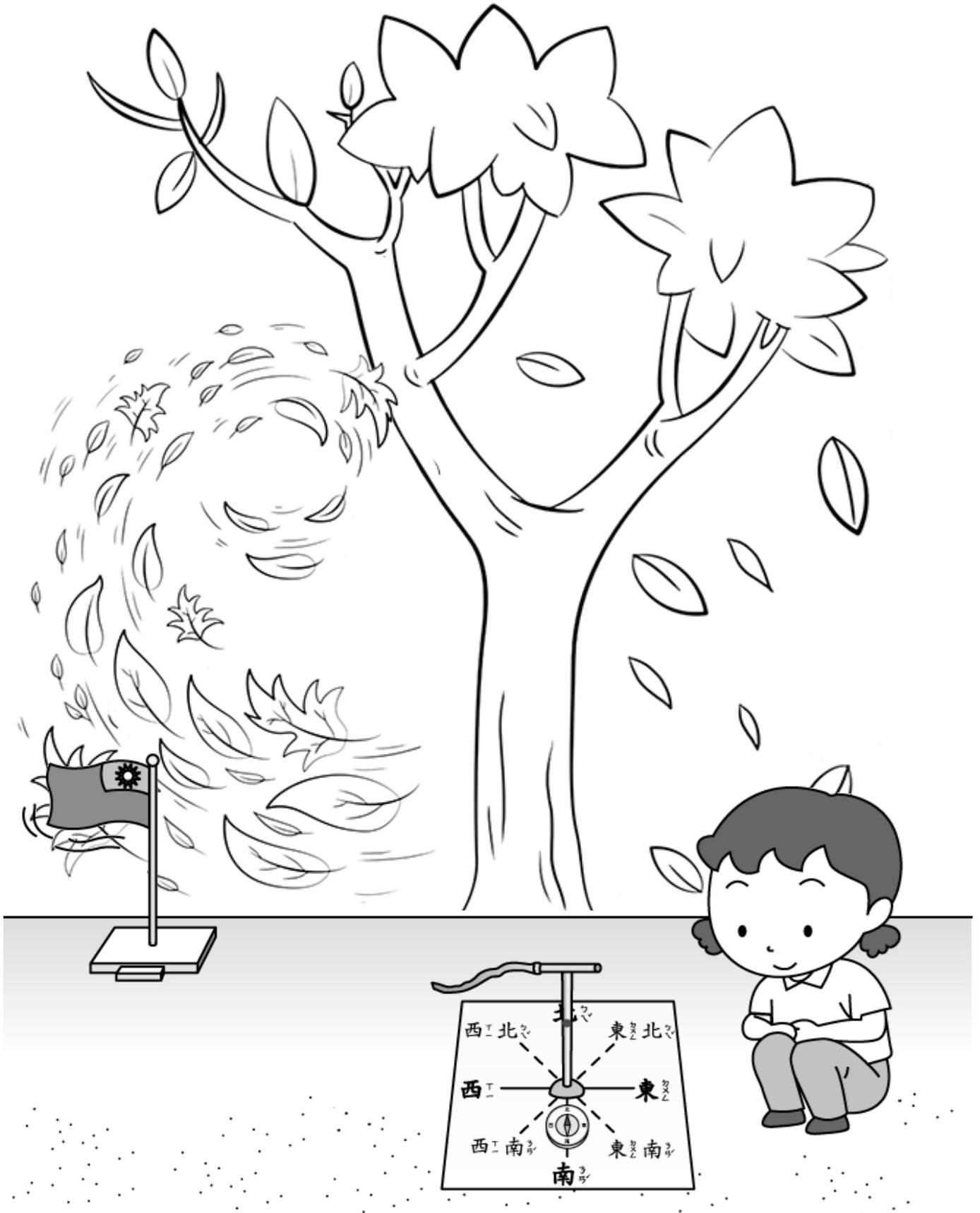
滴管不可放在蘇打水、檸檬水或糖水裡



10.

Chapter 3: Wind and Air

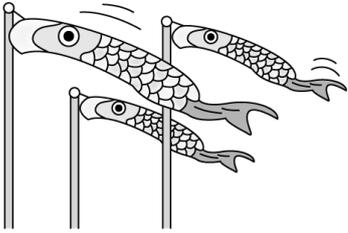
Wind Direction



Wind Direction

Time to Read

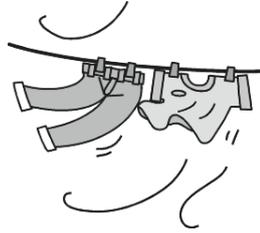
How can you tell where the wind is coming from? Draw arrows to show wind direction for each picture.



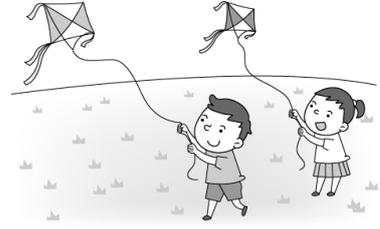
windsocks



flag



clothes



kites

Where is the wind coming from? Circle the correct answer for each person.



Emma

Time to Speak

1. Emma: The wind is coming from the **right / left**.
2. Me: The wind is coming from the **right / left**.

Right (右^ミ), left (左^ヒ), front, and back are not good ways to explain wind direction (方^カ向^ウ). The direction changes when you move.

Time to Read

Cardinal and Ordinal Directions

Cardinal Directions

(四^シ方^カ位^イ次^ジ)

1. north (北^{キタ}方^カ) N
2. east (東^{ヒガシ}方^カ) E
3. south (南^{ミナミ}方^カ) S
4. west (西^{ニシ}方^カ) W

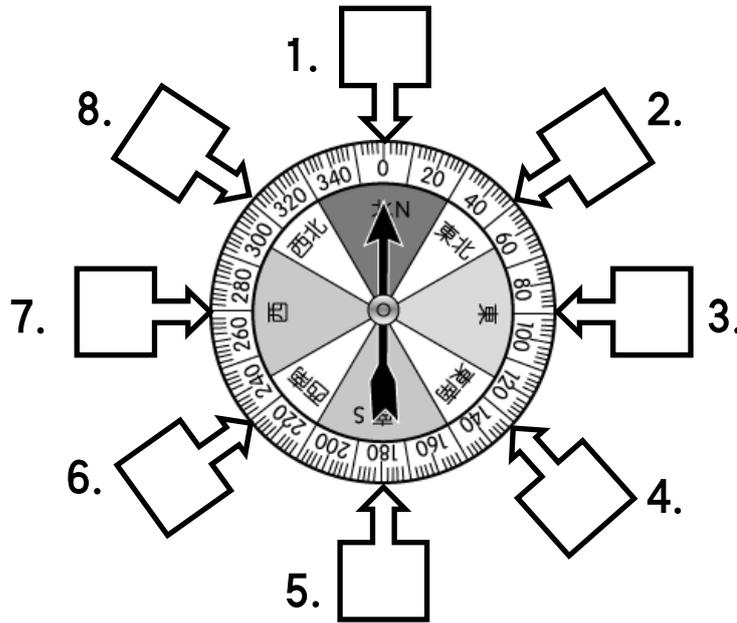
Ordinal Directions

(羅^ラ盤^{パン}方^カ位^イ次^ジ)

5. northeast (東^{ヒガシ}北^{キタ}方^カ) NE
6. southeast (東^{ヒガシ}南^{ミナミ}方^カ) SE
7. southwest (西^{ニシ}南^{ミナミ}方^カ) SW
8. northwest (西^{ニシ}北^{キタ}方^カ) NW

Time to Write

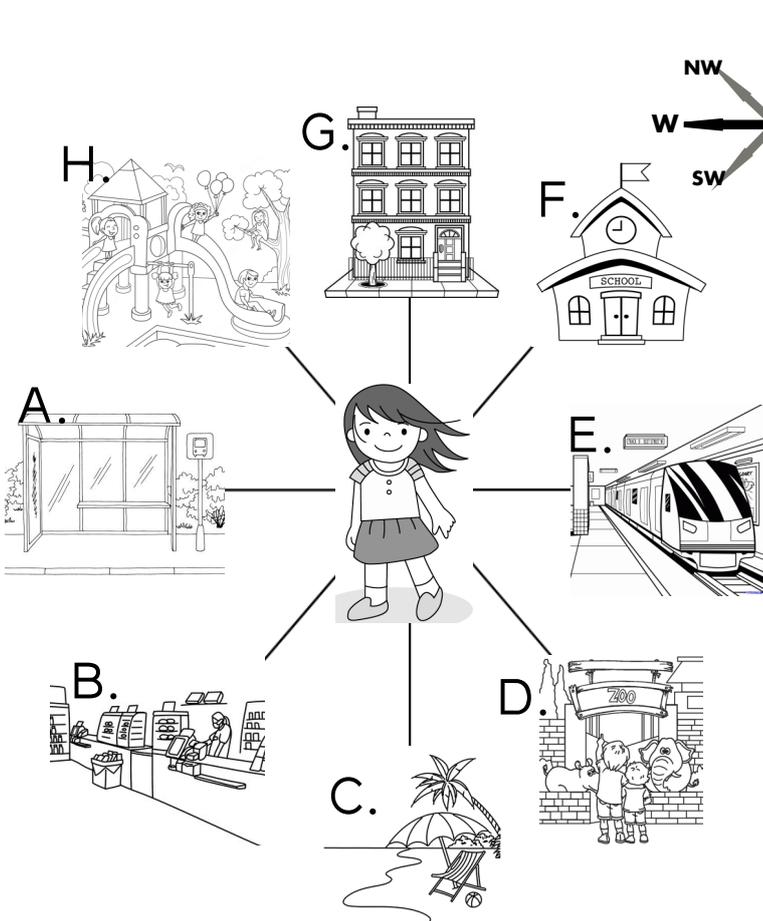
Add the **cardinal** and **ordinal** directions to the compass (指^せ北^{きた}針^{はり}). Write the letters for each direction in the correct boxes.



Using a Compass

Time to Write

Look at the picture. Use the compass to help Emma find each place. Write the number for each direction next to the correct place



Place	Direction
A. bus stop	
B. 7-11	
C. beach	
D. zoo	
E. train	
F. school	
G. home	
H. park	

Where Does the Wind Come From?

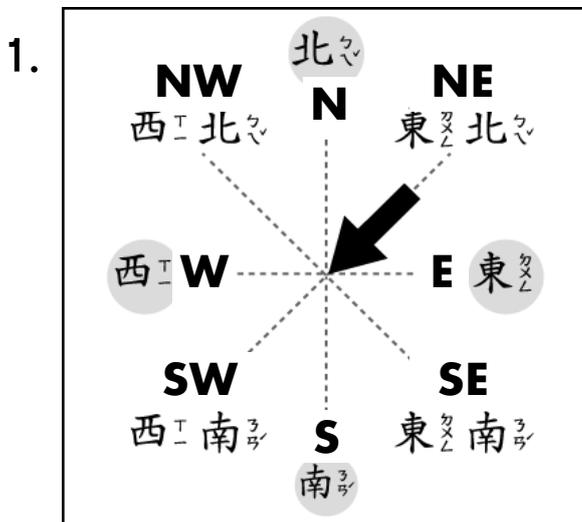
Time to Read

Windssocks (風^ヒ向^イ袋^カ/風^ヒ標^ウ) and wind vanes (風^ヒ向^イ儀^イ) are tools to measure where the wind is coming from.

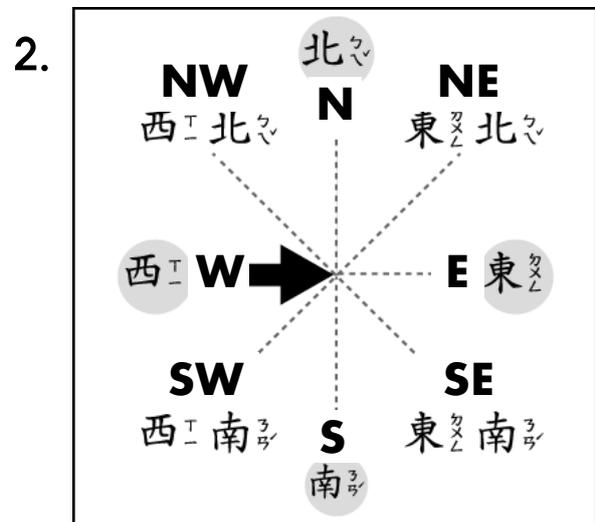
The wind comes from the opposite (相^イ對^ウ的^カ) direction than the windssock is flying.

Time to Write

Look at the pictures. Where is the wind coming from?



The wind is coming from the _____.



The wind is coming from the _____.

Time to Draw

Making a Wind Vane

Draw a picture of the wind vane you made.



 **Time to Explore**

 **Time to Write**

Take your wind vane outside and measure the wind. Read each question and put a check ✓ if your answer is “yes”. Write the answers for A and B.

	1. Does the wind vane move in the wind?
	2. Does the wind vane <u>stand up</u> (直 ^す 立 ^た)?
	3. Does the wind vane show direction?
	4. Does your wind vane <u>measure</u> (測 ^か 量 ^か) wind <u>strength</u> (強 ^く 度 ^か)?

A. What can you use to show the wind vane’s direction?

B. Which direction is the wind coming from? _____

Word List:  Write each English word one time.

1. direction 方^か向^か _____

2. cardinal directions 四^よ方^か位^ち _____

3. north 北^{きた}方^か _____

4. east 東^{あづま}方^か _____

5. south 南^{みなみ}方^か _____

6. west 西^{にし}方^か _____

7. ordinal directions 羅^{カスガ}盤^{タラ}方^{カタ}位^チ

8. northeast 東^{トウ}北^{キョウ}方^{カタ}

9. southeast 東^{トウ}南^{ナン}方^{カタ}

10. southwest 西^{セイ}南^{ナン}方^{カタ}

11. northwest 西^{セイ}北^{キョウ}方^{カタ}

12. compass 指^{サシ}北^{キョウ}針^チ

13. windsock 風^{カゼ}向^{カタ}袋^{フクロ}/風^{カゼ}標^{ヒラ}

14. wind vane 風^{カゼ}向^{カタ}儀^儀

15. opposite 相^{アイ}對^{ゴウ}的^テ

16. measure 測^{チカ}量^{リヤウ}

17. strength 強^{クワク}度^ド

18. left 左^{サマダ}邊^ヘ

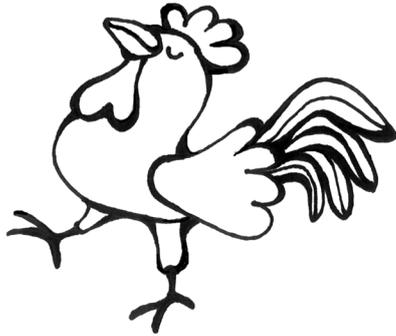
19. right 右^{ミダ}邊^ヘ

Self Assessment: How Am I Doing?

Choose the best one to describe you.

小朋友，這個單元的學習告一段落了，請你看，自己在這個單元裡的學習狀況和下面哪一個敘述類似吧！

4



I've Got It! I understand and I can help my classmates.

我都能理解上課的內容，而且我還可以幫助同學。

3



Almost There! I've got it, and I only make small mistakes.

我大部份都能了解，但有時會不小心出錯。

2



Working on It. Sometimes I need help, I'm starting to understand.

我覺得我有愈來愈進步，只是有時需要別人的幫助。

1



Beginner. I don't understand yet and I need a lot of help.

我還需要努力，因為常常需要老師和同學的幫助，但我會加油的！

Choose 1 face for each sentence.

 Yes, I do it all the time. 是^的的^的，我^一一^直直^這這^樣樣^做做[。]。

 Sometimes I do this. 有^時時^我我^會會^這這^樣樣^做做[。]。

 I don't do this, I need to improve. 我^不不^會會^這這^樣樣^做做[，]我^需需^要要^改改^進進[。]。

1. I follow the teacher's directions.



我^聽聽^從從^老老^師師^的的^指指^示示[。]。

2. I listen when others are talking.



別^人人^說說^話話^的的^時時^候候^我我^會會^注注^意意^聽聽[。]。

3. I work nicely with others.



我^和和^別別^人人^相相^處處^得得^很很^好好[。]。

4. I can do my work by myself.



我^可可^以以^自自^己己^做做^我我^的的^工工^作作[。]。

5. I like to share ideas with the class.



我^喜喜^歡歡^與與^全全^班班^分分^享享^想想^法法[。]。

6. I try my best on all my work.



我^盡盡^力力^做做^好好^我我^所所^有有^的的^工工^作作[。]。

7. I ask for help if I don't understand.



如^果果^我我^不不^明明^白白[，]我^會會^尋尋^求求^幫幫^助助[。]。



1.



Where is the wind coming from?

[怎麼辨別風的方向呢?]

Look at ...

2.



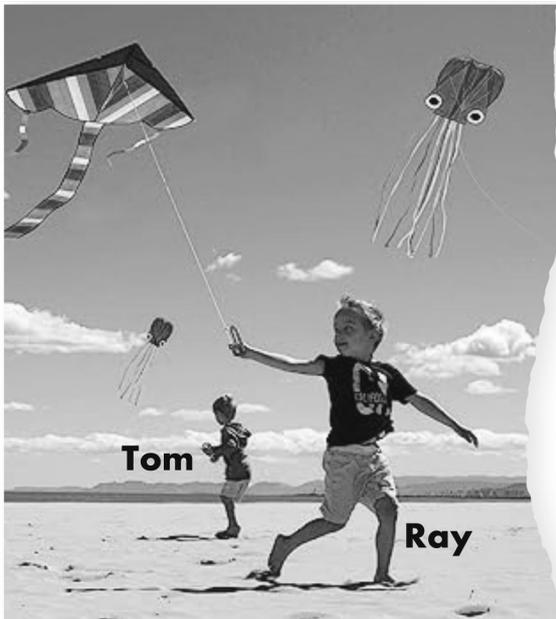
Where is the wind coming from?

[風從哪裡來?]



The wind is coming from the left / right.

3.



Tom

Ray

Right and left are not good ways to explain wind direction

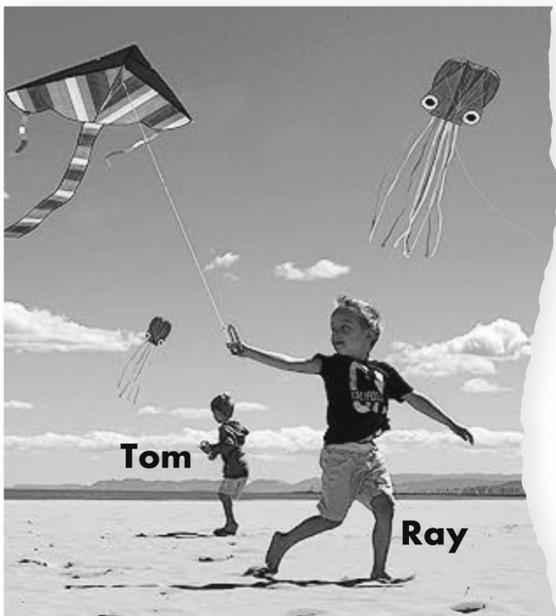
(風_{カゼ}向_{ムキ}).

Ray says the wind is coming from the left.

Tom says the wind is coming from the right.

*look at P. 20 in your book

4.



Tom

Ray

Right and left change when you move. Wind direction will be different when you move to another place.

站_{タチ}的_ノ位_チ置_ノ不_{コト}同_ク， 風_{カゼ}向_{ムキ}也_モ會_ハ不_{コト}一_ト樣_ニ

5.

Cardinal and Ordinal Directions



We use a compass (指_{サシ}北_{キタ}針_{ハリ}) to find wind direction.

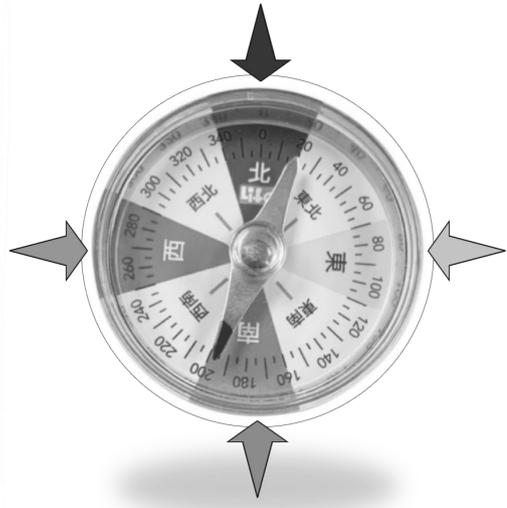
A compass uses cardinal directions (四_ヨ方_ハ位_チ) and ordinal directions (羅_ラ盤_{パン}方_ハ位_チ).



6.

Cardinal Directions

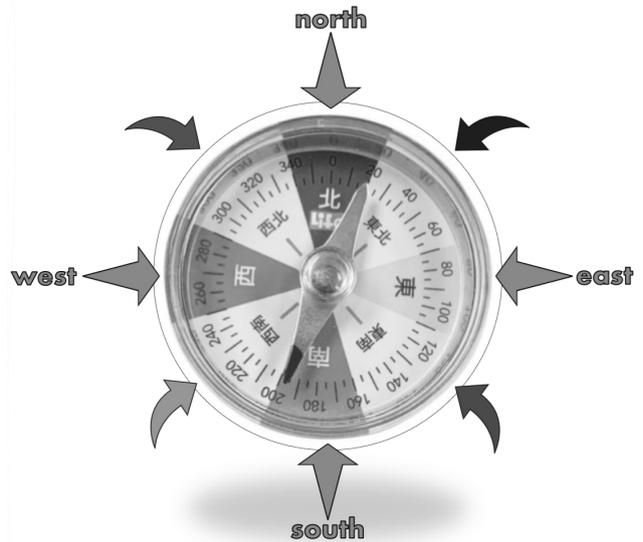
1. **north** (北^{キタ}方^{カタ}) **N**
2. **east** (東^{ヒガシ}方^{カタ}) **E**
3. **south** (南^{ミナミ}方^{カタ}) **S**
4. **west** (西^{ニシ}方^{カタ}) **W**



7.

Ordinal Directions

1. **northeast**
(東^{ヒガシ}北^{キタ}方^{カタ}) **NE**
2. **southeast**
(東^{ヒガシ}南^{ミナミ}方^{カタ}) **SE**
3. **southwest**
(西^{ニシ}南^{ミナミ}方^{カタ}) **SW**
4. **northwest**
(西^{ニシ}北^{キタ}方^{カタ}) **NW**



*look at P. 21 in your book

8.

How to Use a Compass



9.

How to Use a Compass

The colored arrow (有顏色的指針) will always point north.

1. Put your compass on the table. When the arrow stops moving it will point north.

將指北針放在桌子上。
指針停止移動時指的方向就是北方。

10.



How to Use a Compass

2. Turn the compass until the arrow lines up with "north" (北方).

3. Now you can use the compass to find south, east and west.

11.



How to Use a Compass

A compass uses a magnet (磁鐵) to find north.

A compass won't work if there is a magnet or electronics (電子產品) nearby (在旁邊).



<https://youtu.be/NtUvV0xhmyc>

12.

How to Use a Compass

4. Use a compass to find "north" in your classroom



Where is the teacher's desk?
Where is the blackboard?
Where is the door?

*look at P. 21 in your book

13.

Where does the wind come from?

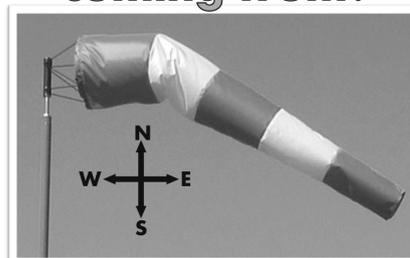
We use tools to show us where the wind is coming from.



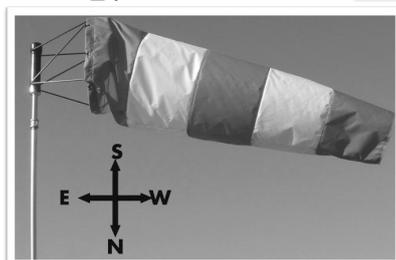
14.

Look at the windsock. Which direction is the wind coming from?

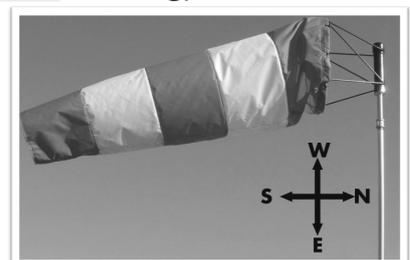
A. west



B. east



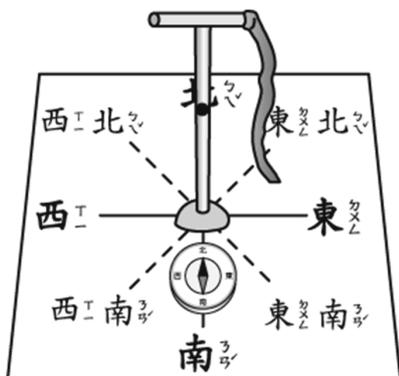
C. north



*look at P. 22 in your book

15.

Making a Wind Vane



You will need:

a straw (吸管)

a chopstick (筷子)

a board (紙板)

tissue paper (衛生紙)

a base (底座) **for the wind vane**

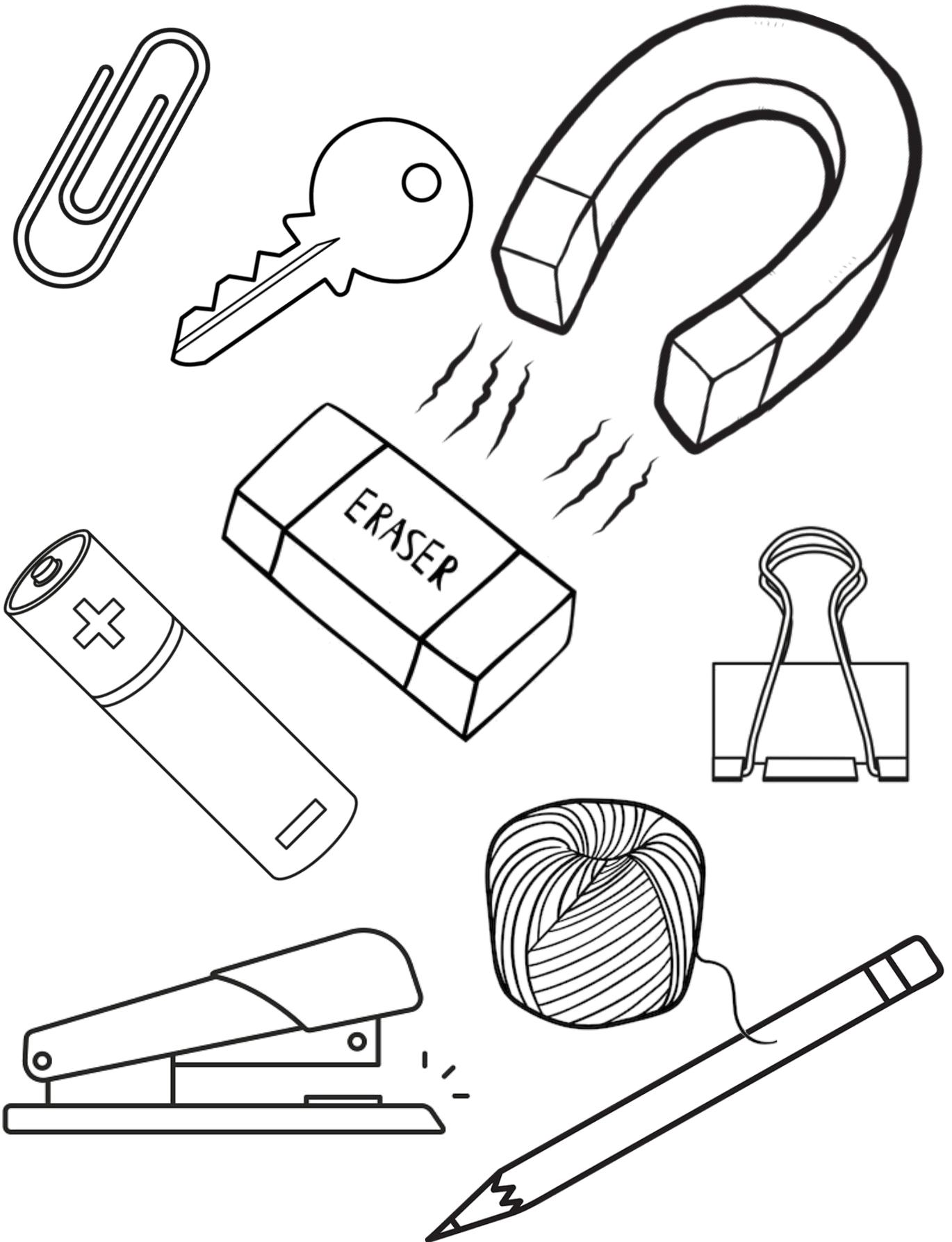
a compass (指南針)

*look at P. 22 in your book

16.

Chapter 4: Magnets

What Do Magnets Attract?

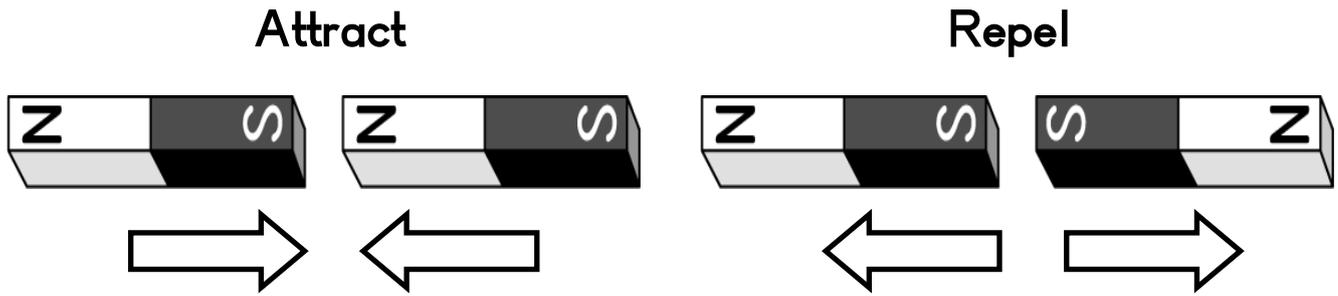


Iron or Not Iron?

Time to Read

Magnets attract (吸^ス引^ク) and repel (相^イ斥^キ) other magnets. North (北^{キタ}方^{カタ}) / south (南^{ミナミ}方^{カタ}) attract.

South / south and north / north repel.



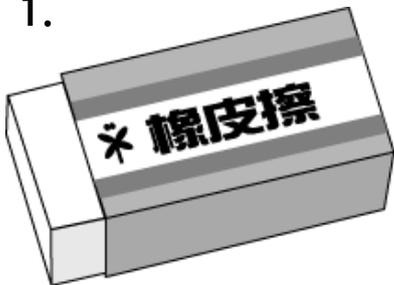
Objects are made of different materials (材^{サイ}料^{リョウ}). Magnets attract some materials and not others.

Magnets do not attract all metal (金^{キン}属^{ジュク}). Iron is a metal. Magnets will attract objects made of iron (鐵^{テツ}).

Time to Explore

Circle the objects made of iron.

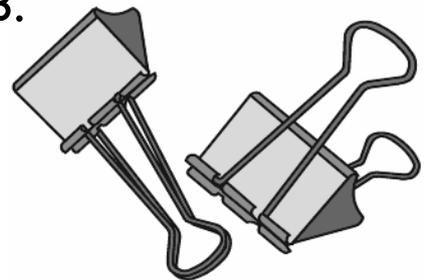
1.



2.



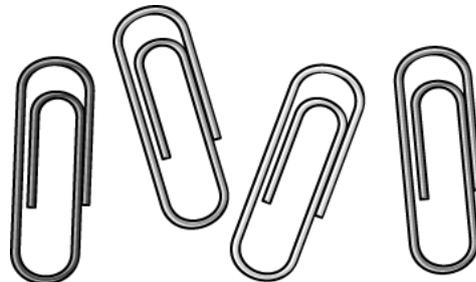
3.



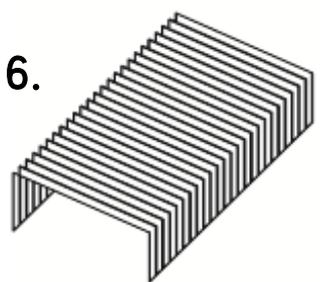
4.



5.



6.



Sorting Objects: Iron or Not Iron

 Time to Write

Iron 鐵^{てつ}製^{せい}品^{ひん}

Not Iron 非^ひ鐵^{てつ}製^{せい}品^{ひん}

My Objects:

 Time to Explore

 Time to Write

Choose 2 objects, 1 object you think is iron and 1 object you think is not iron.

Test each object with a magnet.

1. _____ 2. _____

My Objects:

 Time to Draw

 Time to Write

Complete both sentences. Draw and label each object. You may use English or Chinese.



is / are iron.



is / are not
iron.

 Time to Speak

Share your sentences with the class.



Word List:  Write each English word one time.

1. magnets 磁ち鐵てつ

2. attract 吸ひ引ひ

3. repel 相^ト斥^レ イ

4. materials 材^チ料^{リョウ} カ

4. objects 物^{モノ}體^{タイ} カ

5. iron 鐵^{テツ} カ

6. metal 金^{カネ}屬^{ゾク} カ

7. eraser 橡^{クワ}皮^ヒ擦^チ カ

8. metal ruler 鐵^{テツ}尺^{セキ} イ

9. coins 硬^{コウ}幣^ヒ カ

10. batteries 電^{デン}池^チ イ

11. metal clip 長^{チヤウ}尾^ビ夾^{カサ} イ

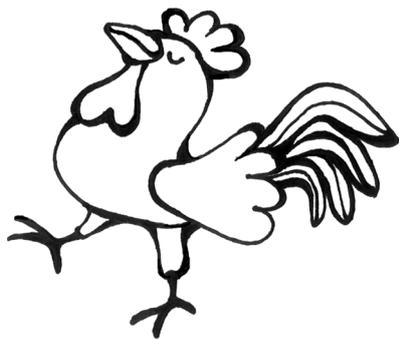
12. paperclips 迴^{クワシ}紋^{モン}針^チ カ

Self Assessment: How Am I Doing?

Choose the best one to describe you.

小朋友，這個單元的學習告一段落了，請你想想看，自己在這個單元裡的學習狀況和下面哪一個敘述類似吧！

4



I've Got It! I understand and I can help my classmates.

我都能理解上課的內容，而且我還可以幫助同學。

3



Almost There! I've got it, and I only make small mistakes.

我大部份都能了解，但有時時候會不小心出錯。

2



Working on It. Sometimes I need help, I'm starting to understand.

我覺得我有愈來愈進步，只是有時時候需要別人的幫助。

1



Beginner. I don't understand yet and I need a lot of help.

我還需要努力，因為常常需要老師和同學的幫助，但我會加油的！

Choose 1 face for each sentence.

 Yes, I do it all the time. 是^的的^分，我^一一^直直^這這^樣樣^做做[。]。

 Sometimes I do this. 有^時時^我我^會會^這這^樣樣^做做[。]。

 I don't do this, I need to improve. 我^不不^會會^這這^樣樣^做做[，]我^需需^要要^改改^進進[。]。

1. I follow the teacher's directions.



我^聽聽^從從^老老^師師^的的^指指^示示[。]。

2. I listen when others are talking.



別^人人^說說^話話^的的^時時^候候^我我^會會^注注^意意^聽聽[。]。

3. I work nicely with others.



我^和和^別別^人人^相相^處處^得得^很很^好好[。]。

4. I can do my work by myself.



我^可可^以以^自自^己己^做做^我我^的的^工工^作作[。]。

5. I like to share ideas with the class.



我^喜喜^歡歡^與與^全全^班班^分分^享享^想想^法法[。]。

6. I try my best on all my work.



我^盡盡^力力^做做^好好^我我^所所^有有^的的^工工^作作[。]。

7. I ask for help if I don't understand.



如^果果^我我^不不^明明^白白[，]我^會會^尋尋^求求^幫幫^助助[。]。

Magnets

Let this kahoot template inspire your own quiz with slides!

22 plays - 187 players

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Questions (27)

1 - Slide

Magnets can push and pull.



Magnets can attract 吸引 (pull) some objects. Magnets can attract 吸引(pull) and repel 相斥 (push) other magnets.

2 - Quiz

Which word means "pull"?



- repel
- object
- magnet
- attract

- X
- X
- X
- ✓

3 - Quiz

Which word means "push"?



- repel
- object
- magnet
- attract

- ✓
- X
- X
- X

4 - Slide

Why are some objects magnet friends? Why do magnets attract (吸引) some objects?



Objects are made of different materials (材料). Some materials (材料) are magnet friends and some are not magnet friends.

5 - Quiz

Can you guess which material (材料) is a magnet friend?



- metal
- plastic
- iron
- glass

- X
- X
- ✓
- X

6 - Slide

Magnets do not attract all metals (金屬).



Iron (鐵) is a metal (金屬). Magnets attract objects made of iron (鐵).

7 - Slide

We are going to look at some objects. You will predict 預測(guess) if they are iron (鐵) or not iron.



The magnet will attract the objects made of iron. We will test the objects after you make your prediction (預測). Choose "true" for iron (鐵) and "false" for not iron.

8 - True or false

stapler



- True
- False

- ✓
- X

9 - True or false
batteries

- True
- False



✓
✗

10 - True or false
tissue

- True
- False



✗
✓

11 - True or false
box of staples

- True
- False



✓
✗

12 - True or false
paper

- True
- False



✗
✓

13 - True or false
spatulas

- True
- False



✗
✓

14 - True or false
clip

- True
- False



✓
✗

15 - True or false
dice

- True
- False



✗
✓

16 - True or false
paper clip

- True
- False



✓
✗

17 - True or false
coins

- True
- False



✗
✓

18 - True or false
metal spoon

- True
- False



✓
✗

19 - True or false pencil	
<input type="checkbox"/> True	X
<input checked="" type="checkbox"/> False	✓
20 - True or false plastic rulers	
<input checked="" type="checkbox"/> True	X
<input checked="" type="checkbox"/> False	✓
21 - True or false erasers	
<input checked="" type="checkbox"/> True	X
<input checked="" type="checkbox"/> False	✓
22 - True or false metal ruler	
<input checked="" type="checkbox"/> True	✓
<input checked="" type="checkbox"/> False	X
23 - True or false plastic spoons	
<input checked="" type="checkbox"/> True	X
<input checked="" type="checkbox"/> False	✓
24 - True or false metal box	
<input checked="" type="checkbox"/> True	✓
<input checked="" type="checkbox"/> False	X
25 - True or false string	
<input checked="" type="checkbox"/> True	X
<input checked="" type="checkbox"/> False	✓
26 - True or false tape	
<input checked="" type="checkbox"/> True	X
<input checked="" type="checkbox"/> False	✓
27 - True or false whisk	
<input checked="" type="checkbox"/> True	✓
<input checked="" type="checkbox"/> False	X

B Long Pu Elementary School **Bilingual Domain of Natural Science**

Principal: 黃清海 Leo

Bilingual Director: 張秭翊 Tracy

Development Lead: Michelle Vatcher

Language and Translation:

江明儀 Grace

李旻臻 Julie

**A Special Thanks to All the Grade Three Domain of
Natural Science Teachers That Have Contributed to This
Program**

Published August 2023



Grade 3: Domain of Natural Science Book 2



TEACHER'S BOOK

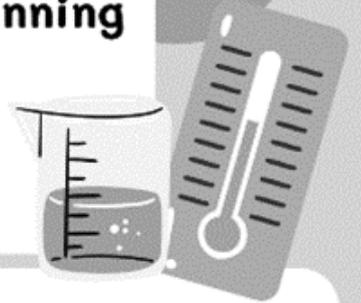
Name: _____

Experiment Rules

1

No eating, drinking, playing or running in the science classroom.

自_レ然_ル教_シ室_ノ內_ニ不_レ可_シ以_テ飲_ム食_ヲ、
嬉_シ戲_ス及_ビ奔_ル跑_ス。



2

Don't touch lab equipment until the teacher tells you.

經_ル過_キ老_シ師_ノ指_シ示_ス、才_レ能_ク使_フ用_ス實_シ驗_シ器_ノ具_ヲ或_ハ材_ヲ料_ヲ。



3

If something goes wrong, quickly ask your teacher for help.

有_レ任_レ何_ノ突_ニ發_ス狀_ノ況_ヲ、請_ヒ尋_ヒ求_ヒ老_シ師_ノ協_シ助_ス。



4

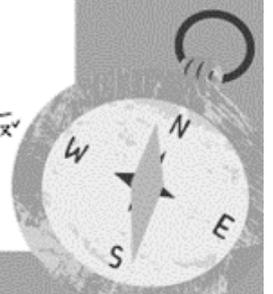
Never eat or smell science materials.

不_レ可_シ食_ム用_ス或_ハ直_ニ接_シ聞_ク實_シ驗_シ材_ノ料_ヲ。

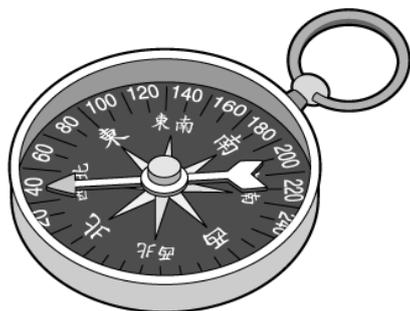
5

Make sure all your equipment is clean before you put it away.

實_シ驗_シ操_シ作_シ完_ル畢_ス、務_ク必_ク清_ク潔_ニ所_ノ有_ル實_シ驗_シ器_ノ具_ヲ、並_ニ放_リ回_シ原_ノ位_ニ。

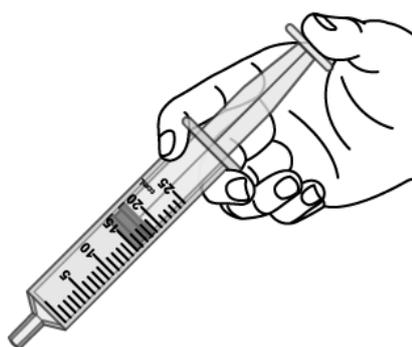


My Science Tools



compass

指北針



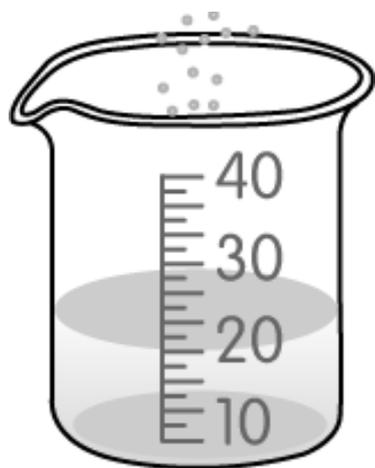
syringe

塑膠注射筒



magnifying glass

放大鏡



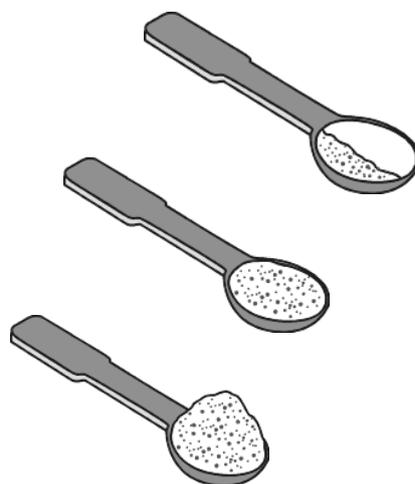
beaker

燒杯



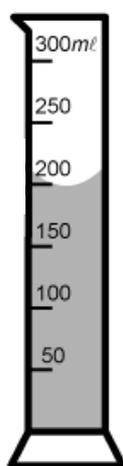
glass rod

攪拌棒



measuring spoons

量匙



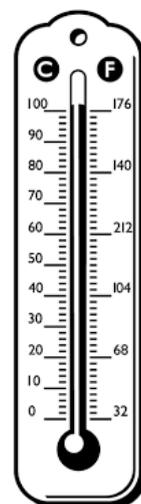
measuring cylinder

量筒



liquid thermometer

溫度計



air thermometer

氣溫計

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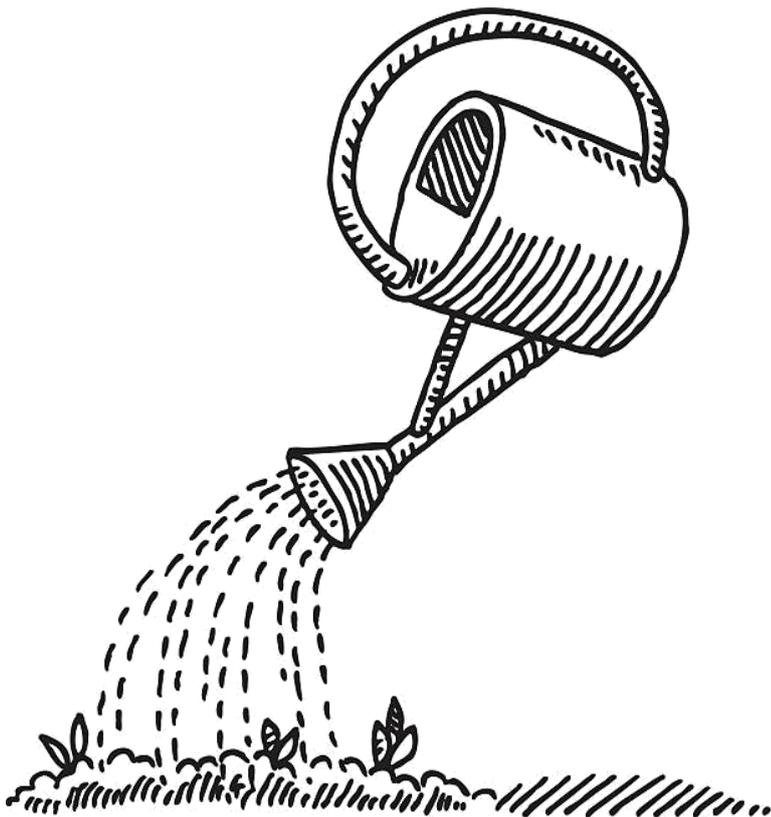
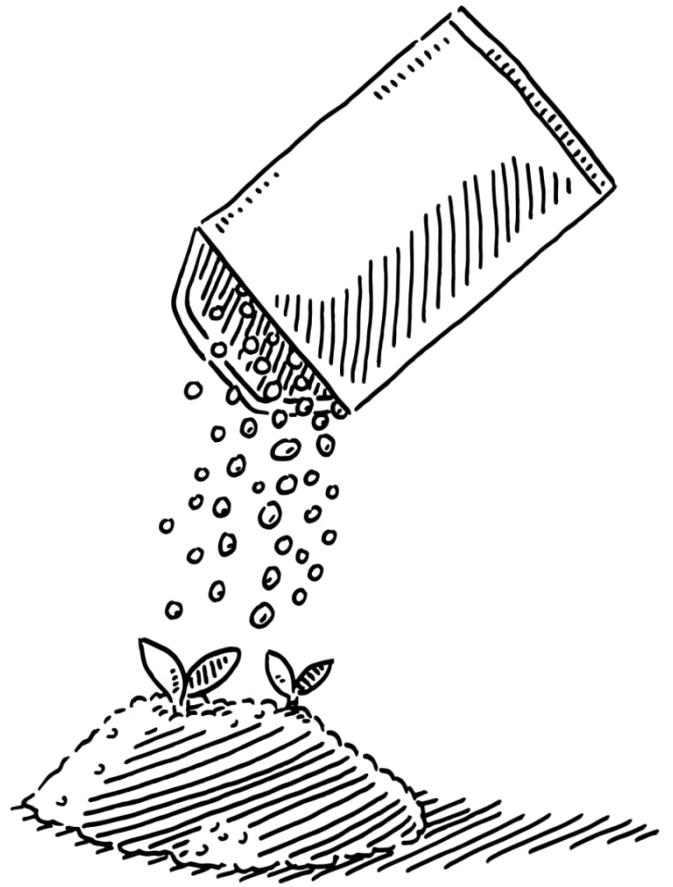
Word List

Self Assessment

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Chapter 1: Farming

Planting Seeds

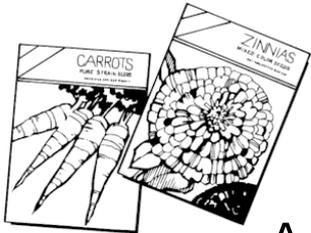


Tools and Materials For Planting

 Time to Read

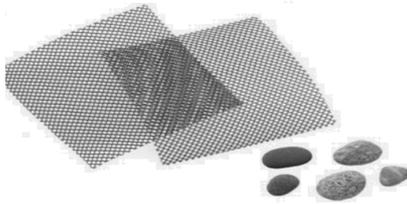
 Time to Write

Look at the tools and materials (材料). Match the picture to its function (功用). Write the correct number in each box.



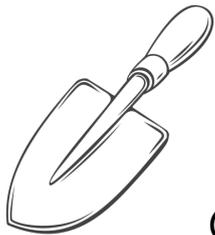
A. seeds

3



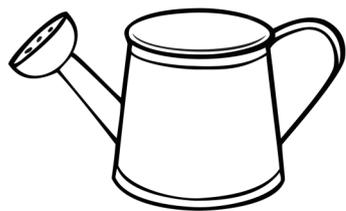
B. screening and stones

4



C. a trowel

2



D. a watering can

6



E. soil

1



F. pots

5

1. We plant seeds in _____.

2. We use _____ to move soil.

3. Plants grow from _____.

4. _____ let water drain through the soil.

5. We put soil in the _____ and plant seeds.

6. We use _____ to water plants.

Let's Think!

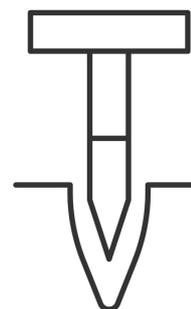
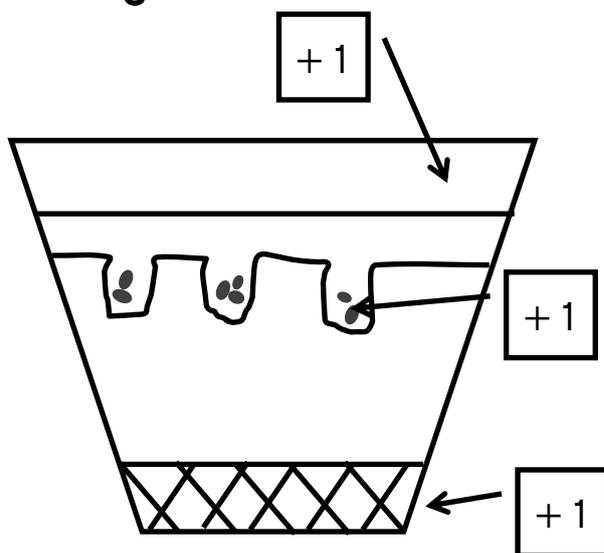
1. What can you do if you don't have a pot when planting seeds?
2. If you use a different container (容器) what should you do so the water can drain (排水)?

Two Methods for Planting Seeds

Dibbling (點播)

1. We use this method (方法) for seeds that are 7 mm or larger (比較大的). ○
2. Make holes in the soil and put 2-3 seeds in each hole.
3. The holes should be evenly spaced (均勻分布) so the plants have room to grow.

Draw the dibbling method.

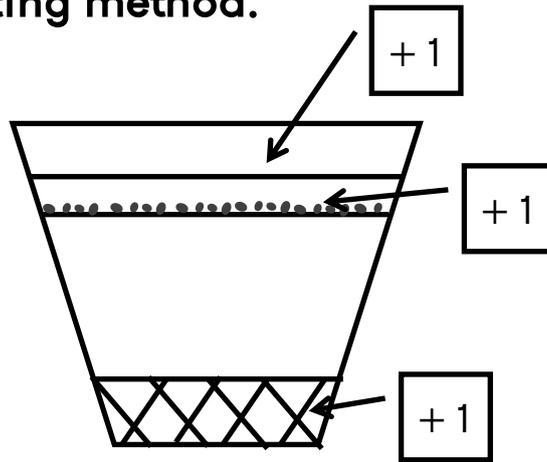


a dibbler 小鏟子

Broadcasting (撒播)

1. We use this method with seeds 6 mm or smaller. ○
2. The seeds need to be scattered (疏鬆的) evenly (均勻地) on the soil.
3. Cover the seeds with a thin layer (薄薄的一層) of soil.

Draw the broadcasting method.



Video Activity

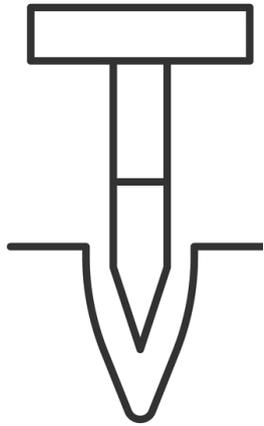
Time to Explore

Do you remember the different methods (方法) for planting (種植) seeds? Let's watch a video about each method and put the steps in order.

Let's Think!

1. When do you use the dibbling method? What size are the seeds?
2. When do you use the broadcasting method? What size are the seeds?
3. Which method uses the most seeds?
4. Which steps are the same and which steps are different for each planting method?

What are the steps for the **dibbling** method? Let's watch the video and put the steps in order (1-5).



Planting using the **dibbling** method.

5



A. Lightly water the seeds.

4



B. Cover the seeds with soil.

1



C. Add stones or screening to the bottom of the pot.

3



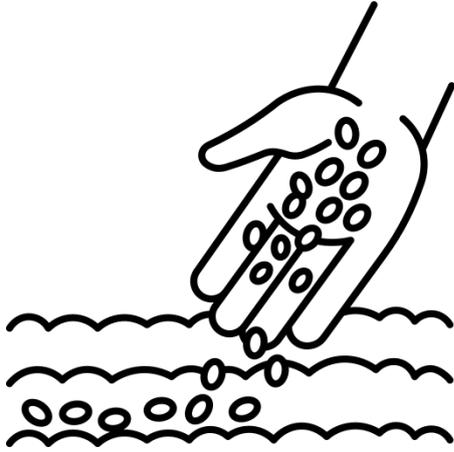
D. The Dibbling Method: 2-3 seeds in each hole

2



E. Add soil to the pot.

What are the steps for the **broadcasting** method? Let's watch the video and put the steps in order (1-5).



Planting using the **broadcasting** method.

2



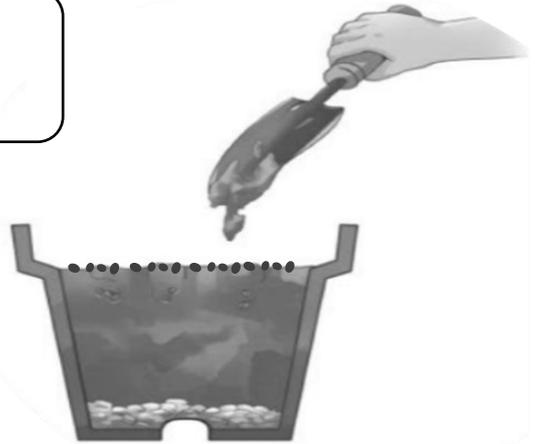
A. Add soil to the pot.

1



B. Add stones or screening to the bottom of the pot.

4



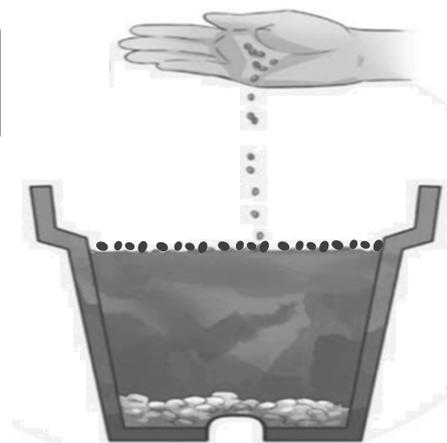
C. Cover the seeds with soil.

5



D. Lightly water the seeds.

3



E. The Broadcasting Method: scatter the seeds evenly

Word List:  Write each English word one time.

1. planting 種^{タネ}植^{ウヅ} _____
2. equipment 器^{モノ}具^ツ _____
3. seeds 種^{タネ}子^コ _____
4. pots 花^{ハナ}盆^{ハシ} _____
5. screening 紗^{メシ}網^コ _____
6. trowel 鏟^{シノ}子^コ _____
7. soil 土^{ツチ} _____
8. watering can 澆^{シヤク}水^{スイ}壺^フ _____
9. function 功^{コウ}用^{ヨウ} _____
10. drain 排^ハ水^{スイ} _____
11. dibbling 點^チ播^{ハク} _____
12. broadcasting 撒^サ播^{ハク} _____
13. method 方^{ホウ}法^{ホフ} _____
14. scattered 疏^ス鬆^ス的^{テキ} _____
15. evenly 均^{ヒラ}勻^{ヒラ}地^チ _____

16. cover 覆^フ蓋^カ

17. add 增^{ゾウ}加^カ ; 添^{テン}加^カ

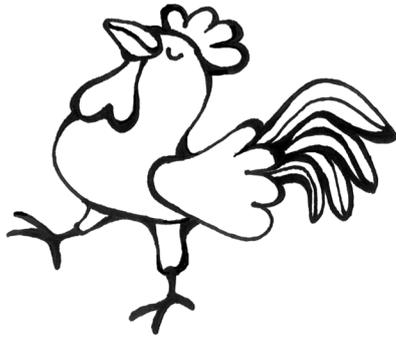
18. lightly 輕^ク輕^ク地^チ

Self Assessment: How Am I Doing?

Choose the best one to describe you.

小朋友，這個單元的學習告一段落了，請你想想看，自己在這個單元裡的學習狀況和下面哪一個敘述類似吧！

4



I've Got It! I understand and I can help my classmates.

我都能理解上課的內容，而且我還可以幫助同學。

3



Almost There! I've got it, and I only make small mistakes.

我大部份都能了解，但有時會不小心出錯。

2



Working on It. Sometimes I need help, I'm starting to understand.

我覺得我有愈來愈進步，只是有時需要別人的幫助。

1



Beginner. I don't understand yet and I need a lot of help.

我還需要努力，因為常常需要老師和同學的幫助，但我會加油的！

Choose 1 face for each sentence.

 Yes, I do it all the time. 是^的的^時時^候，我^一一^直直^這這^樣樣^做做[。]。

 Sometimes I do this. 有^時時^我我^會會^這這^樣樣^做做[。]。

 I don't do this, I need to improve. 我^不不^會會^這這^樣樣^做做[，]我^需需^要要^改改^進進[。]。

1. I follow the teacher's directions.



我^聽聽^從從^老老^師師^的的^指指^示示[。]。

2. I listen when others are talking.



別^人人^說說^話話^的的^時時^候候^我我^會會^注注^意意^聽聽[。]。

3. I work nicely with others.



我^和和^別別^人人^相相^處處^得得^很很^好好[。]。

4. I can do my work by myself.



我^可可^以以^自自^己己^做做^我我^的的^工工^作作[。]。

5. I like to share ideas with the class.



我^喜喜^歡歡^與與^全全^班班^分分^享享^想想^法法[。]。

6. I try my best on all my work.



我^盡盡^力力^做做^好好^我我^所所^有有^的的^工工^作作[。]。

7. I ask for help if I don't understand.



如^果果^我我^不不^明明^白白[，]我^會會^尋尋^求求^幫幫^助助[。]。

Farming

Planting Seeds



1.

We are going to grow some vegetables.

What do plants need to grow?

2.

What tools do we need to plant our vegetables?

Plants grow from seeds.



3.

What tools do we need to plant our vegetables?

Plants grow from seeds.



4.

watering can 澆水器



What tools do we need to plant our vegetables?

We use a watering can to water plants.



5.

trowel 鏟子



What tools do we need to plant our vegetables?

We use a trowel to move soil.



6.

trowel 鏟子



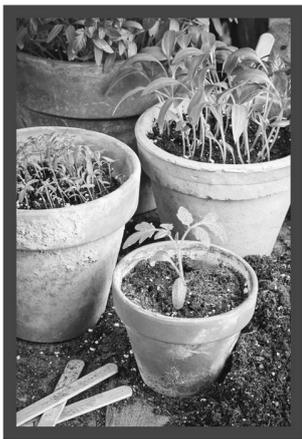
What tools do we need to plant our vegetables?

We use a trowel to move soil.



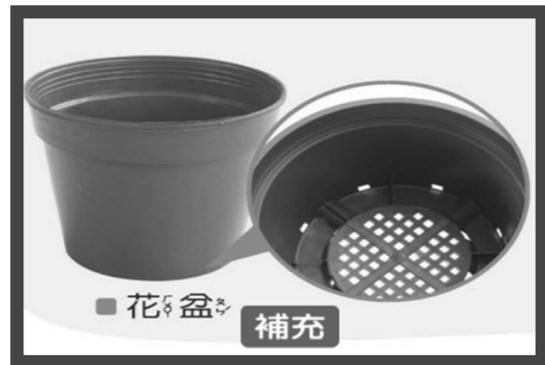
7.

pots 花盆



What tools do we need to plant our vegetables?

We put soil in the pots and plant the seeds.



8.



How to Plant Seeds

9.

Step 1



Put screening or stones in the bottom of the pot.

將石頭或紗網放在花盆底部

10.

Step 2



Add the soil to the pot.

裝土，將土弄鬆再倒入花盆中

Make the soil flat.

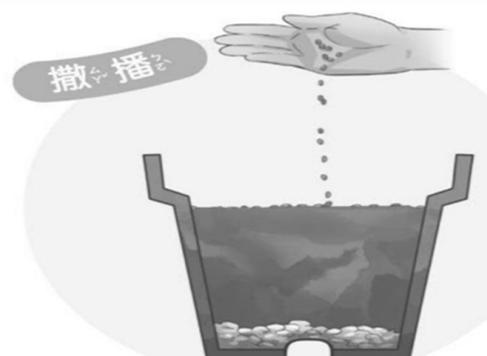
把土攤平

11.

Step 3

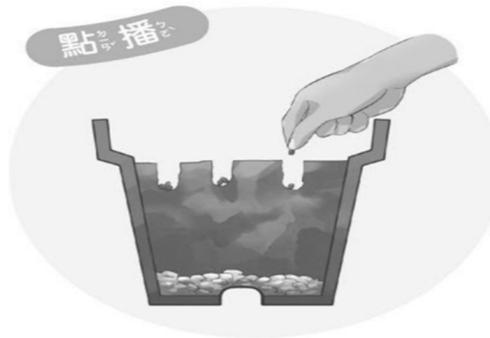
Put the seeds into the soil.

將種子放到泥土中



12.

A.



Dibbling 點播 (for bigger seeds):

Make holes with your finger and put 2-3 seeds in each hole.

13.

A.



<https://youtu.be/XD1VIOLxj1g?si=Km884Nqi2LzDfEu>
<https://youtu.be/lyzpd3ydi1g?si=3kpAJ61O3rShAwYe>

Dibbling 點播 :
You can make the holes using a dibbler (小鏟子).



14.

B.



Broadcasting 撒播 (for many small seeds):

Scatter the seeds evenly over the soil.

15.

B.



Broadcasting

<https://youtube.com/shorts/FLlLgGt2jo?si=lneX4Of-KXaXbKL9>

<https://youtube.com/shorts/onlyKTOiCk?si=fosXLHdLzTUjCfsy>



16.

Step 4



Cover the seeds with soil.

覆_フ土_ツ：在_ニ種_{タネ}子_ノ
 上_ニ蓋_フ上_ニ一_ニ層_ノ薄_ク
 薄_ク的_ニ土_ヲ

17.

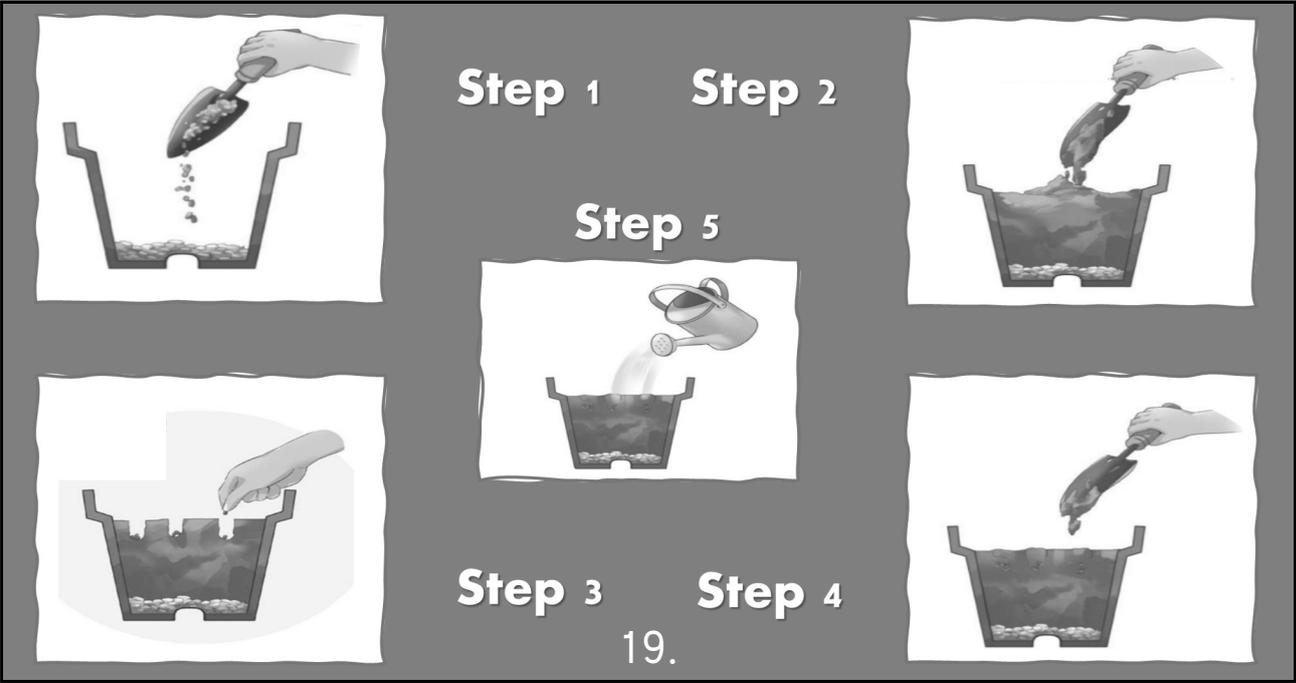
Step 5



Lightly water the seeds.

澆_ユ水_ヰ：輕_ク輕_ク地_ニ
 澆_ユ水_ヰ不_レ要_ハ破_ク壞_ル
 土_ノ堆_ヲ，澆_ユ到_ク土_ヲ
 壤_ヲ充_フ分_ニ濕_ク潤_ス

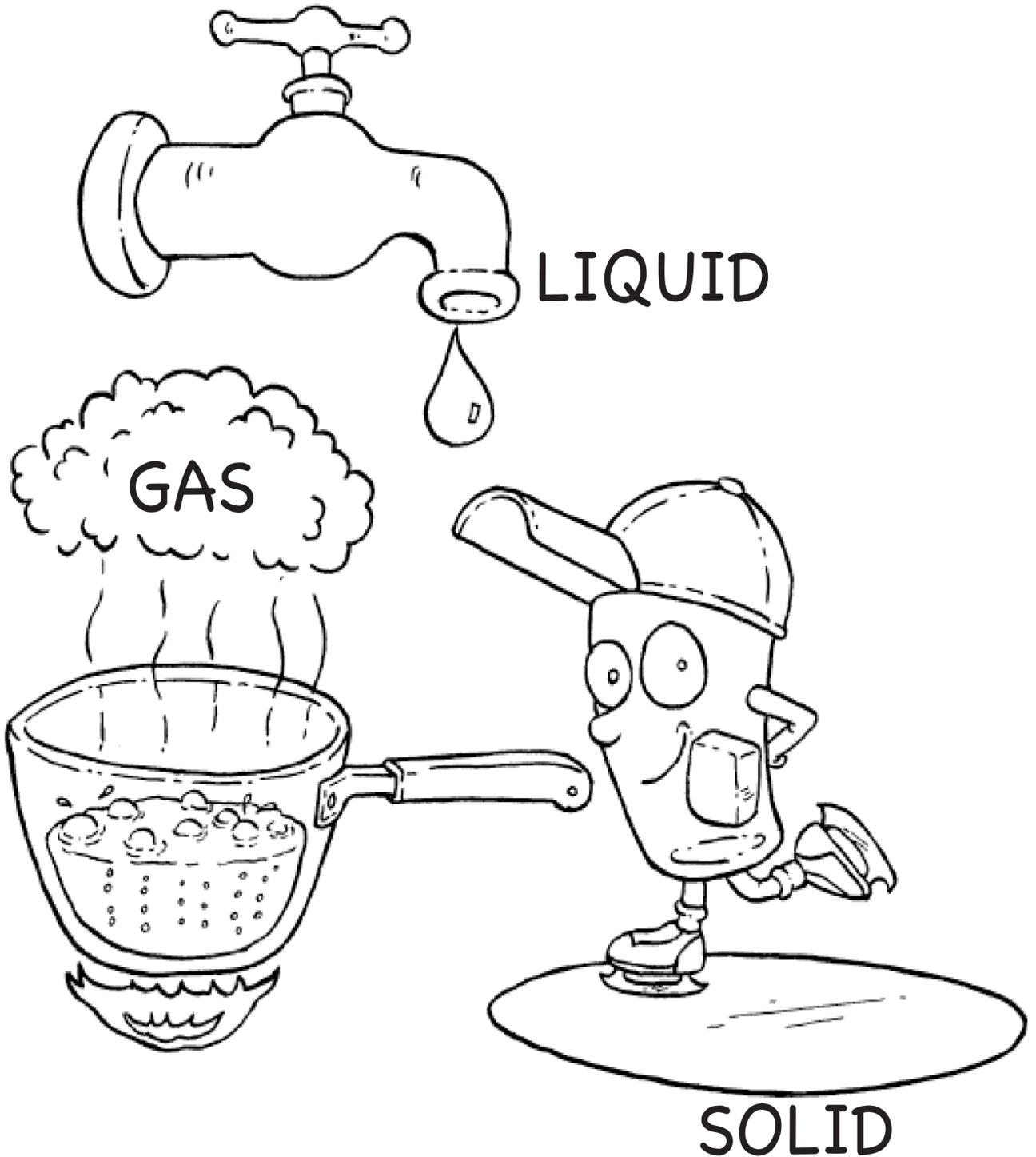
18.



Note Page

Chapter 2: The Different States of Water

All About Water



The 3 States

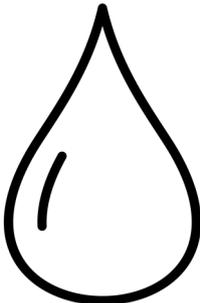
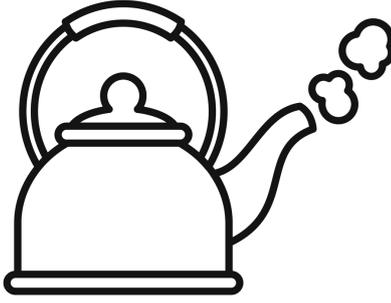
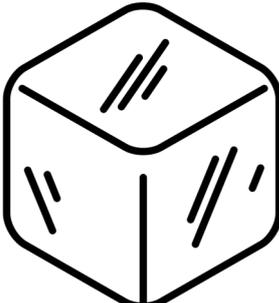
 Time to Read

 Time to Write

The 3 states of water:

- A. solid (固態) B. liquid (液態) C. gas (氣態)

Write the correct letter for each state (狀態) of water above each picture.

liquid	gas	solid
 <p>1. water (水) 0 - 100 °C</p>	 <p>2. water vapor (水蒸氣) 100°C ↑</p>	 <p>3. ice (冰塊) 0°C ↓</p>

Water and Ice

 Time to Write

What are the differences (不同處) between water and ice?

water	ice
◆ liquid	◆ solid
◆ hot, cool, cold 0 - 100 °C	◆ very cold 0°C ↓
◆ no color	◆ no color or white
◆ fluid	◆ not fluid

Let's Think!

Circle the correct answer.

1. What happens if we put **water** in different shaped containers (不同形状的容器)?

changes shape

doesn't change shape

2. What happens if we put **ice** in different shaped containers?

changes shape

doesn't change shape

The Characteristics of Water and Ice

What are the characteristics (特性) of water and ice? Fill in the table using the answers in the **Word Bank**. Each answer will be used one time.

states characteristics	Water	Ice
Is it fluid? (這是液體嗎?)	A. 1. fluid	B. 4. not fluid
Shape	C. 3. changes shape	D. 2. doesn't change shape

Word Bank:

1. fluid (液體)

2. doesn't change shape (形狀沒有改變)

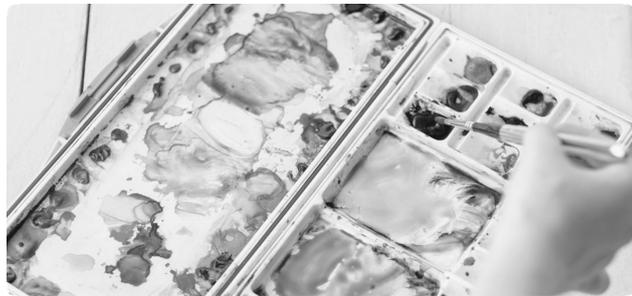
3. changes shape (形狀有改變)

4. not fluid (不是液體)

The Application of Water in Daily Life

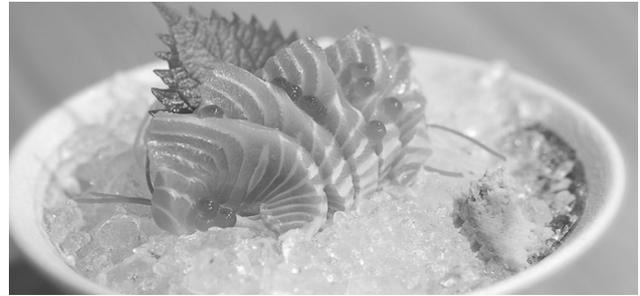
 Time to Read  Time to Write

How do we use ice, water and water vapor in our daily lives (日常^{にちじょう}生^あ活^{かつ})? Write the number for each picture next to the correct applications (應^お用^う品^{ひん}).



1. mix watercolor paint

(水^{すい}彩^{さい}調^{てう}色^{しき})



2. keep food fresh

(新^{しん}鮮^{せん})



3. ice skate (滑^か氷^{こおり}スケーティング).



4. steam (蒸^む熟^{じやく}) food



5. water crops (農^{のう}作^{さく}物^{ぶつ})



6. make a steam engine

(蒸^む汽^き機^き) run

- A. applications of water 1, 5
- B. applications of ice 2, 3
- C. applications of water vapor 4, 6

Water Conservation

 **Time to Read** |  **Time to Write**

How can we save water? Put a check next to each method. Think of your own way to save water and write the answer in English or Chinese.



1. Use things with the water saving label. (省水標章)



2. Use rainwater (雨水) to water plants.



3. Reuse rinse (洗米水) water to water plants.



4. Taking a bath saves more water than a shower.



5. Turn off the tap tightly (緊密). No drips!

6. How do you save water at home?

Word List:  Write each English word one time.

1. states 状態 じょうたい _____

2. solid 固態 こたい _____

3. liquid 液態 えきたい _____

4. gas 氣態 きたい _____

5. water vapor 水蒸氣 すいじょうき _____

6. differences 不同處 ふどうちよ _____

7. characteristics 特性 とくせい _____

8. fluidity 流動性 りゅうどうせい _____

9. fluid 液體 えきたい _____

10. crops 農作物 のうさくぶつ _____

11. container 容器 ようき _____

12. shaped 形狀 けいじょう _____

13. steam engine 蒸氣機 じょうきき _____

14. steam 蒸氣 じょうき _____

15. rinse 洗米 せんまい _____

16. rainwater 雨^{ㄩˇ}水^{ㄕㄨㄟˋ}

17. drought 乾^{ㄑㄩㄢˊ}旱^{ㄓㄨㄢˋ}

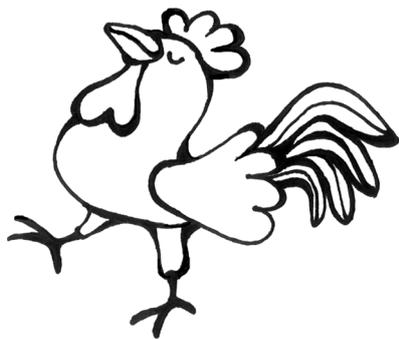
18. water conservation 節^{ㄑㄩㄝˊ}約^{ㄩㄝˋ}用^{ㄩㄥˊ}水^{ㄕㄨㄟˋ}

Self Assessment: How Am I Doing?

Choose the best one to describe you.

小朋友，這個單元的學習告一段落了，請你想想看，自己在這個單元裡的學習狀況和下面哪一個敘述類似吧！

4



I've Got It! I understand and I can help my classmates.

我都能理解上課的內容，而且我還可以幫助同學。

3



Almost There! I've got it, and I only make small mistakes.

我大部份都能了解，但有時時候會不小心出錯。

2



Working on It. Sometimes I need help, I'm starting to understand.

我覺得我有愈來愈進步，只是有時時候需要別人的幫助。

1



Beginner. I don't understand yet and I need a lot of help.

我還需要努力，因為常常需要老師和同學的幫助，但我會加油的！

Choose 1 face for each sentence.

 Yes, I do it all the time. 是^的的^分，我^一一^直這^樣做[。]。

 Sometimes I do this. 有^時時^我會^這這^樣做[。]。

 I don't do this, I need to improve. 我^不不^會這^樣做[，]我^需需^要改^進。

1. I follow the teacher's directions.



我^聽聽^從老^師的^指指^示。

2. I listen when others are talking.



別^人人^說說^話的^時時^候我^會會^注注^意聽[。]。

3. I work nicely with others.



我^和和^別別^人相^處處^得得^很很^好。

4. I can do my work by myself.



我^可可^以自^己己^做我^的的^工工^作。

5. I like to share ideas with the class.



我^喜喜^歡與^全全^班分^享想^法。

6. I try my best on all my work.



我^盡盡^力做^好我^所所^有的^工工^作。

7. I ask for help if I don't understand.



如^果果^我不^明明^白，我^會會^尋尋^求幫^助。



The Different States of Water

1.

The 3 States of Water

Solid (固態):
ice

Liquid (液態):
water

Gas (氣態):
water vapor



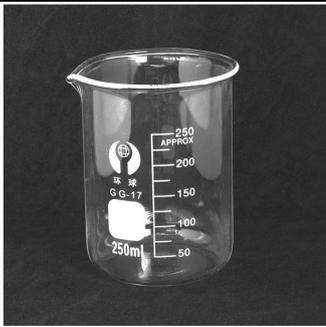
2.

- **liquid** (液態)
- **hot, cool or cold** 0 - 100°C
- **no color** (無色)
- **fluid** (液體)

- **solid** (固態)
- **very cold** 0°C ↓
- **no color or white**
- **not fluid** (不是液體)

What are the differences between water and ice?

3.



What happens to water if we put it in different shaped containers?

(如果我們把水倒進不同形狀的容器中，會發生什麼事?)



4.

The water changes shape.

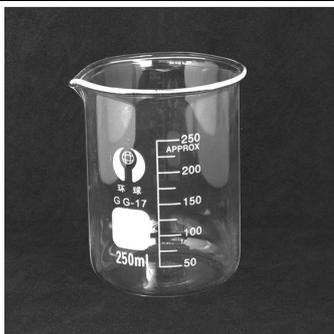
(水的形狀會改變)

Water is fluid.

(水是液體)



5.



What happens to ice if we put it in different shaped containers?

(如果我們把冰塊裝進不同形狀的容器中，會發生什麼狀況?)



6.

The ice does not change shape.

[冰^ク塊^ク的^ク形^ク狀^ク
不^ク會^ク改^ク變^ク]

Ice isn't fluid.

[冰^ク塊^ク不^ク是^ク液^ク
體^ク]



7.

Applications of Water in Our Life



water



ice



water vapor

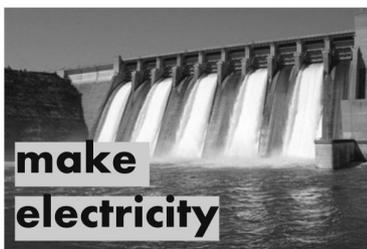
Which one is a solid?

Which one is a liquid?

Which one is a gas?

8.

We use water to...



make electricity



clean



mix watercolors



brush my teeth



water crops



flush the toilet

9. **Applications of Liquids**

We use ice to...



ice skate



reduce fevers

help bruises



keep food fresh



10. Applications of Solids

We use water vapor to...



make the kettle whistle



make a steam engine run



steam food



iron clothes

11. Applications of Gases

What is a drought?



Drought is when there isn't a lot of rain and there isn't enough water.

乾旱是指當降雨量很少，水源短缺。

12.

Treasure Water

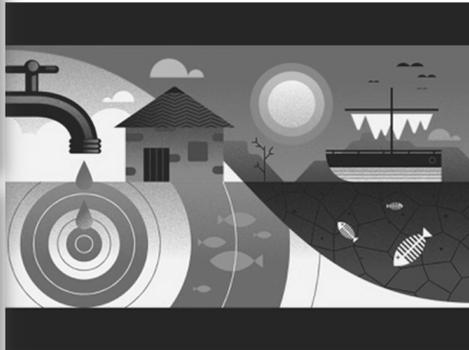
What happens if we don't have enough water?

(如果缺水，會發生什麼事?)

animals die



people get sick



plants die



water life dies



13.

Water Conservation



14.



How do we save water?

Turn off the tap tightly. No drips!

關緊水龍頭，避免漏水

Use things with the water saving label.

使用有省水標章的設備



15



Use less soap and water.

勿_レ使_フ用_ヒ過_シ量_ノ肥_レ皂_ヲ
和_シ水_ヲ

Use rainwater to water plants.

利_ク用_ヒ雨_ノ水_ヲ灌_ス溉_ス植_ノ物_ヲ



16.



How do we save water?

A shower saves more water than a bath.

淋_ル浴_ハ比_シ泡_ス澡_ヲ省_ス水_ヲ

Reuse rinse water to water plants.

用_ヒ洗_ハ米_ノ水_ヲ灌_ス溉_ス植_ノ物_ヲ

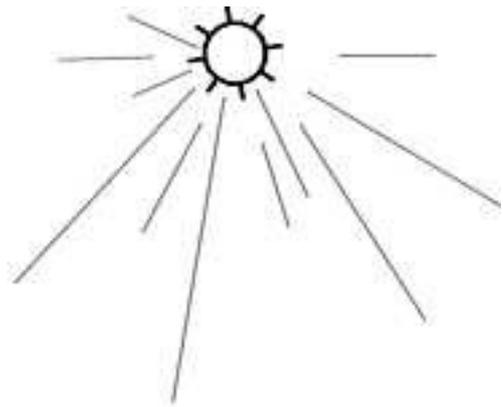
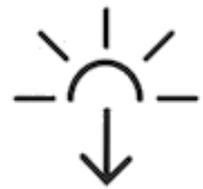


17.

Note Page

Chapter 3: Weather

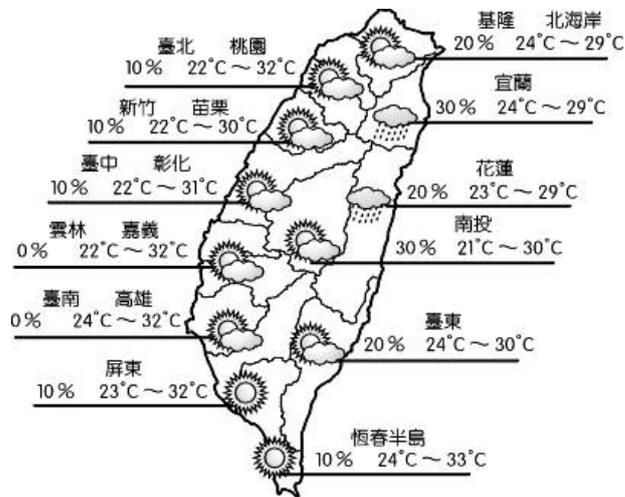
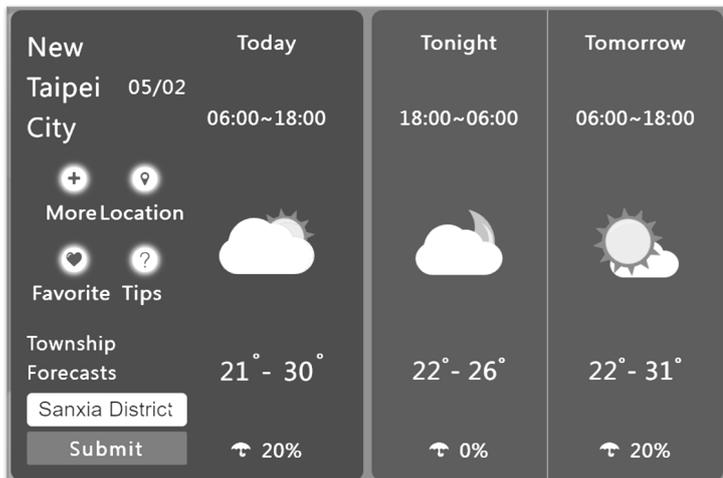
Weather Forecasting



What's the Weather Like?



The weather forecast (天氣預報) tells us what the weather is like now (今天) and what it will be later (未來幾天). We can see the weather in our neighborhood or anywhere in Taiwan.



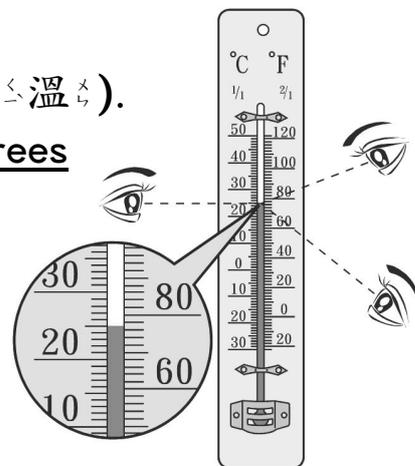
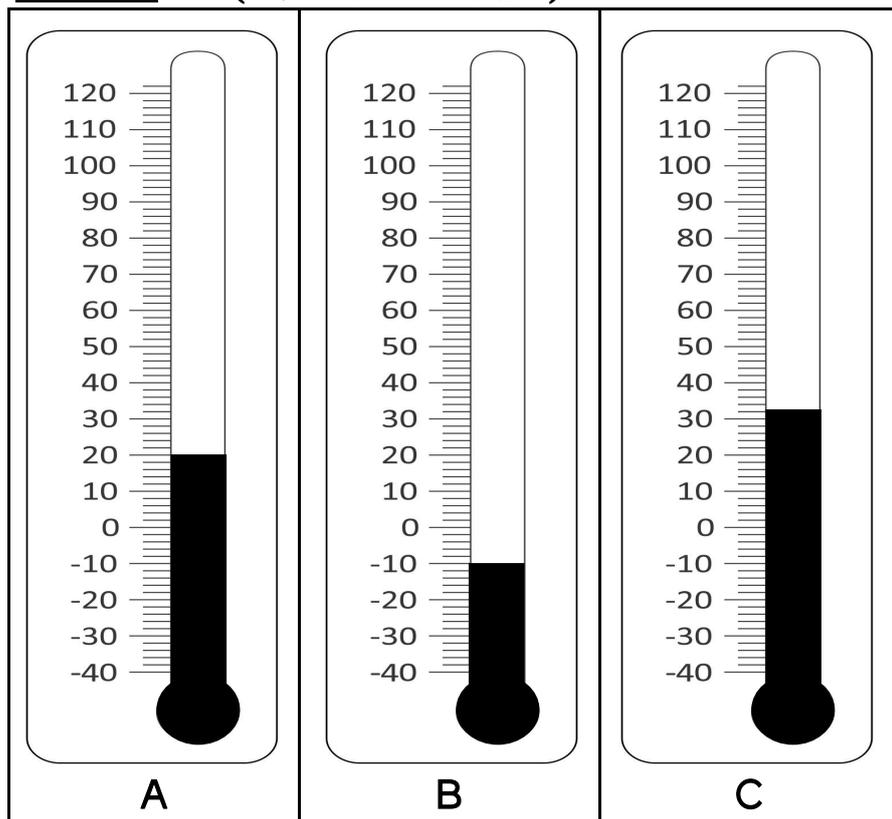
What's the Temperature?



The weather forecast tells us the temperature (氣溫).

Read the temperatures and write them using degrees

Celsius °C (攝氏溫度).



A. 20 °C

B. -10 °C

C. 32 °C

Look at the Weather APP!

 Time to Read |  Time to Explore

Weather APPs (應用程式) and websites (網站) use weather icons (圖示).

 sunrise 日出	 partly cloudy 多雲時晴	 windy 有風的	 rainy 下雨的
 sunset 日落	 hazy 朦朧的	 cloudy 多雲的/陰天的	 heavy rain 下大雨
 sunny 晴朗的	 foggy 有霧的	 stormy 暴風雨的	 drizzle 毛毛雨

My Weather Forecast

 Time to Write |  Time to Speak

On _____ it will be _____.

星期_____的天氣會是_____。

The low will be _____°C and the high will be _____°C .

當日最低溫攝氏_____度，最高溫攝氏_____度。

There is a _____% chance of rain.

有百分之_____的機會下雨。

Finding the Weather Forecast

Time to Read

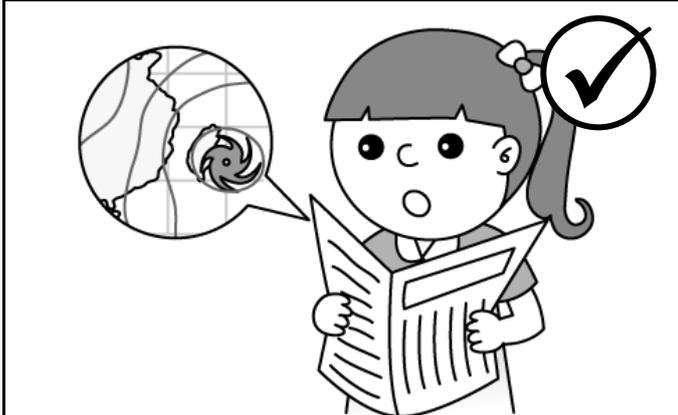
Where can you find the weather forecast? Look at each picture and put a check ✓ next to the correct answers.



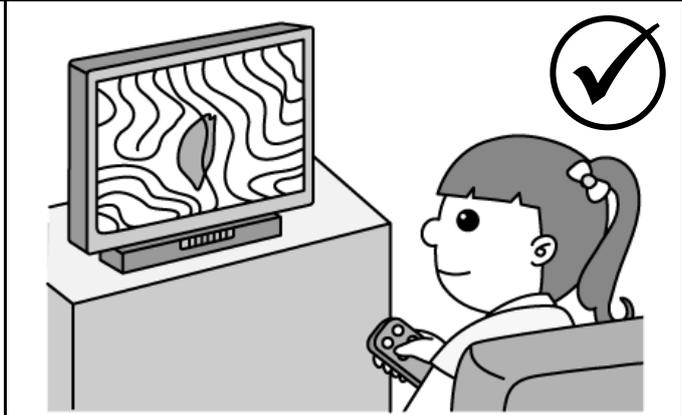
1. Find a weather website
(網^メ站^シ).



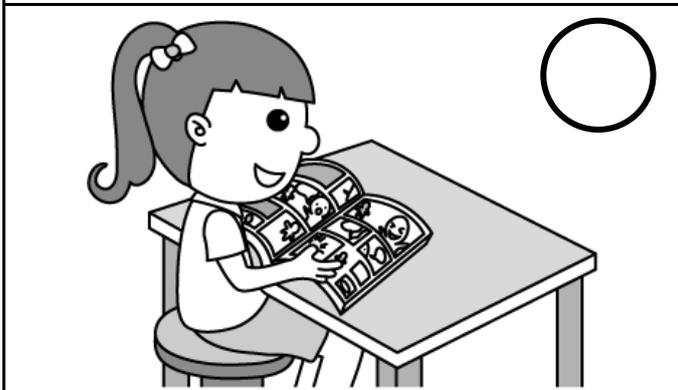
2. Call 166 or 167 on the phone
(手^テ機^キ).



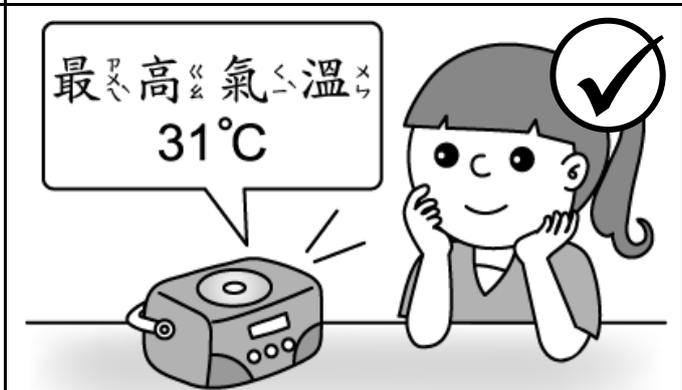
3. Read the newspaper
(報^ク紙^シ).



4. Watch the TV news
(電^ク視^カ新^シ聞^ク).



5. Read a comic book
(漫^マ畫^ガ書^カ).



6. Listen to the radio (廣^ク播^ホ).

Word List:  Write each English word one time.

1. weather 天^{てん}氣^き _____

2. forecast 預^よ報^{ほう} _____

3. temperature 氣^き溫^ん _____

4. degrees Celsius °C 攝^摂氏^氏溫^ん度^度 _____

5. thermometer 氣^き溫^ん計^{けい} _____

6. website 網^ま站^{ちやう} _____

7. newspaper 報^{ほう}紙^し _____

8. radio 廣^{くわ}播^ぱ _____

9. high 高^{かう} _____

10. low 低^{てい} _____

11. partly cloudy 多^た雲^{うん}時^じ晴^{せい} _____

12. hazy 朦^{もう}朧^{らう}的^{てき} _____

13. foggy 有^あ霧^{きり}的^{てき} _____

14. heavy rain 下^あ大^{たい}雨^う _____

15. drizzle 毛^{もう}毛^{もう}雨^う _____

16. Monday 星期一

17. Tuesday 星期二

18. Wednesday 星期三

19. Thursday 星期四

20. Friday 星期五

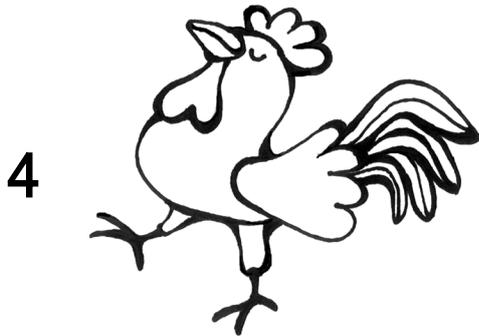
21. Saturday 星期六

22. Sunday 星期日

Self Assessment: How Am I Doing?

Choose the best one to describe you.

小朋友，這個單元的學習告一段落了，請你看，自己在這個單元裡的學習狀況和下面哪一個敘述類似吧！



I've Got It! I understand and I can help my classmates.

我都能理解上課的內容，而且我還可以幫助同學。



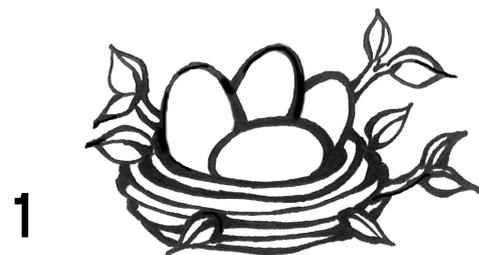
Almost There! I've got it, and I only make small mistakes.

我大部份都能了解，但有時會不小心出錯。



Working on It. Sometimes I need help, I'm starting to understand.

我覺得我有愈來愈進步，只是有時需要別人的幫助。



Beginner. I don't understand yet and I need a lot of help.

我還需要努力，因為常常需要老師和同學的幫助，但我會加油的！

Choose 1 face for each sentence.

 Yes, I do it all the time. 是^的的^分，我^一一^直這^樣做[。]。

 Sometimes I do this. 有^時時^候我^會會^這這^樣做[。]。

 I don't do this, I need to improve. 我^不不^會會^這這^樣做[，]我^需需^要要^改改^進進[。]。

1. I follow the teacher's directions.



我^聽聽^從從^老老^師師^的的^指指^示示[。]。

2. I listen when others are talking.



別^人人^說說^話話^的的^時時^候候^我我^會會^注注^意意^聽聽[。]。

3. I work nicely with others.



我^和和^別別^人人^相相^處處^得得^很很^好好[。]。

4. I can do my work by myself.



我^可可^以以^自自^己己^做做^我我^的的^工工^作作[。]。

5. I like to share ideas with the class.



我^喜喜^歡歡^與與^全全^班班^分分^享享^想想^法法[。]。

6. I try my best on all my work.



我^盡盡^力力^做做^好好^我我^所所^有有^的的^工工^作作[。]。

7. I ask for help if I don't understand.



如^果果^我我^不不^明明^白白[，]我^會會^尋尋^求求^幫幫^助助[。]。



Weather

Weather Forecasting

1.



Kinds of Weather

Which weather words
do you know?

2.



windy

stormy

cloudy

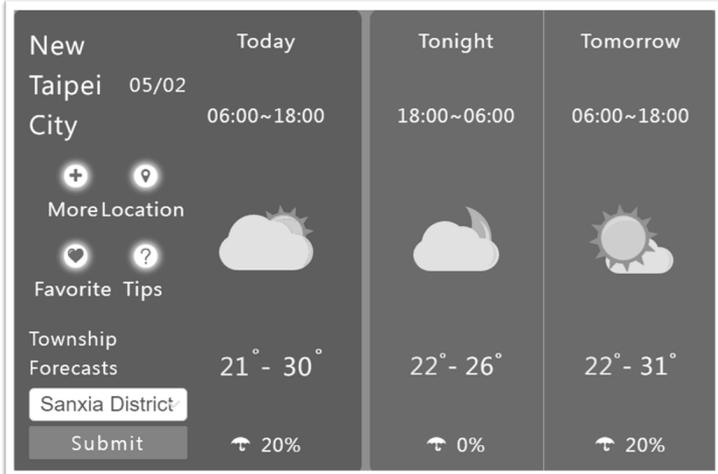
rainy

sunny

snowy

3.

What's the weather like?



This is a weather **forecast** 預報.

It tells us what the weather is **now** 今天.

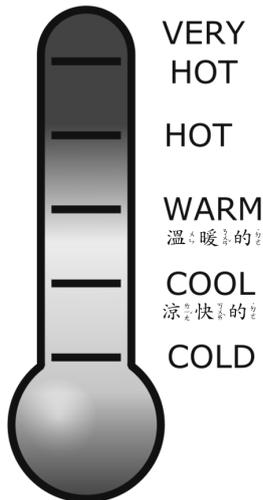
and what the weather will be **later** 未來幾天.

4.

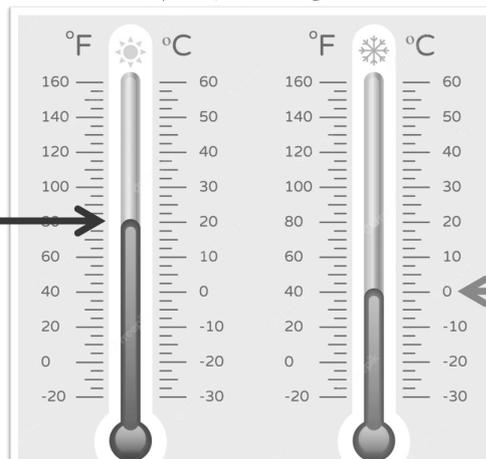
What is the temperature (氣溫) today?

degrees Celsius

攝氏溫度 °C



20 °C



0 °C

5.

Where can I find the weather forecast?



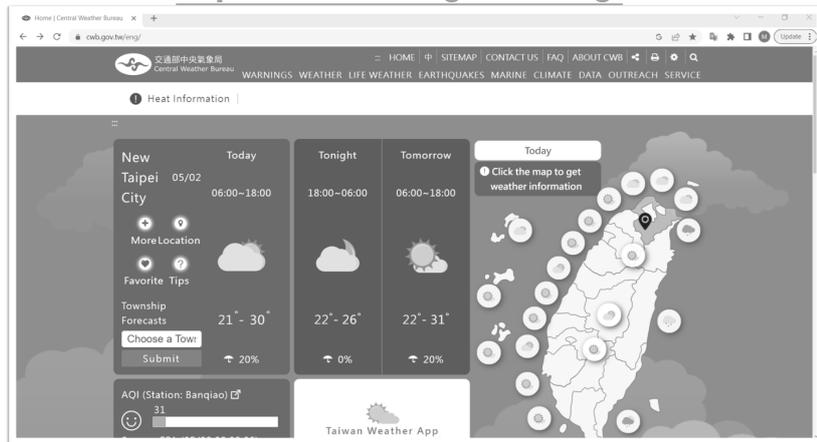
6.



Central Weather Bureau Website

交通部中央氣象局

<https://www.cwb.gov.tw/eng/>



7.

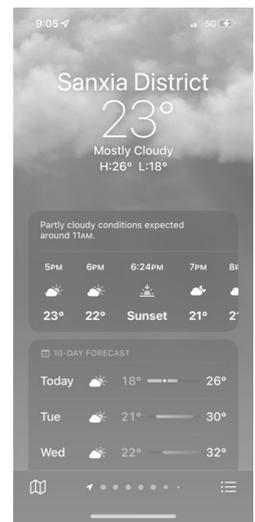
Using Weather APPs



TaiwanWeather



Weather



8.



Weather

Look at the Apple Weather APP

Daily Weather:

- ✓ **current** 目前的 **temperature**
- ✓ **current weather**
- ✓ **the forecast high** 高 **temperature**
- ✓ **the forecast low** 低 **temperature**
- ✓ **the weather forecast for the day**



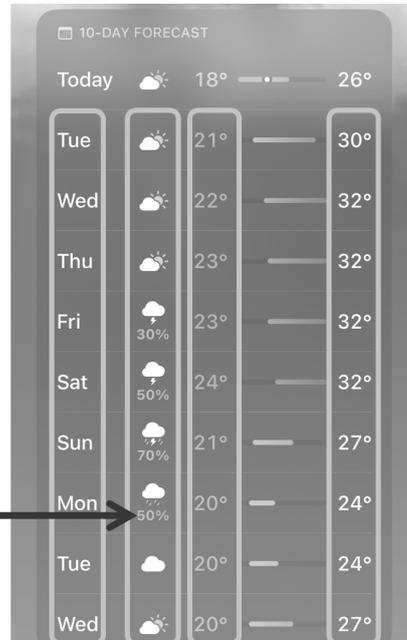
9.



Look at the Apple Weather APP

10 Day Forecast:

- ✓ day of the week
- ✓ weather
- ✓ the forecast low temperature
- ✓ the forecast high temperature
- ✓ chance of rain (%) 降_ふ雨_{あめ}の機_き率_{りつ}



10.

Days of the Week

Today - (今_{けふ}天_{あま})

11.

Days of the Week

Today - (今_{けふ}天_{あま})

Mon	Monday	星 _し 期 _じ 一 _{いち}
Tue	Tuesday	星 _し 期 _じ 二 _に
Wed	Wednesday	星 _し 期 _じ 三 _{さん}
Thu	Thursday	星 _し 期 _じ 四 _し
Fri	Friday	星 _し 期 _じ 五 _ご
Sat	Saturday	星 _し 期 _じ 六 _{ろく}
Sun	Sunday	星 _し 期 _じ 日 _{にち}

12.

My Weather Forecast

On Sunday it will be stormy .

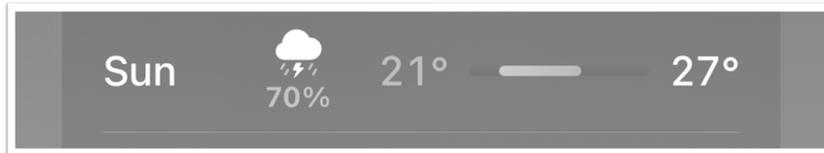
星^ㄊ期^ㄨ天^ㄊ的^ㄨ天^ㄊ氣^ㄨ會^ㄨ是^ㄨ暴^ㄨ風^ㄨ雨^ㄨ

The low will be 21 °C and the high will be 27 °C.

當^ㄨ日^ㄨ低^ㄨ溫^ㄨ攝^ㄨ氏^ㄨ21度^ㄨ，高^ㄨ溫^ㄨ攝^ㄨ氏^ㄨ27度^ㄨ

There is a 70 % chance of rain.

有^ㄨ百^ㄨ分^ㄨ之^ㄨ70的^ㄨ機^ㄨ率^ㄨ會^ㄨ下^ㄨ雨^ㄨ

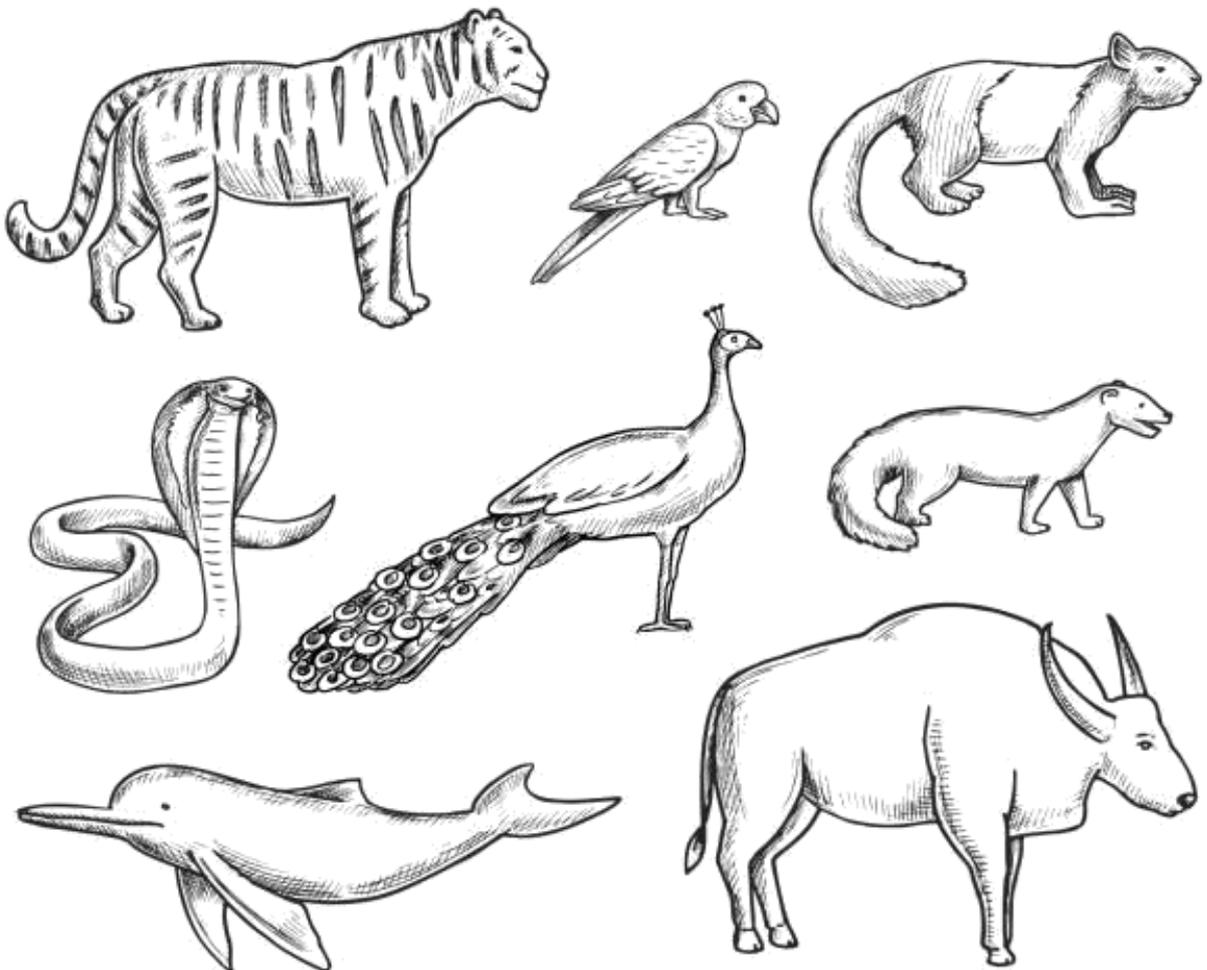
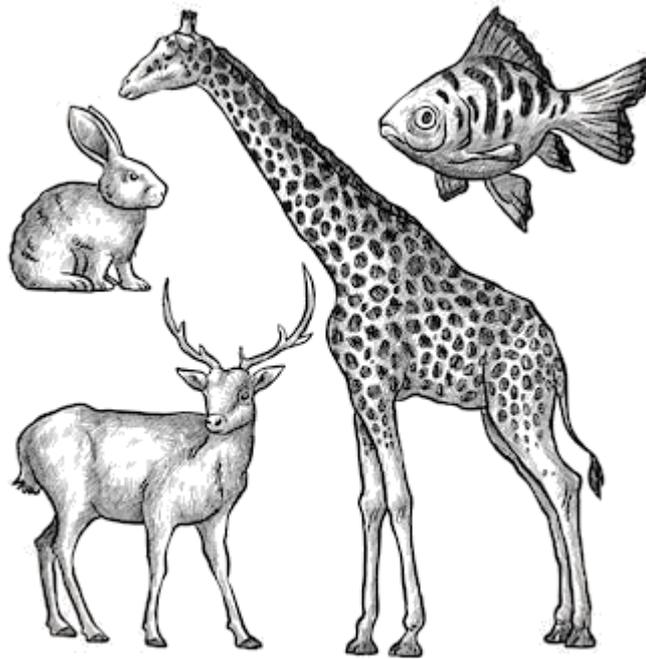


13.

Note Page

Chapter 4: Animal Kingdom

Animal Bodies



Body Structures and Their Functions



Animals have different shapes and body structures (身^シ體^タ構^カ造^{ゾウ}).

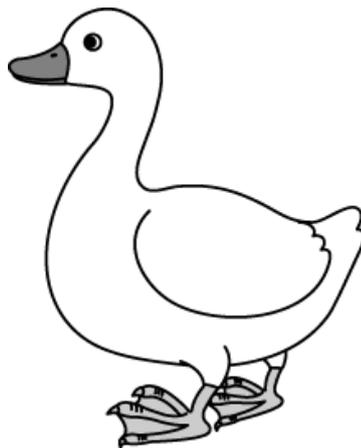
Most animals' bodies can be divided (分^ワ為^カ) into 3 structures.



1. head (頭^カ部^ブ) 2. trunk (軀^ク幹^{カン}) 3. limbs (四^シ肢^ジ)



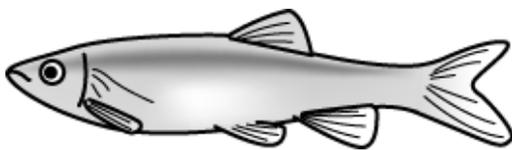
A. koala



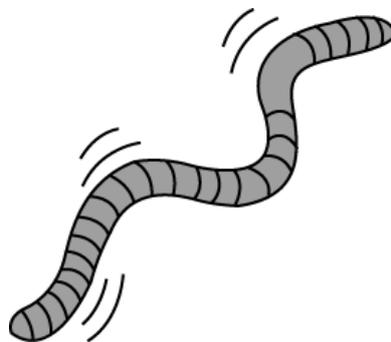
B. duck



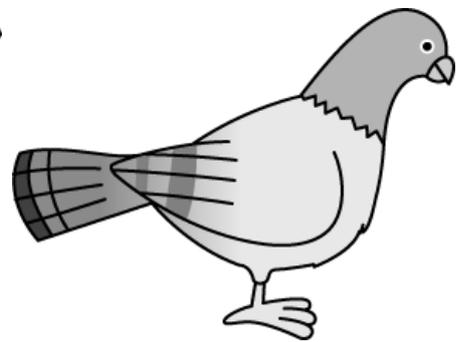
C. butterfly



D. fish



E. earthworm



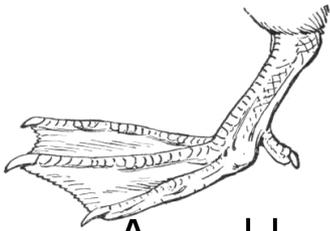
F. pigeon

Let's Think!

1. Which animals don't have limbs?
2. Can you guess the function (功^ク用^{ヨウ}) of each body structure?

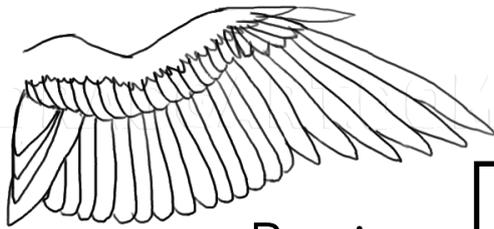
Some animals have special structures with different functions

(功用). Look at each special (特别的) structure and match the picture to its function. Write the correct number in each box.



A. webbed feet

5



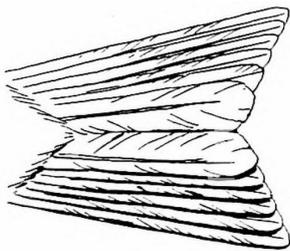
B. wings

1



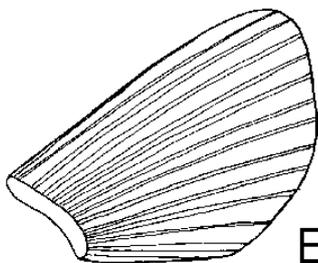
C. a tail

6



D. tail feathers

2



E. fins

3



F. toes

4

1. Animals have _____ so they can fly.

2. Animals have _____ so they can stop and turn in the air.

3. Animals have _____ so they can swim and move left and right.

4. Animals have _____ so they can walk and climb.

5. Animals have _____ so they can swim faster.

6. Animals have _____ so they can stay balanced.

How Animals Move

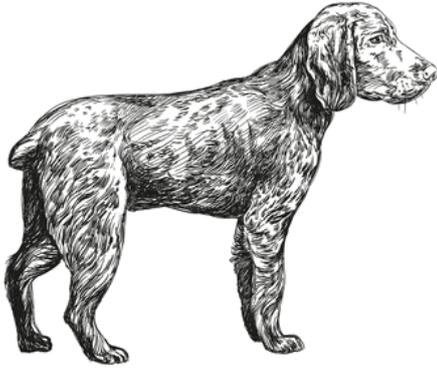


Time to Read



Time to Write

1. A dog's front and back legs are almost the same thickness (厚度) and length (長さ), so they are good at **running**.

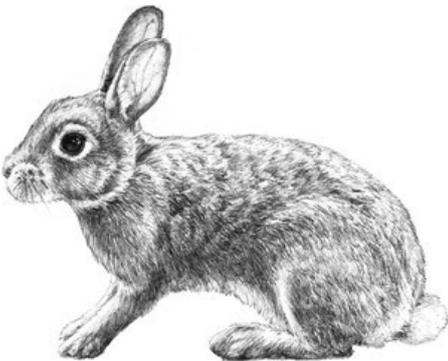


A. horse

B. deer

C. tiger

2. Rabbits have **strong** and thick (粗的) back legs, so they are good at **jumping**.



D. kangaroo

E. frog

F. grasshopper

Word Bank: kangaroo, horse, frog, grasshopper, deer, tiger

Let's Think!

1. Which animals have limbs with the same function as the **dog's** legs? Write the matching animals in the boxes.
2. Which animals have limbs with the same function as the **rabbit's** legs? Write the matching animals in the boxes.

Word List:  Write each English word one time.

1. body structure 身^シ體^{タイ}構^{コウ}造^{ゾウ} _____

2. function 功^{コウ}用^{ヨウ} _____

3. head 頭^{カウ}部^ブ _____

4. trunk 軀^ク幹^{カン} _____

5. limbs 四^シ肢^シ _____

6. tail 尾^ビ巴^バ _____

7. fins 鰭^シ _____

8. tail fins 尾^ビ鰭^シ _____

9. wings 翅^{テウ}膀^{ポウ} _____

10. tail feathers 尾^ビ羽^ウ _____

11. webbed feet 腳^{ケツ}蹼^{メツ} _____

12. toes 腳^{ケツ}趾^シ _____

13. balanced 平^{テイ}衡^{コウ}的^{テキ} _____

14. thickness 厚^{コウ}度^ド _____

15. length 長^{チウ}度^ド _____

16. koala 無^ム尾^ビ熊^{クマ}

17. earthworm 蚯^ク蚓^コ

18. pigeon 鴿^{トビ}子^コ

19. kangaroo 袋^カ鼠^{リス}

20. grasshopper 蚱^サ蟬^シ

21. deer 鹿^カ

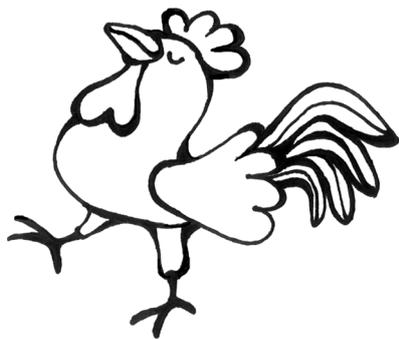
Note Page

Self Assessment: How Am I Doing?

Choose the best one to describe you.

小朋友，這個單元的學習告一段落了，請你想想看，自己在這個單元裡的學習狀況和下面哪一個敘述類似吧！

4



I've Got It! I understand and I can help my classmates.

我都能理解上課的內容，而且我還可以幫助同學。

3



Almost There! I've got it, and I only make small mistakes.

我大部份都能了解，但有時時候會不小心出錯。

2



Working on It. Sometimes I need help, I'm starting to understand.

我覺得我有愈來愈進步，只是有時時候需要別人的幫助。

1



Beginner. I don't understand yet and I need a lot of help.

我還需要努力，因為常常需要老師和同學的幫助，但我會加油的！

Choose 1 face for each sentence.

 Yes, I do it all the time. 是^的的^分，我^一一^直這^樣做[。]。

 Sometimes I do this. 有^時時^我會^這這^樣做[。]。

 I don't do this, I need to improve. 我^不不^會這^樣做[，]我^需需^要改^進。

1. I follow the teacher's directions.



我^聽聽^從老^師的^指指^示。

2. I listen when others are talking.



別^人人^說說^話的^時時^候我^會會^注注^意聽[。]。

3. I work nicely with others.



我^和和^別別^人相^處處^得得^很很^好。

4. I can do my work by myself.



我^可可^以自^己己^做我^的的^工工^作。

5. I like to share ideas with the class.



我^喜喜^歡與^全全^班分^享想^法。

6. I try my best on all my work.



我^盡盡^力做^好我^所所^有的^工工^作。

7. I ask for help if I don't understand.



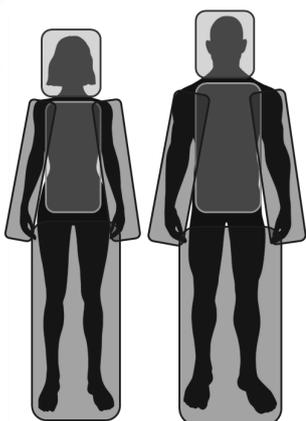
如^果果^我不^明明^白，我^會會^尋尋^求幫^助。

THE ANIMAL KINGDOM

ANIMAL BODIES



1.



The human body has 3 main structures:

the head

頭部 (カビ)



the trunk

軀幹 (カビ)



the limbs

四肢 (カビ)

2.



What can you see?



humans

Humans are animals too.

人類 (カビ) 也是 (カビ) 動物 (カビ)。

3.



animals

What body structures do people and animals both have?

a lizard (蜥蜴)



a fish



a dog



a squirrel
(松鼠)



humans

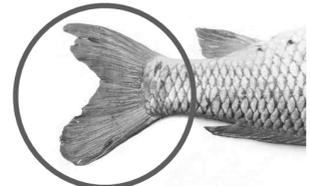


a sparrow
(麻雀)

4.

Some animals have special body structures.

有些動物的身體構造與其他動物不同。



5.

◎ Wings (翅/膀):

Wings are limbs.

翅/膀算是肢體。

Some animals have wings so they can fly.

某些動物有翅/膀，所以牠們會飛。



6.

◎ Tail Feathers (尾羽):



Tail feathers are not a tail.

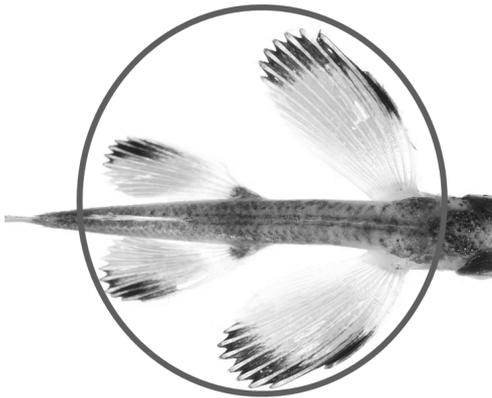
尾羽不是尾巴。

Some animals have tail feathers so they can stop and turn in the air.

某些動物有尾羽，所以牠們能控制飛行的方向。

7.

◎ Fins (鰭):



Fins are not limbs.

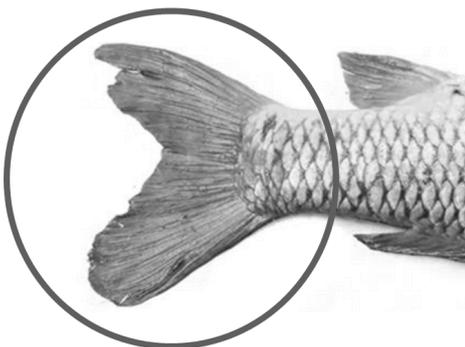
鰭不是肢體。

Some animals have fins so they can swim and move left and right.

某些動物有鰭，所以牠們能在水裡游泳和左右移動。

8.

◎ Tail Fins (尾鰭):



Some animals have tail fins so they can swim forward.

某些動物有尾鰭，所以牠們能往前游。

9.

◎ Toes (腳_{ㄒㄩㄛˋ}趾_{ㄓㄩˇ}):



Some animals have toes so they can walk and climb.

某_{ㄇㄨˊ}些_{ㄒㄩㄛˋ}動_{ㄉㄨㄥˋ}物_{ㄨㄛˋ}有_{ㄩˊ}腳_{ㄒㄩㄛˋ}趾_{ㄓㄩˇ}，
所_{ㄕㄨㄛˋ}以_{ㄩˊ}牠_{ㄊㄚˊ}們_{ㄇㄢˊ}能_{ㄥㄨㄥˋ}行_{ㄒㄩㄥˋ}走_{ㄓㄩˊ}和_{ㄆㄨˊ}
攀_{ㄆㄢ}爬_{ㄆㄚˊ}。

10.

◎ Webbed Feet (腳_{ㄒㄩㄛˋ}蹼_{ㄨㄛˋ}):



Some animals have webbed feet so they can swim faster.

某_{ㄇㄨˊ}些_{ㄒㄩㄛˋ}動_{ㄉㄨㄥˋ}物_{ㄨㄛˋ}有_{ㄩˊ}腳_{ㄒㄩㄛˋ}蹼_{ㄨㄛˋ}，
所_{ㄕㄨㄛˋ}以_{ㄩˊ}牠_{ㄊㄚˊ}們_{ㄇㄢˊ}能_{ㄥㄨㄥˋ}在_{ㄆㄨㄛˊ}水_{ㄨㄛˊ}裡_{ㄌㄩˇ}
游_{ㄩㄥˊ}得_{ㄉㄜˊ}更_{ㄍㄨㄥˋ}快_{ㄆㄚˊ}。

11.

◎ Tails (尾_{ㄨㄟˊ}巴_{ㄅㄚˊ}):



Some animals have tails so they can stay balanced.

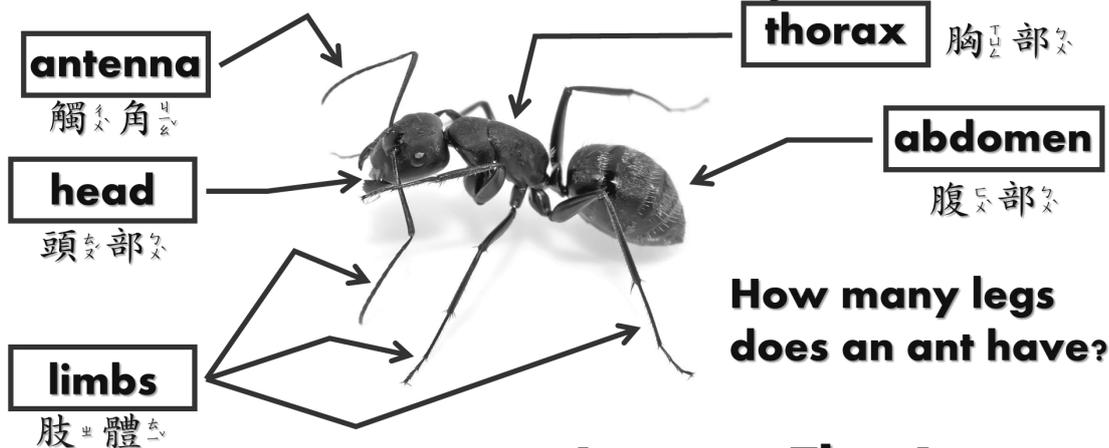
某_{ㄇㄨˊ}些_{ㄒㄩㄛˋ}動_{ㄉㄨㄥˋ}物_{ㄨㄛˋ}有_{ㄩˊ}尾_{ㄨㄟˊ}巴_{ㄅㄚˊ}，
可_{ㄎㄨㄛˋ}以_{ㄩˊ}幫_{ㄅㄤ}助_{ㄓㄨˊ}牠_{ㄊㄚˊ}們_{ㄇㄢˊ}保_{ㄆㄤ}持_{ㄔㄩˊ}
平_{ㄆㄢˊ}衡_{ㄏㄨㄥˊ}。

Tails help animals move.

尾_{ㄨㄟˊ}巴_{ㄅㄚˊ}能_{ㄥㄨㄥˋ}幫_{ㄅㄤ}助_{ㄓㄨˊ}動_{ㄉㄨㄥˋ}物_{ㄨㄛˋ}移_{ㄩㄥˊ}
動_{ㄉㄨㄥˋ}。

12.

The ant's body is divided into three parts, but it has a different kind of trunk. It has two parts.



How many legs does an ant have?

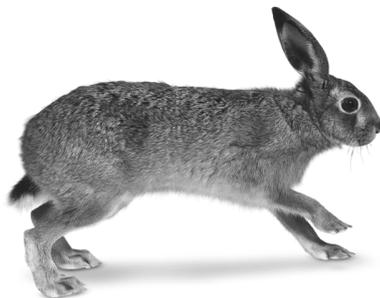
Insects: The Ant

13.



Is the shape of a body structure related to its function?

動物的身體構造有特殊的功用嗎?

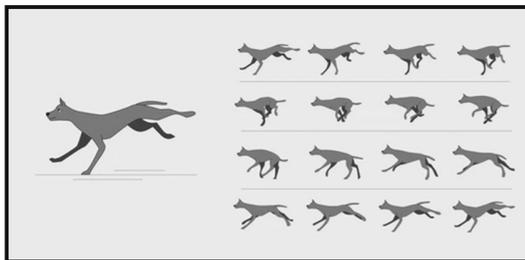


- How do dogs move?
- How do rabbits move?
- Which body structures are the same?
- Do their limbs have the same function?
- How are their limbs different?

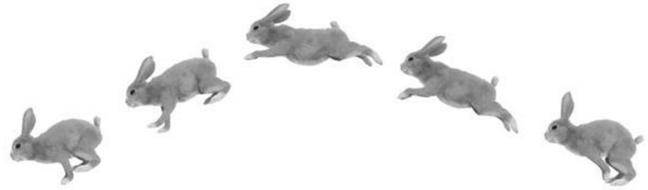
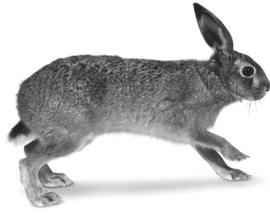
14.



The dog's front and back legs are almost the same thickness and length, so they are good at running.



15.



Rabbits have
strong and
thick back legs,
so they are
good at
jumping



16.



17.

B Long Pu Elementary School

Bilingual Domain of Natural Science

Principal: 黃清海 Leo

Bilingual Director: 高文謙 Andy

Development Lead: Michelle Vatcher

Language and Translation:

江明儀 Grace

李旻臻 Julie

**A Special Thanks to All the Grade Three Domain of
Natural Science Teachers That Have Contributed to This
Program**

Published February 2024

二、雙語自然單元教案



新北市龍埔國小雙語實驗課程教學活動設計
New Taipei City LongPu Elementary School CLIL Program

實施年級 (Grade Level): 3

課程名稱 (Name of the Curriculum): Natural Science

單元名稱 (Name of the Unit): Plants and Their Leaves: All About Leaves

總節數 (Length of the Unit): 4 Weeks

設計者 (Lesson Designer): Michelle Vatcher

本單元設計理念 (Unit Overview: Rationale and Philosophy)

General introduction of the unit (objective and rationale):

The “All About Leaves” unit is designed to allow students to make observations about natural phenomena and learn to describe them. Students will learn about the shapes of leaves, types of edges, and venation patterns. Students will be able to classify leaves based on their physical characteristics. Students will learn how to share their observations verbally and with pictures. Students will use both group activities and individual tasks to fully immerse themselves in the materials and create a deeper understanding. Students are encouraged to access previous knowledge and share it with their classmates.

“葉子”單元旨在讓學生觀察自然現象並能夠描述觀察到的葉片。學生將學習葉子的形狀、葉緣類型和葉脈型式。學生將能夠根據葉子的特徵對其進行分類。學生將學習如何用口語和圖畫分享他們的觀察結果。學生將通過小組活動和個人任務充分沈浸在學習內容中，並得已更深刻的理解。鼓勵學生運用以往的知識並與同學分享。

Objectives of this unit/theme:

The objectives of this unit/theme are:

- Students will recognize the different parts of a plant and understand their functions.
- Students will be able to describe leaves based on their physical characteristics (leaf shapes, edge type and venation patterns).
- Students will be able to categorize leaves based on their physical characteristics.

本單元/主題的目標是：

- 學生將識別植物的不同部位並了解其功能。
- 學生將能夠根據葉子的物理特徵（葉形、葉緣類型和葉脈型式）描述葉子。
- 學生將能夠根據葉子的物理特徵對其進行分類。

本單元整體目標 (Learning Objectives for This Unit)

<p>學習重點 Essential Learning Focuses</p>	<p>學習表現 (Learning Performance):</p> <p>tc-II-1 Students can easily distinguish or classify the observed natural science phenomena. 能簡單分辨或分類所觀察到的自然科學現象。</p> <p>pc-II-2 Students can use the simple forms of speaking, writing, or drawing to express the process and findings of inquiry. 能利用簡單形式的口語、文字或圖畫等，表達探究之過程、發現。</p>
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	學習內容 (Learning Content): INb-II-6 The external morphology of common plants is mainly composed of roots, stems, leaves, flowers, fruits, and seeds. 常見植物的外部形態主要由根、莖、葉、花、果實及種子所組成。	
內容 Content (New knowledge, skills and understanding)		預計進行的節數 Corresponding Lesson
Students will: <ul style="list-style-type: none"> Review the parts of a plant learned in Grade 2. Identify the parts of a plant in pictures. Label a diagram of a plant. Define the functions of each part of the plant. Review different shapes. Examine leaves and identify their shapes. Describe the edges of leaves. Recognize and compare different venation patterns. Recognize the physical characteristics of leaves and apply them to create a diagram. Collect and examine a leaf. Draw a leaf based on observations and label the physical characteristics. Determine the leaf's shape, type of edge and venation pattern and write it in the worksheet. 	<ul style="list-style-type: none"> Lesson 1 Lesson 1 Lesson 1 Lesson 1 Lesson 2 Lesson 2 Lesson 3 Lesson 3 Lesson 3 Lesson 4 Lesson 4 Lesson 4 	
認知 Cognition (High-order thinking skills, problem-solving, challenges and reflection)		
<ul style="list-style-type: none"> Students will be able to apply previous knowledge to answer questions and complete activities. Students will be able to recognize and label the different parts of a plant. Students will be able to define the functions of each part of the plant in simple language. Students will be able to identify the different physical characteristics of leaves. Students will be able to organize different leaves based on their physical characteristics. Students will be able to compare the different physical characteristics that leaves share. Students will be able to describe a leaf based on its' physical characteristics. Students will be able to create a diagram of a leaf based on a set of specific physical characteristics. Students will be able to collect and examine an actual leaf, then describe its' physical characteristics. 		
溝通 Communication (What and how)		
Language of Learning (Key vocabulary-content-obligatory)		
flower fruit seeds leaf / leaves stem roots	narrow oval egg shaped heart shaped needle shaped hand shaped outside part	smooth jagged veins venation patterns parallel venation

different
shapes

edge

net venation

Language for learning (Functional language e.g. language while learners participate in the lesson—thinking skills)

Get in groups.
Open your book to page ____.
Write the number in the box.
Read with me.
How do you say ____ in Chinese?

Write a letter next to each picture.
Look at the PPT and look at your book.
Read the instructions and draw a picture.
Write the correct number.
Write each English word one time.

Match the words to the parts of the plant.
What are the parts of a plant?
Which part is this?
Where are the seeds? They are inside the fruit.
Show me the roots / stem / leaves / fruit.
Leaves are different shapes.
What shape is this?
This leaf is ____ shaped.
Show me the (egg, heart, needle, hand) shaped leaf.
Which leaf is a narrow oval?
What shape is each leaf?

Leaves have different edges.
Do these leaves have ____ edges?
What kind of edge is this?
Show me a leaf with ____ edges.
Leaves have veins.
They make different patterns.
This is a ____ venation pattern.
Which venation pattern is this?
Show me a leaf with a ____ venation pattern.
Draw a leaf with a ____ edge and ____ venation pattern.
Collect and bring a leaf to the next lesson.

Language through learning (Language progression, practice and extension—emerging language)

- Be able to name different parts of a plant.
- Be able to describe the functions of the parts of the plant.
- Be able to list different shapes of leaves.
- Be able to describe a leaf based on its' physical characteristics.
- Be able to compare leaves' physical characteristics.
- Be able to name and identify the different physical characteristics of leaves.
- Be able to label plants and leaves.

文化 Culture (Awareness of self and other, identity, citizenship, and multicultural understanding)

- Students will be able to create/uphold school culture.
- Students will learn not to pick leaves from the trees and plants on the school grounds, it is important to keep the environment healthy and beautiful.
- Students will learn to care for the school and the environment so that others can still enjoy it.

教學活動設計：第一節課 (Lesson 1)

Lesson 1: Parts of a Plant 植物的構造

Objectives:

At the end of the lesson, the students will:

- Review the parts of a plant learned in Grade 2.
- Identify the parts of a plant in pictures.
- Label a diagram of a plant.
- Define the functions of each part of the plant.

在課程結束時學生能夠：

- 複習在二年級學過的植物各部分。
- 識別圖片中的植物各部分。
- 給植物的圖示標上標籤。
- 定義植物各部分的功能。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can participate in group discussions and use their previous knowledge.

Students can recognize the parts of plants when looking at different types of plants.

Students can label a diagram of a plant.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音詞彙。

在老師的幫助下，學生能識讀相關英語和中文。

學生能運用他們先備的知識參與小組討論。

學生能夠在觀察不同種類的植物時識別植物的各部分。

學生能夠標註植物圖示各部份。

Teacher will mark Chapter 1 Plants and Their Leaves: All About Leaves page 4 "Parts of a Plant."

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	1. Introduce the name of the chapter, "Plants and their Leaves: All About Leaves." 2. Review the 4 things that plants need to grow; students learned this in Grade 2. (air, water, sun, soil) Make sure students know both the English and Chinese words.	Chapter 1 PPT
主要內容 Core Part			
Presentation	5 mins	1. Show students PPT slide #2. Have students look at the picture and ask them to identify the 5 parts of the	Chapter 1 PPT workbook

		<p>plant. Make sure students learn both the English and Chinese words.</p> <ol style="list-style-type: none"> 2. Ask students the following question: Where are the seeds? (They are inside the fruit.) Students can answer in English or Chinese. 3. Tell students to open their book to page 4. Have students read the 6 parts of the plant and their functions. Ask students to explain each function in Chinese to check for understanding. 	
Practice	5 mins	<ol style="list-style-type: none"> 1. Tell students to look at the picture of a plant at the bottom of page 4. Have students read the instructions. Ask students to write the number for each part of the plant in the correct box. 	Chapter 1 workbook
Production	20 mins	<ol style="list-style-type: none"> 1. Show students PPT slides# 3-6 and have students look at the pictures. Ask students to do the following: Show me the roots / stem / leaves / fruit. 2. Identify one of the plants on the slide, then choose a student to come to the board and circle the indicated part of the plant. Repeat for each picture. Move on to the next slide for a different part of the plant. 3. Show students PPT slide# 7. Have students look at the pictures. Ask students the following question: Where are the seeds? 4. Identify one of the plants on the slide, then choose a student to come to the board and circle either the pictured seeds or the fruit where the seeds can be found. 5. Explain to students that you can see the seeds in some pictures, but not others. Repeat for each picture. 	Chapter 1 PPT
總結 Closure			
Wrap-up	5 mins	Check the answers on page 4. If students have time, they can work on the word list on pages 8-9	Chapter 1 workbook

References:

1. Grade 3: Domain of Natural Science Book 1
2. PPT Plants and Their Leaves: All about Leaves
3. Domain of Natural Science Chinese Textbook and PPTs

教學活動設計：第二節課 (Lesson 2)

Lesson 2: Describing Leaves: Leaf Shapes 描述你的葉片：葉片的形狀

Objectives:

At the end of the lesson, the students will:

- Review different shapes.
- Examine leaves and identify their shapes.

在課程結束時學生能夠：

- 複習不同的形狀。
- 檢視葉子並識別其形狀。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can participate in group discussions.

Students can match the word to the correct picture.

Students can recognize leaves with specific shapes.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音詞彙。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠參與小組討論。

學生能夠將詞彙與正確的圖片匹配。

學生能夠識別具有特定形狀的葉子。

Teacher will mark Chapter 1 Plants and Their Leaves: All About Leaves page 5

"Describing Leaves" and page 6 "What shape is each leaf?"

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	2 mins	<ol style="list-style-type: none"> 1. Review what a plant needs to grow. 2. Review the parts of a plant. 	
主要內容 Core Part			
Presentation	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 8. Ask students the following questions: What are shapes? What does it mean in Chinese? Tell me some shapes you know. Students can answer in English or Chinese. 2. Show students each shape (narrow oval, egg shaped, heart shaped, needle shaped, hand shaped.) Make sure students learn both the English and Chinese words. 3. Students may have trouble determining the narrow oval leaf 	Chapter 1 PPT

		from the egg-shaped leaf. Show them that an egg-shaped leaf is a different width at each end, while the narrow oval is the same width at each end.	
Practice	5 mins	<ol style="list-style-type: none"> 1. Give each group a selection of leaves that are different shapes. They can be fresh leaves, laminated leaves or preserved leaves. 2. Ask the groups to find a specific shaped leaf and hold it up. Make sure to do each possible shape at least once. 	sample leaves (make sure each group has example for each shape)
Production	10 mins	<ol style="list-style-type: none"> 1. Tell students to open their book to page 5 and read about the shapes of leaves. Practice reading the different leaf shapes. 2. Show students PPT slide# 9. Write a letter next to each picture of a leaf. (A. hand, B. heart, C. egg, D. needle, E. narrow oval) 3. In their groups, students need to look at the pictures on PPT slide# 9 and determine which shape each leaf is. 4. Students can discuss the question in English or Chinese. They must then write the letters from the slide in their books on page 5 next to the correct shape. 5. The teacher will walk around the room to help facilitate discussion and to check students understanding of the activity and topic. 6. Ask each group to give one answer (if there are more than 5 groups, have 2 groups give one answer). Students can give their answers in English or Chinese. Encourage students to help their classmates to translate their answers if they can. 7. Show students PPT slides#9-10 to check students' answers. 	Chapter 1 PPT and workbook
Presentation	5 mins	<ol style="list-style-type: none"> 1. Show students PPT slide#11. Look at the pictures. Have students read the sentence. Explain what an edge is. 	Chapter 1 workbook

		<ol style="list-style-type: none"> 2. Teach the meaning of “jagged edges” and “smooth edges.” 3. Make sure students learn both the English and Chinese words. 	
Practice	5 mins	<ol style="list-style-type: none"> 1. Give each group a selection of leaves that are different shapes. They can be fresh leaves, laminated leaves or preserved leaves. 2. Ask the groups to find a leaf with one of the edge types and hold it up. Do this multiple times. 3. Ask groups to show leaves with a specific shape and edge type to review shapes. Each group might not have each combination. 	sample leaves (make sure each group has an example for each shape)
總結 Closure			
Wrap-up	3 mins	Check the answers on page 4. If students have time, they can work on the word list on pages 8-9	Chapter 1 workbook
References: <ol style="list-style-type: none"> 1. Grade 3: Domain of Natural Science Book 1 2. PPT Plants and Their Leaves: All about Leaves 3. Domain of Natural Science Chinese Textbook and PPTs 			

教學活動設計：第三節課 (Lesson 3)

Lesson 3: Leaf Edges and Venation Patterns 葉緣及葉脈

Objectives:

At the end of the lesson, the students will:

- Describe the edges of leaves.
- Recognize and compare different venation patterns.
- Recognize the physical characteristics of leaves and apply them to create a diagram.

在課程結束時學生能夠：

- 描述葉子的邊緣。
- 識別並比較不同的葉脈模式。
- 識別葉子的特徵並能夠繪製圖示。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can read instructions and follow them.

Students can recognize leaves with specific characteristics.

Students can draw leaves with specific characteristics.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音詞彙。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠閱讀指示並遵循它們。

學生能夠識別具有特定特徵的葉子。

學生能夠描繪出具有特定特徵的葉子。

Teacher will mark Chapter 1 Plants and Their Leaves: All About Leaves page 6 "Edges" and page 7 "Venation Patterns"

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	2 mins	1. Review the shapes of leaves and types of edges.	
主要內容 Core Part			
Presentation	5 mins	1. Show students PPT slides#12-13. Look at the pictures. Have students read the sentence. Explain what "veins" and "venation pattern" means. 2. Teach the meaning of "parallel venation pattern" and "net venation pattern." 3. Make sure students learn both the English and Chinese words.	Chapter 1 PPT

Practice	10 mins	<ol style="list-style-type: none"> 1. Give each group a selection of leaves that are different shapes. They can be fresh leaves, laminated leaves or preserved leaves. 2. Ask the groups to find a leaf with one of the venation patterns and hold it up. Do this multiple times. 3. Ask groups to show leaves with different physical characteristics to check students' understanding. 	sample leaves (make sure each group has example for each shape)
Presentation	5 mins	<ol style="list-style-type: none"> 1. Tell students to open their book to page 6 and 7. Have students read "Edges" and "Venation Patterns." 	Chapter 1 workbook
Production	15 mins	<ol style="list-style-type: none"> 1. Tell students to open their book to page 7 and look at the drawing activity at the bottom of the page. 2. Have students read the instructions. 3. Students will draw a leaf with a jagged edge and net venation pattern, and a leaf with a smooth edge and a parallel venation pattern. 4. If students have trouble understanding what to do, draw an example on the board. <p><i>While students are drawing, do an individual speaking activity.</i></p> <ol style="list-style-type: none"> 1. Tell students to open their book to page 6. Students will be doing a speaking activity. Go to each student individually. 2. Students will look at the pictures, the teacher will choose three pictures and the students must answer the following question: What shape is the leaf? 3. Put a check mark on the picture if the student is correct. 4. For less able students, the teacher can ask the following question: Which leaf is ____ shaped? The student will then point to the correct picture. 	Chapter 1 workbook
總結 Closure			
Wrap-up	3 mins	Tell students they need to bring a leaf to	

		<p>the next class. The leaf needs to be small enough to fit on the supplementary worksheet. Tell students they shouldn't pick leaves off trees or plants because if too many people take leaves, it can hurt the plants and it is not good for the school environment.</p>	
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References:

1. Grade 3: Domain of Natural Science Book 1
2. PPT Plants and Their Leaves: All about Leaves
3. Domain of Natural Science Chinese Textbook and PPTs

教學活動設計：第四節課 (Lesson 4)

Lesson 4: Collecting Leaves 收集葉片

Objectives:

At the end of the lesson, the students will:

- Collect and examine a leaf.
- Draw a leaf based on observations and label the physical characteristics.
- Determine the leaf's shape, type of edge and venation pattern and write it in the worksheet.

在課程結束時學生能夠：

- 收集並檢查葉子。
- 根據觀察畫出一片葉子並標記其物理特徵（葉形、葉緣及葉脈）。
- 判斷葉子的葉形、葉緣類型和葉脈模式，並將其紀錄在學習單上。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can remember to complete tasks set in previous lessons.

Students can examine a real leaf and apply the knowledge they have learned.

Students can look up information they need to complete a task.

Students can complete the self-assessment.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠記住並完成前幾節課交待的任務。

學生能應用所學知識觀察真實的葉子。

學生能夠查找完成任務所需的資訊。

學生能夠完成自我評估。

Teacher will mark Chapter 1 Plants and Their Leaves: All About Leaves "Collecting Leaves" supplementary worksheet

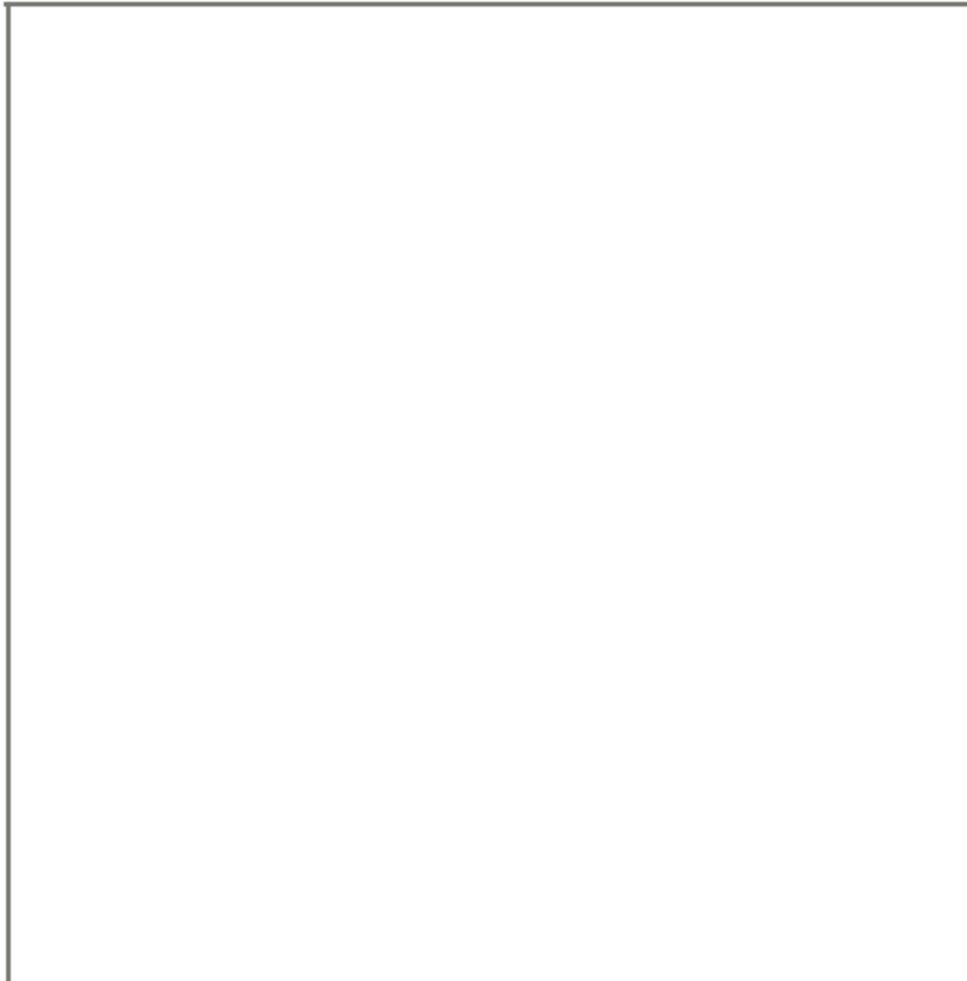
活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	1. Ask students if they remembered to bring their leaves. Have some extra leaves that students could use if they forgot to bring one.	extra leaves
主要內容 Core Part			
Presentation	5 mins	1. Review the physical characteristics of leaves. 2. Show students the supplementary worksheet on the screen. 3. Show students where they can find the vocabulary in their books to	supplementary worksheet (see attachment below) colored pencils

		complete the worksheet. (Shapes page 5, edges page 6, venation patterns page 7)	tape and glue
Production	25 mins	<ol style="list-style-type: none"> 1. Students will attach their leaf to the worksheet in the big box. Students must draw the leaf. 2. Show students the table at the bottom of the worksheet. 3. Students must look at their leaf and determine which characteristics match their leaf. 4. Students will write the shape, type of edge and venation pattern in the table. 5. If students finish early, they should make sure everything in chapter 1 is complete. 	Chapter 1 PPT A3 sized paper x6 colored pencils pencils markers
總結 Closure			
Wrap-up	5 mins	Check the answers on page 6 and 7. If students have time, they can work on the word list on pages 5-6. Ask students to complete their self-assessment on pages 10-11.	Chapter 1 Workbook
References: <ol style="list-style-type: none"> 1. Grade 3: Domain of Natural Science Book 1 2. PPT Plants and Their Leaves: All about Leaves 3. Domain of Natural Science Chinese Textbook and PPTs 4. Leaves: All About Leaves "Collecting Leaves" supplementary worksheet 			

Class: _____ Name: _____ () Group# _____

Collecting Leaves

Find a leaf and glue it in the box. Describe the leaf. Write the shape, venation pattern and the kind of edges in the table.



Shape:
Venation Pattern:
Edges:

新北市龍埔國小雙語實驗課程教學活動設計
New Taipei City LongPu Elementary School CLIL Program

實施年級 (Grade Level): 3

課程名稱 (Name of the Curriculum): Natural Science

單元名稱 (Name of the Unit): Dissolving: Acids, Neutrals and Alkalis

總節數 (Length of the Unit): 3 Weeks

設計者 (Lesson Designer): Michelle Vatcher

本單元設計理念 (Unit Overview: Rationale and Philosophy)

General introduction of the unit (objective and rationale):

The "Acids, Neutrals and Alkalis" unit is designed to allow students to make observations and learn to describe them. Students will learn what acids, neutrals and alkalis are, and some of their characteristics. Students will take part in an experiment to learn how to identify acids, neutrals and alkalis using purple cabbage juice and butterfly pea flower tea (pH indicators). Students will compare the results of the experiment and record their observations. Students will use both group activities and individual tasks to fully immerse themselves in the materials and create a deeper understanding.

“酸性、中性和鹼性”單元旨在讓學生進行觀察並學會描述它們。學生將學習什麼是酸性、中性和鹼性物質，以及它們的特徵。學生將參加實驗，學習如何使用紫高麗菜汁和蝶豆花茶（pH 指示劑）識別酸性、中性和鹼性物質。學生將比較實驗結果並將觀察結果紀錄下來。學生將通過小組活動和個人任務充分習得學習內容，並期望獲得更深刻的理解。

Objectives of this unit/theme:

The objectives of this unit/theme are:

- Students will learn what acids, neutrals and alkalis are.
- Students will be able to describe the characteristics of acids, neutrals and alkalis.
- Students will be able to explain what a solution is.
- Students will be able to take part in an experiment that will allow them to identify acids, neutrals and alkalis.

本單元/主題的目標是：

- 學生將學習什麼是酸性物質、中性物質和鹼性物質。
- 學生能夠描述酸性物質、中性物質和鹼性物質的特徵。
- 學生能夠解釋什麼是溶液。
- 學生能夠透過實驗，識別酸性物質、中性物質和鹼性物質。

本單元整體目標 (Learning Objectives for This Unit)

學習重點 Essential Learning Focuses	<p>學習表現 (Learning Performance): ah-II-1 Students can understand the characteristics of reality in life by all kinds of senses. 透過各種感官了解生活週遭事物的屬性。</p>
	<p>學習內容 (Learning Content): INa-II-3 Matter has characteristics, and it can be classified by its characteristics and applications. 物質各有其特性，並可依其特性與用途進行分類。</p>

	INb-II-2 The differences in material properties can be used to distinguish or separate substances. 物質性質上的差異性可用來區分或分離物質。	
內容 Content (New knowledge, skills and understanding)		預計進行的節數 Corresponding Lesson
Students will: <ul style="list-style-type: none"> Recognize acids, neutrals and alkalis. Identify the characteristics of acids, neutrals and alkalis. Examine the materials and equipment needed to complete an experiment to identify acids, neutrals and alkalis. Understand that adding certain liquids to acids, neutrals and alkalis will make them change color. Identify the color family associated with acids and alkalis. Take part in an experiment. Record the results of their experiment. Compare the results and draw a conclusion. 	Lesson 1 Lesson 1 Lesson 2 Lesson 2 Lesson 2 Lesson 3 Lesson 3 Lesson 3	
認知 Cognition (High-order thinking skills, problem-solving, challenges and reflection)		
<ul style="list-style-type: none"> Students will be able to recognize acids, neutrals and alkalis Students will be able to organize the materials and equipment needed to complete an experiment. Students will be able to make observations and record them. Students will be able to compare the results of their experiment and make a conclusion. Students will be able to make the connection between cause and effect when adding a pH indicator (purple cabbage juice and butterfly pea flower tea) to acids, neutrals and alkalis. 		
溝通 Communication (What and how)		
Language of Learning (Key vocabulary-content-obligatory)		
acid acidic sour burn alkali alkaline slippery neutral	baking soda solution lemon juice sugar solution pipettes beaker test tube purple cabbage juice	butterfly pea flower tea liquid red family blue family green family change

Language for learning (Functional language e.g. language while learners participate in the lesson—thinking skills)

Get in groups.
Open your book to page ____.
Read with me.
How do you say ____ in Chinese?
Color the ____.

Circle the correct answer.
Write each English word one time.
Collect the ____ and bring them to the teacher.

How does ____ taste?
Tell me something that tastes sour.
What do you use ____ for?
Is it acidic / neutral / alkaline?
You will need ____.
An acid / neutral / alkali will change color if you add ____.
Will acids / neutrals / alkalis change color?

Which color will acids / alkalis be?
Put a number (1, 2, 3) next to each beaker on page ____.
Did the ____ change color?
Put a check above the beaker if it changed color.
Put an X above the beaker if it didn't change color.
Is ____ an acid, neutral or alkali?

Language through learning (Language progression, practice and extension—emerging language)

- Be able to name acids, neutrals, and alkalis.
- Be able to describe their characteristics.
- Be able to list the steps of an experiment.
- Be able to describe their observation.
- Be able to compare their experiment results.

文化 Culture (Awareness of self and other, identity, citizenship, and multicultural understanding)

- Students will be able to share the uses of acids, neutrals and alkalis in their daily life. Students will recognize that not all items can be found in every country. Students can share their experiences with the teacher and vice versa.
- Students will experience the importance of teamwork and working together to achieve a goal while completing an experiment.

教學活動設計：第一節課 (Lesson 1)

Lesson 1: Acids, Neutrals and Alkalis 酸性物質、中性物質及鹼性物質

Objectives:

At the end of the lesson, the students will:

- Recognize acids, neutrals and alkalis.
- Identify the characteristics of acids, neutrals and alkalis.

在課程結束時學生能夠：

- 識別酸性物質、中性物質和鹼性物質。
- 確認酸性物質、中性物質和鹼性物質的特徵。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can listen to their classmates.

Students can share knowledge about the uses of different acids, neutrals and alkalis.

Students can make observations using pictures.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音詞彙。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠傾聽同學的發言。

學生能夠分享有關不同酸性、中性和鹼性物質用途的知識。

學生能夠通過圖片進行觀察。

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	2 mins	<ol style="list-style-type: none"> 1. Introduce the name of the chapter, "Dissolving: Acids, Neutrals and Alkalis." 2. Ask students the following question: Have you heard of these words before? 	Chapter 3 PPT
主要內容 Core Part			
Presentation	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 2. Have students read "Acids" and "Acidic." Make sure students understand both the English and Chinese words. 2. Have students read the sentence. Explain the meaning of "sour" and "burn". 3. To help students understand "sour", teach them the other 3 flavors (salty, spicy/hot, sweet) 4. Show students the 2 examples of acids. Ask students the following 	Chapter 3 PPT

		<p>questions: Do you like vinegar drinks? How do they taste (sweet and sour) Have you eaten grapefruit? How does it taste? (sour)</p> <ol style="list-style-type: none"> Students can answer in English or Chinese. Ask students the following question: Do you know anything else that tastes sour? Students can answer in English or Chinese. 	
Presentation	10 mins	<ol style="list-style-type: none"> Show students PPT slide# 3. Have students read "Alkalis" and "Alkaline." Make sure students understand both the English and Chinese words. Have students read the sentence. Explain the meaning of "slippery". Explain that we use some alkalis for cleaning. Show students 3 examples of alkalis. Ask students the following questions: What do we use shampoo for? (wash our hair) What do we use body wash for? (wash our body) What do we use bleach for? (clean many things, give examples) Should we drink these alkalis? (no, alkalis can make you sick) Students can answer in English or Chinese. 	Chapter 3 PPT
Presentation	5 mins	<ol style="list-style-type: none"> Show students PPT slide# 4. Have students read "neutrals". Make sure students understand both the English and Chinese words. Have students read the sentence. Explain that if something is not acidic or alkaline it is neutral. Show students the example of a neutral. Ask students the following questions: What does mouthwash do? 	Chapter 3 PPT
Presentation	10 mins	<ol style="list-style-type: none"> Show students PPT slide# 5. Have students read the sentence. Look at the pictures and read the words. Make sure the students learn both the English and the Chinese 	Chapter 3 PPT

		<p>words.</p> <ol style="list-style-type: none"> 3. Explain how to make a solution to the students. <ol style="list-style-type: none"> a. Baking soda solution: add baking soda and water. b. Sugar solution: add sugar and water. 4. Explain that a solution is a combination of something with water i.e. saltwater solution. 5. Ask students the following question: Do we need to make a lemon juice solution to have make a liquid? (No, it is already a liquid) 6. Students can answer in English or Chinese. 7. Explain to students that we will be doing an experiment to find out which liquid is an acid, a neutral and an alkali. 	
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總結 Closure

Wrap-up	3 mins	If students have time, they can work on the word list on page 16.	Chapter 3 Workbook
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References:

1. Grade 3: Domain of Natural Science Book 1
2. PPT Dissolving: Acids, Neutrals and Alkalis
3. Domain of Natural Science Chinese Textbook and PPTs

教學活動設計：第二節課 (Lesson 2)

Lesson 2: Preparing for an Experiment 實驗準備

Objectives:

At the end of the lesson, the students will:

- Examine the materials and equipment needed to complete an experiment to identify acids, neutrals and alkalis.
- Understand that adding certain liquids to acids, neutrals and alkalis will make them change color.
- Identify the color family associated with acids and alkalis.

在課程結束時學生能夠：

- 檢查識別酸性物質、中性物質和鹼性物質實驗所需的材料和設備。
- 理解添加某些液體到酸性物質、中性物質和鹼性物質會使它們變色。
- 識別顯示酸性物質和鹼性物質相關的顏色。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can participate in group discussions and use their personal experience.

Students can listen to their classmates.

Students can predict what color a solution will change based on which pH indicator is used during the experiment.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音詞彙。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能運用個人經驗參與小組討論。

學生能夠傾聽同學的發言。

學生能夠根據實驗中使用的 pH 指示劑預測溶液會變成什麼顏色。

Teacher will mark Chapter 3 Dissolving: Acids, Neutrals and Alkalis page 23 "What Color Is It?"

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	2 mins	1. Review acids, neutrals and alkalis. 2. Remind students we will be doing an experiment. Tell students we will be learning how to do the experiment in today's lesson.	
主要內容 Core Part			
Presentation	10 mins	1. Show students PPT slide# 5. Review the 3 liquids and the meaning of "solution". Remind students that we want to find out which liquid is an acid, a neutral and an alkali.	Chapter 3 PPT

		<ol style="list-style-type: none"> 2. Show students PPT slide# 6. Have students read the title. Look at the pictures. Ask students the following question: Do you know what this is called? (pipettes, beaker, test tube) 3. Students can answer in English or Chinese. 4. Have students read "pipettes," "beaker" and "test tube." Make sure students learn both the English and Chinese words. 	
Presentation	15 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 7. Have students read the sentence. Explain to students that we will be using "purple cabbage juice" and "butterfly pea flower tea" to test our 3 liquids. Make sure students learn both the English and Chinese words. 2. Show students PPT slide# 8 and have students read the slide. Explain that we will be adding purple cabbage juice and butterfly pea flower tea to our three liquids. 3. Show students PPT slide# 9. Explain that when you test acids, the color of the liquid will be a part of the red family. It can be any shade of red, pink or even purple. 4. Explain that when you test neutrals, the color of the liquid will not change. 5. Explain that when you test alkalis, the color of the liquid will be part of the blue family, the green family, or a blue/green color. 6. Show students PPT slide# 7 again. Ask students the following questions: What color will the purple cabbage juice be when added to an acid / neutral / alkali? (purple or pink / no change / blue or green) 7. Ask students the following questions: What color will the butterfly pea flower tea be when added to an acid / neutral / alkali? (purple or pink / no change / blue or green) 	Chapter 3 PPT
Practice	10 mins	<ol style="list-style-type: none"> 1. Tell students to open their book to page 15 and look at "What Color Is 	Chapter 3 PPT and workbook

		It?" Student should color the rectangle next to "Acids" red and pink. Color the rectangle next to "Alkalis" blue and green. In the space next to "Neutrals" draw three X's.	
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總結 Closure

Wrap-up	3 mins	Check the answers on page 15. If students have time, they can work on the word list on pages 16.	Chapter 3 workbook
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References:

1. Grade 3: Domain of Natural Science Book 1
2. PPT Dissolving: Acids, Neutrals and Alkalis
3. Domain of Natural Science Chinese Textbook and PPTs

教學活動設計：第三節課 (Lesson 3)

Lesson 3: Purple Cabbage Juice and Butterfly Pea Flower Tea Experiment

紫高麗菜汁和蝶豆花茶實驗

Objectives:

At the end of the lesson, the students will:

- Take part in an experiment.
- Record the results of their experiment.
- Compare the results and draw a conclusion.

在課程結束時學生能夠：

- 參與實驗。
- 記錄實驗結果。
- 比較實驗結果並得出結論。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can participate in an experiment.

Students can demonstrate an understanding of the purpose of the experiment.

Students can draw conclusions based on observations.

Students can complete the self-assessment.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音詞彙。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠參與實驗。

學生能理解實驗的目的。

學生能夠根據觀察得出結論。

學生能夠完成自我評估。

Teacher will mark Chapter 3 Dissolving: Acids, Neutrals and Alkalis page 22-23 "Purple Cabbage Juice Test" and "Butterfly Pea Flower Tea Test."

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	<ol style="list-style-type: none"> 1. Review acid, neutral, and alkali. 2. Tell students we will be doing the experiment in this lesson. 3. Review the color families for acids, neutrals and alkalis. 4. Have most of the materials set up before the class if you need to save time. Tell students not to touch the materials. <p><i>Note: before the lesson, set up 6 test tubes or small containers, 2 lemon juice, 2 baking soda solution, 2 sugar solution.</i></p>	

		<p>Label the containers or put out the A4 sized mat with labels for each liquid. Put each liquid in the correct location.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;"> 蘇打汽水 1. baking soda solution </td> <td style="text-align: center;"> 檸檬汁 2. lemon juice </td> <td style="text-align: center;"> 糖水 3. sugar solution </td> </tr> <tr> <td style="text-align: center;"> 1. baking soda solution 蘇打汽水 </td> <td style="text-align: center;"> 2. lemon juice 檸檬汁 </td> <td style="text-align: center;"> 3. sugar solution 糖水 </td> </tr> </table> <p>Make sure to make the pH indicator liquids the day before at least, they need to be a strong liquid. Make sure each table has the liquids in the same location, and that it is in two sets, one for each pH indicator.</p>	蘇打汽水 1. baking soda solution	檸檬汁 2. lemon juice	糖水 3. sugar solution	1. baking soda solution 蘇打汽水	2. lemon juice 檸檬汁	3. sugar solution 糖水	
蘇打汽水 1. baking soda solution	檸檬汁 2. lemon juice	糖水 3. sugar solution							
1. baking soda solution 蘇打汽水	2. lemon juice 檸檬汁	3. sugar solution 糖水							

主要內容 Core Part

Presentation	10 mins	<ol style="list-style-type: none"> 1. Review what we will be doing in the experiment. (Adding indicators to different liquids to determine if it is an acid, neutral or an alkali.) 2. Tell students to open their book to page 14 and page 15. Have students look at "Acid, Neutral, or Alkali?" and review the equipment we will use. 3. Explain that we will test each liquid, observe what happens and then color the matching beaker in their book. <ol style="list-style-type: none"> a. "Purple Cabbage Juice Test" b. "Butterfly Pea Flower Tea Test" 	Chapter 3 workbook
Production	10 mins	<ol style="list-style-type: none"> 1. Give each group a box of colored pencils. Ask one student to get the purple cabbage juice and a pipette. 2. Show students PPT slide# 10. Have students read it. Explain that if we mix the liquids the experiment won't work properly. 3. Have students add the pH indicator to each liquid. 4. Ask students the following questions: Did the baking soda 	Chapter 3 PPT and workbook

		<p>solution/lemon juice/sugar solution change color? What color is it?</p> <ol style="list-style-type: none"> Students can answer in English and Chinese. Have students color the beakers on page 14, "Purple Cabbage Juice Test". Ask students to put a tick above the beaker if the color changed, and an X if it didn't change. Collect the purple cabbage juice and pipette. 	
Production	10 mins	<ol style="list-style-type: none"> Ask one student to get the butterfly pea flower tea and another pipette. Have students add the pH indicator to each liquid. Ask students the following questions: Did the baking soda solution/lemon juice/sugar solution change color? What color is it? Students can answer in English and Chinese. Have students color the beakers on page 15, "Butterfly Pea Flower Tea Test". Ask students to put a tick above the beaker if the color changed, and an X if it didn't change. Collect the butterfly pea flower tea and pipette. Tell students to open their book to page 14-15 and have them read the questions under the beakers and circle the correct answers. Have students read the question under the beakers and circle the correct answers. 	Chapter 3 Workbook
總結 Closure			
Wrap-up	5 mins	<p>Have students help clean up the experiment materials. Check the answers on page 14-15. If students have time, they can work on the word list on page 16. Have students complete their self-assessment on page 17-18.</p>	Chapter 3 Workbook
References: 1. Grade 3: Domain of Natural Science Book 1			

2. PPT Dissolving: Acids, Neutrals and Alkalis
3. Domain of Natural Science Chinese Textbook and PPTs

新北市龍埔國小雙語實驗課程教學活動設計
New Taipei City LongPu Elementary School CLIL Program

實施年級 (Grade Level): 3
 課程名稱 (Name of the Curriculum): Natural Science
 單元名稱 (Name of the Unit): Wind and Air: Wind Direction
 總節數 (Length of the Unit): 4 Weeks
 設計者 (Lesson Designer): Michelle Vatcher

本單元設計理念 (Unit Overview: Rationale and Philosophy)

General introduction of the unit (objective and rationale):

The “Wind Speed and Direction” unit is designed to allow students to observe and measure natural phenomena. Students will learn how to determine wind direction. They will use everyday objects to determine wind direction and then how to use a wind vane and compass to determine wind direction. In order to do this, they will learn about the ordinal and cardinal directions. Then they will learn how to use a compass to determine the direction of places and objects. Students will use the wind vane they have built to figure out wind direction. Students are encouraged to access previous knowledge and share it with their classmates.

“風速和風向”單元旨在讓學生觀察並測量自然現象。學生將學習如何判斷風向。他們將使用日常物品來判斷風向，然後學習如何使用風向標和指南針來確定風向。為了做到這一點，他們將學習關於八個方位的基本知識。同時將學習如何使用指南針來確定地點和物體的方向。學生將使用他們製作的風向標來測定風向。鼓勵學生運用先備知識並與同學分享。

Objectives of this unit/theme:

The objectives of this unit/theme are:

- Students will observe natural phenomena.
- Students will learn how to use different scientific equipment to measure natural phenomena.
- Students will be able to share their observations with others.
- Students will apply different methods to determine wind direction.

本單元/主題的目標是：

- 學生將能夠觀察自然現象。
- 學生將學習如何使用不同的科學設備來測量自然現象。
- 學生將能夠與他人分享觀察結果。
- 學生將應用不同的方法來判定風向。

本單元整體目標 (Learning Objectives for This Unit)

<p>學習重點 Essential Learning Focuses</p>	<p>學習表現 (Learning Performance):</p> <p>pa-II-1 Students can organize existing information or data by using simple classification, charting, etc. 能運用簡單分類、製作圖表等方法，整理已有的資訊或數據。</p> <p>pe-II-2 Students can correctly and safely operate items, devices, scientific equipment, and use chemicals suitable for their learning stage. And they can observe and record the</p>
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	<p>experimental process. 能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和紀錄。</p>
	<p>學習內容 (Learning Content): INc-II-1 Using tools or custom standards to measure and compare. 能以合理的參考標準或工具代替實際的數值，例如：測量磁力的強弱時，能以吸起迴紋針的數量作比較度量；測量風力大小時，能以風車轉動的快慢、旗子飄揚的高度訂定比較的標準。</p>

<u>內容 Content (New knowledge, skills and understanding)</u>	<u>預計進行的節數 Corresponding Lesson</u>
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<p>Students will:</p> <ul style="list-style-type: none"> • Be able to indicate left and right. • Use observations to determine which direction the wind is coming from. • Understand that "left" and "right" change depending on the observer's location. • Recognize that using the directions "left" and "right" are not an accurate way to indicate wind directions. • Learn the cardinal and ordinal directions. • Demonstrate how to use a compass to find direction. • Determine the direction of different objects. • Discuss how windsocks and wind vanes can help determine wind direction. • Understand how to make a wind vane. • Use their wind vane and a compass to determine wind direction. • Share observations. 	<p>Lesson 1 Lesson 1 Lesson 1 Lesson 1 Lesson 2 Lesson 2 & 3 Lesson 3 Lesson 3 Lesson 4 Lesson 4 Lesson 4</p>
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<u>認知 Cognition (High-order thinking skills, problem-solving, challenges and reflection)</u>
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<ul style="list-style-type: none"> • Students will be able to apply previous knowledge to answer questions and complete activities. • Students will make connections between how to measure wind direction and their observations of people and objects in relation to the wind. • Students will examine how wind blowing affects different objects. • Students will discover the function of a compass through hands on experience. • Students will demonstrate how to measure the wind with different scientific equipment. • Students will observe windsocks and then build their device to measure wind direction. • Students will test their wind vane and analyze its performance. 	
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<u>溝通 Communication (What and how)</u>
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<u>Language of Learning (Key vocabulary-content-obligatory)</u>

wind direction	north	electronics
left	east	wind vane
right	south	windsock

direction	west	opposite
flag	northeast	measure
kites	southeast	strength
clothes	southwest	stand up
compass	northwest	tools
cardinal directions	colored arrow	
ordinal directions	magnet	

Language for learning (Functional language e.g. language while learners participate in the lesson—thinking skills)

<p>Get in groups. Open your book to page ____. Write the number in the box. Write the letter in the box. Read with me. How do you say ____ in Chinese? Find the answers on page ____. Draw an arrow to show direction.</p>	<p>Put a check next to ____. Write the answer on the line. Write a letter next to each picture. Look at the PPT and look at your book. Read the instructions and draw a picture. Write the correct letter. Write each English word one time.</p>
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<p>How can you tell where the wind is coming from? Look at ____. Where is the wind coming from? The wind is coming from the ____. What do we use a ____ for? Which direction is it? Where does the arrow point? It points north. Where is the ____? It is _____.What do we use to measure wind direction?</p>	<p>We use a ____. Does the wind vane move in the wind? Does the wind vane stand up? Does the wind vane show direction? Does your wind vane show wind strength? What can we use to show the wind vane's direction? Which direction is the wind coming from? What do you need to make a wind vane? You need ____.</p>
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Language through learning (Language progression, practice and extension—emerging language)

- Be able to indicate direction using the correct words (right, left, cardinal directions, ordinal directions).
- Be able to ask questions about direction.
- Be able to make predictions based on observations.
- Be able to explain how they can build and use their wind vane.
 Be able to discuss what the windvane is doing with their classmates and explain what it means.

文化 Culture (Awareness of self and other, identity, citizenship, and multicultural understanding)

- Students will be able to recognize equipment used to measure wind direction in their community.
- Students will learn that wind direction is measured the same way around the world.
- Students will learn that cardinal and ordinal directions are used to indicate wind direction in their own community, just like it is used in communities around the world.

- Students will see that designs for wind vanes and windsocks can vary from culture to culture.

教學活動設計：第一節課 (Lesson 1)

Lesson 1: Wind Direction 風向

Objectives:

At the end of the lesson, the students will:

- Be able to indicate left and right.
- Use observations to determine which direction the wind is coming from.
- Understand that “left” and “right” change depending on the observer’s location.
- Recognize that using the directions “left” and “right” are not an accurate way to indicate wind directions.

在課程結束時學生能夠：

- 指示左右方向。
- 通過觀察來確定風的來向。
- 理解“左邊”和“右邊”會根據觀察者的位置而改變。
- 認識到使用“左”和“右”來指示風向並不準確。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can participate in group discussions and use their previous knowledge.

Students can listen to their classmates, ask questions, and share opinions.

Students can recognize where the wind is coming from by observing various objects.

Students can understand why wind direction changes depending on where you are when you use “left” and “right”.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音詞彙。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能運用先備知識參與小組討論。

學生能夠傾聽同學的發言、提問並分享意見。

學生能夠通過觀察各種物體來識別風的來向。

學生能夠理解使用“左”和“右”描述風向會根據所在位置的不同而改變。

Teacher will mark Chapter 2 Wind and Air: Wind Speed and Direction page 14 “Wind Direction.”

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	<ol style="list-style-type: none"> 1. Introduce the name of the chapter, “Wind and Air: Wind Speed and Direction.” 2. Review how you can see the wind, students learned this in Grade 2. Ask students the following questions: How we can see the wind? How can we tell which direction the wind is coming from? 	Chapter 2 PPT

主要內容 Core Part			
Presentation	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 2. Have the students read the question in both English and Chinese. Look at the pictures. Ask students the following questions: What is it? Can a ___ show wind direction? Students can answer in English or Chinese. 2. Make sure students learn both the English and Chinese word. 3. Show students PPT slide# 3 and read the question in both English and Chinese. Remind students of the meaning of "left" and "right". Make sure students learn both the English and Chinese words. 4. Have students look at each picture and either show or tell which direction the wind is coming from. 5. Teach students the sentence structure "I think the wind is coming from the ___?" 	Chapter 2 PPT
Practice	10 mins	<ol style="list-style-type: none"> 1. Tell students to open their books to page 20 and look at "Wind Direction". Have students read the question and then the name of each object. 2. Ask students to look at the picture of "Emma". Ask students the following question: Which direction is the wind coming from for Emma? 3. Have students read Emma's sentence and circle the correct answer. 4. Ask students to look at the picture again. Which direction is the wind coming from when they look at the grass? 5. Have students read the "Me" sentence and circle the correct answer. 6. Have students read the sentences at the bottom of the section. 	Chapter 2 workbook
Presentation	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 4. Have students read the sentence. 2. Have students look at the picture of Tom and Ray. Ask students the following questions: Which direction is the wind coming from 	Chapter 2 PPT

		<p>for Ray/Tom? Students can answer in English or Chinese.</p> <ol style="list-style-type: none"> 3. Have students read the answers on the slide. 4. Ask students the following question: Why is the wind direction different for each boy. Students can answer in English or Chinese. 5. Show students PPT slide# 5. Read the answer in both English and Chinese. 	
總結 Closure			
Wrap-up	5 mins	Check the answers on page 20. If students have time, they can work on the word list on pages 23-24.	Chapter 2 workbook
<p>References:</p> <ol style="list-style-type: none"> 1. Grade 3: Domain of Natural Science Book 1 2. PPT Wind and Air: Wind Speed and Direction 3. Domain of Natural Science Chinese Textbook and PPTs 			

教學活動設計：第二節課 (Lesson 2)

Lesson 2: Cardinal and Ordinal Directions 八個方位

Objectives:

At the end of the lesson, the students will:

- Learn the cardinal and ordinal directions.
- Demonstrate how to use a compass to find direction.

在課程結束時學生能夠：

- 學習判別八個方位。
- 示範如何使用指南針來找到方向。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can name 8 directions and show where they are on the compass.

Students can use a compass.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音詞彙。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠說出八個方向並在指南針上指出它們的位置。

學生能夠使用指南針。

Teacher will mark Chapter 2 Wind and Air: Wind Speed and Direction page 14-15 "Cardinal and Ordinal Directions."

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	3 mins	<ol style="list-style-type: none"> 1. Show students a compass and ask them the following question: What is this? Students can answer in English or Chinese. 2. Tell students to open their book to page 2 if they can't remember. 3. Ask students the following question: What do we use a compass for? 	Chapter 2 workbook
主要內容 Core Part			
Presentation	5 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 6 and have students look at the picture. Ask students the following question: What is it? (a compass) Students can answer in English or Chinese. 2. Have students read the first sentence. Ask the students what it means in Chinese. 3. Give each student a compass (if 	Chapter 2 PPT compass class set

		<p>there aren't enough, give 1 or 2 to each group).</p> <p>4. Have the students read the second sentence. Explain that there are 4 cardinal directions and 4 ordinal directions. Make sure students learn both the English and Chinese words and meanings.</p>	
Practice	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 7. Teach the cardinal directions in English and Chinese and show where they are on the compass. 2. Show students PPT slide# 8. Teach the ordinal directions in English and Chinese and show where they are on the compass. <i>NOTE: Explain to the students that in Chinese North and South are put 2nd, but in English, North and South are for ordinal directions.</i> 3. Tell students to open their book to page 20 and look at "Cardinal and Ordinal Directions". Have students read the directions. 4. Have students look at the compass on page 21 and read the instructions. Label the compass. Students can use the table on page 20 to help them. 	<p>Chapter 2 PPT and Workbook</p> <p>Compass Class Set</p>
Presentation and Practice	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 9-10 and have students read each slide. 2. Students need to follow the directions on the slides to learn how to use a compass to find directions. 3. Have students find north. 4. Show students PPT slide# 11 and have students watch the video to help them understand the instructions. 	<p>Chapter 2 PPT video</p>
Presentation	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 12 and ask students the following questions: What is inside a compass? Do you remember what we learned in grade 2? (a magnet). 2. Explain that the magnet makes the compass point north. 3. Show students the video and ask them why the compass is not working (because the magnet is 	<p>Chapter 2 PPT YouTube Video</p>

		<p>attracting the magnet in the compass). Students can answer in English or Chinese.</p> <p>4. Have students read the sentences. Ask students the following question: Why can't we use magnets near computers and speakers? (They have magnets inside) Students can answer in English or Chinese.</p>	
總結 Closure			
Wrap-up	2 mins	Check the answers on page 21. If students have time, they can work on the word list on pages 23-24	Chapter 2 workbook
<p>References:</p> <ol style="list-style-type: none"> 1. Grade 3: Domain of Natural Science Book 1 2. PPT Wind and Air: Wind Speed and Direction 3. Domain of Natural Science Chinese Textbook and PPTs 4. YouTube video https://youtu.be/NtUvV0xhmyc 			

教學活動設計：第三節課 (Lesson 3)

Lesson 3: Wind Vanes and Windsocks 風向標與風向袋

Objectives:

At the end of the lesson, the students will:

- Demonstrate how to use a compass to find direction.
- Determine the direction of different objects.
- Discuss how windsocks and wind vanes can help determine wind direction.

在課程結束時學生能夠：

- 示範如何使用指南針來找到方向。
- 確定不同物體的方向。
- 討論風向袋和風向標如何幫助確定風向。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can find the direction of different objects using a compass.

Students can recognize and name tools we can use to measure wind direction.

Students can determine the direction of the wind using their observations.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音詞彙。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠使用指南針來找到不同物體的方向。

學生能夠識別並說出用來測量風向的工具。

學生能夠根據觀察確定風的方向。

Teacher will mark Chapter 2 Wind and Air: Wind Speed and Direction page 15 and 16 "Using a Compass." And "Where does the Wind Come From?"

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	1. Show students PPT slide# 13 and have students look at the picture of the compass. Review the cardinal and ordinal directions in English and Chinese.	Chapter 2 PPT
主要內容 Core Part			
Production	15 mins	1. Give students a compass. 2. Show students PPT slide#13. Have students find north. Have students find the direction for different objects in the room (teacher's desk, blackboard, door). 3. Tell students to open their book to page 15 and look at "Using a	Chapter 2 PPT and workbook compass class set

		Compass." Have students read the instructions. Write the direction next to the correct location. Students can also use the letters or shortforms from the table on page 14.	
Presentation and Practice	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 14 and have students read. Ask students the following question: What tools do we use to measure wind direction? (windsock). Students can answer in English or Chinese. 2. Have students look at the pictures and ask them the following questions: What is it? (wind vane, windsock) Have students read the English and the Chinese. 3. Show students PPT slide# 15 and read it. Ask students the following questions: Which direction is the wind coming from in picture A/B/C? (west / east / north). Tell students to use the small compasses to help them. 4. Tell students to open their books to page 22 and look at "Where Does the Wind Come From?" Have students read the sentences. 5. Have students look at the pictures and write the wind direction. 	Chapter 2 PPT
總結 Closure			
Wrap-up	5 mins	Check the answers on page 21-22. If students have time, they can work on the word list on pages 23-24.	Chapter 2 Workbook
References: <ol style="list-style-type: none"> 1. Grade 3: Domain of Natural Science Book 1 2. PPT Wind and Air: Wind Speed and Direction 3. Domain of Natural Science Chinese Textbook and PPTs 			

教學活動設計：第四節課 (Lesson 4)

Lesson 4: Using a Wind Vane 如何使用風向標

Objectives:

At the end of the lesson, the students will:

- Understand how to make a wind vane.
- Use their wind vane and a compass to determine wind direction.
- Share observations.

在課程結束時學生能夠：

- 理解如何製作風向標。
- 使用他們的風向標和指南針來確定風向。
- 分享觀察結果。

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can listen to their classmates, ask questions, and share opinions.

Students can recognize the materials needed to create a wind vane.

Students can record their observations in their book.

Students can complete the self-assessment.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音詞彙。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠傾聽同學的發言、提問並分享意見。

學生能夠瞭解製作風向標所需的材料。

學生能夠記錄他們的觀察結果。

學生能夠完成自我評估。

Teacher will mark Chapter 2 Wind and Air: Wind Speed and Direction page 16 and 17 "Making a Wind Vane."

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	<ol style="list-style-type: none"> 1. Review the cardinal and ordinal directions. 2. Ask students the following questions: What tools we can use to measure wind direction? Which tool did you make in your science class? (a windvane) 3. Hand out the wind vanes for each group. 	Students' wind vanes
主要內容 Core Part			
Presentation and Practice	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 16. Have students look at the picture or have them look at their wind vane. Ask 	Chapter 2 PPT and workbook

		<p>them the following question: What did you need to make your wind vane? Students can answer in English and Chinese.</p> <ol style="list-style-type: none"> Show students the name of each object they used to make their wind vane and read them in English and Chinese. Tell students to open their book to page 22 and look at "Making a Wind Vane". Have students read the instructions and draw a picture of the wind vane. 	
Production	20 mins	<ol style="list-style-type: none"> Have students take their wind vanes outside. Students need to bring their books and pencils with them. Have students observe their wind vanes and answer the questions in their book. Tell students to open their book to page 23 and have students look at the table. Have students read the instructions. Have students read the questions. For questions 1-4, students put a tick next to the question if their answer is "yes". Students need to write their answers for questions A and B. 	<p>Chapter 2 workbook</p> <p>Pencils</p> <p>wind vanes</p>
總結 Closure			
Wrap-up	5 mins	<p>Check the answers on page 22-23. If students have time, they can work on the word list on pages 23-24. Have students complete their self-assessment on pages 25-26.</p>	Chapter 2 Workbook
<p>References:</p> <ol style="list-style-type: none"> Grade 3: Domain OF Natural Science Book 1 PPT Wind and Air: Wind Speed and Direction Domain of Natural Science Chinese Textbook and PPTs 			

新北市龍埔國小雙語實驗課程教學活動設計
New Taipei City LongPu Elementary School CLIL Program

實施年級 (Grade Level): 3
 課程名稱 (Name of the Curriculum): Natural Science
 單元名稱 (Name of the Unit): Magnets: What do Magnets Attract?
 總節數 (Length of the Unit): 3 Weeks
 設計者 (Lesson Designer): Michelle Vatcher

本單元設計理念 (Unit Overview: Rationale and Philosophy)

General introduction of the unit (objective and rationale):

The “What do Magnets Attract?” unit is designed to allow students to make observations about natural phenomena and learn to describe them. Students will learn that magnets attract iron. Students will be able to test and sort objects using a magnet. Students will recognize materials that magnets attract, and materials that magnets do not attract. Students will use both group activities and individual tasks to fully immerse themselves in the materials and create a deeper understanding. Students are encouraged to access previous knowledge and share it with their classmates.

“磁鐵吸引什麼？”單元旨在讓學生觀察自然現象並學會描述它們。學生將學習磁鐵會吸引鐵製品。學生能夠利用磁鐵測試並分類物體。學生將識別磁鐵會吸引的材料和磁鐵不吸引的材料。學生將通過小組活動和個人任務充分學習到學習內容，並能有更深刻的理解。鼓勵學生運用先備知識並與同學分享。

Objectives of this unit/theme:

The objectives of this unit/theme are:

- Students will test objects using magnets.
- Students will be able to sort objects based on the materials they are made of. (magnetic / not magnetic, iron / not iron)
- Students will be able to share their observations in multiple ways. (writing, drawing, speaking)

本單元/主題的目標是：

- 學生將使用磁鐵測試物體。
- 學生將能夠根據物體的材質進行分類。(磁性/非磁性，鐵/非鐵)
- 學生將能夠以多種方式分享他們的觀察結果。(寫作、繪畫、口述)

本單元整體目標 (Learning Objectives for This Unit)

學習重點
Essential
Learning Focuses

學習表現 (Learning Performance):

pe-II-1

Students can understand the possible effects of a change in one factor and predict the approximate outcome of the activity.

能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和記錄。

an-II-1

Students can experience that all science inquiry begins with questions.

體會科學的探索都是由問題開始。

	學習內容 (Learning Content): INa-II-3 Matter has characteristics, and it can be classified by its characteristics and applications. 物質各有其特性，並可以依其特性及用途進行分類。	
內容 Content (New knowledge, skills and understanding)		預計進行的節數 Corresponding Lesson
Students will: <ul style="list-style-type: none"> Review what they learned about magnets in Grade 2. Discuss a magnets ability to attract and repel some objects and other magnets. Recognize which materials are "magnet friends" and which are not. Understand that iron is a kind of metal that magnets attract. Predict which objects a magnet can attract and test that prediction. Explain and describe what they learned in the previous lesson. Sort iron and non-iron objects. Choose two objects and test if they are iron or not iron. Share the results with the class/teacher. 	Lesson 1 Lesson 1 & 2 Lesson 1 Lesson 1 & 2 Lesson 1 Lesson 2 Lesson 2 Lesson 3	
認知 Cognition (High-order thinking skills, problem-solving, challenges and reflection)		
<ul style="list-style-type: none"> Students will be able to apply previous knowledge to answer questions and complete activities. Students will be able to discuss what objects are made of and recognize different materials. Students will be able to make a connection between the material an object is made of and how a magnet reacts to the object. Students will be able to compare different objects. Students will be able to predict the results of a test based on previous knowledge. Students will be able to categorize objects based on the material they are made of. Students will be able to share their observations through writing, drawing and speaking. 		
溝通 Communication (What and how)		
Language of Learning (Key vocabulary-content-obligatory)		
magnets attract repel push pull materials metal plastic glass paper	iron prediction stapler battery tissue staples spatula clip dice paperclip	whisk metal spoon pencil plastic ruler eraser metal ruler plastic spoon metal box string tape

wood

coins

Language for learning (Functional language e.g. language while learners participate in the lesson—thinking skills)

Get in groups.
Turn on your iPad.
Scan the QR code.
Type in your team's name.
Choose the correct answer and touch the button.
Open your book to page ____.
Complete the sentence.

Draw and label each object.
Write the correct words in the T-Chart.
Read with me.
How do you say ____ in Chinese?
Draw a picture.
Circle the correct word.
Write each English word one time.
Read the sentence for me.

Which word means "pull"?
Which word means "push"?
Why are some objects magnet friends?
Why do magnets attract some objects?
Can you guess which material is a magnet friend?
Magnets do not attract all metal.
Look at the objects. You will predict if they are iron or not iron.
Is it iron?

Test the object with the magnet.
Is a/an ____ iron?
The ____ is iron / not iron.
____ / ____ attract. ____ / ____ repel.
Circle the objects made of iron.
Sort the objects into "iron" and "not iron".
Choose 2 objects, 1 object you think is made of iron and 1 object you think is not iron.

Language through learning (Language progression, practice and extension—emerging language)

- Be able to describe the function of a magnet.
- Be able to list different materials.
- Be able to recognize materials that are magnetic and materials that are not magnetic.
- Be able to make predictions about what objects will be magnetic.
- Be able to categorize objects that are iron and not iron.
- Be able to share their observations about objects.

文化 Culture (Awareness of self and other, identity, citizenship, and multicultural understanding)

- Students will be able to share the types of materials they see in their daily life and realize that people around the world can have the same experience.
- Students can share their experiences using magnets with the teacher and vice versa.
- Students will experience the importance of teamwork and working together to achieve a goal while completing a task.
- Students can use their life experiences to make predictions and answer questions about magnets and magnetic objects.
- Students will see how magnets and magnetic materials are used in their daily life.

教學活動設計：第一節課 (Lesson 1)

Lesson 1: Kahoot Magnet Activity 以 Kahoot 進行磁性的預測活動

Objectives:

At the end of the lesson, the students will:

- Review what they learned about magnets in Grade 2.
- Discuss a magnets ability to attract and repel some objects and other magnets.
- Recognize which materials are "magnet friends" and which are not.
- Understand that iron is a kind of metal that magnets attract.
- Predict which objects a magnet can attract and test that prediction.

在課程結束時學生能夠：

- 複習二年級學到的關於磁鐵的知識。
- 討論磁鐵能夠吸引和排斥某些物體和其他磁鐵。
- 識別哪些材料是“磁鐵的朋友”，哪些不是。
- 理解鐵是一種磁鐵會吸引的金屬。
- 預測磁鐵能吸引哪些物體並進行測試驗證。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can participate in group discussions and use their previous knowledge.

Students can listen to their classmates, ask questions, and share opinions.

Students can make predictions.

Students can test their predictions.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音詞彙。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能運用其先備知識參與小組討論。

學生能夠傾聽同學的發言、提問並分享意見。

學生能夠進行預測。

學生能夠測試他們的預測是否正確。

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	<ol style="list-style-type: none"> 1. Introduce the name of the chapter. Ask students the following questions: What are magnets? What do magnets do? 2. Explain to students we will be doing a Kahoot activity. Divide the students into groups. Give each group an iPad, a couple of magnets and a bag of objects to test. 3. If there aren't enough objects, 2 groups can share 1 bag at a single table. 	Kahoot: Magnets (see attachment below) iPads magnetic object bags magnets

		<p><i>NOTE: find the following objects for the object bag – stapler, batteries, tissue, box of staples, paper, spatula, clip, dice, paperclip, coins, metal spoon, pencil, plastic ruler, erasers, metal ruler, plastic spoons, metal, box, string, tape, whisk</i></p>	
主要內容 Core Part			
Presentation	15 mins	<ol style="list-style-type: none"> Put the Kahoot QR code up on the board. Have students sign in to the activity. Have students put in a team name based on the group they are in. For example: table 1 group A is 1A, and group B is 1B etc. Show students Kahoot slide# 1, have students read the sentences. Show students Kahoot slide# 2-3, QUIZ. Have students answer the 2 questions. (Which word means pull/push? Attract/repel). Make sure students learn both the English and Chinese. Show students Kahoot slide# 4, have them read the sentences. Make sure students understand “attract” and “repel”. Review the materials students learned in grade 2 (plastic, glass, metal, paper) Also teach students “wood” if they didn’t learn it in grade 2. Students can answer in English or Chinese. Show students Kahoot slide# 5, QUIZ. Have students answer the question. (Can you guess which material is a magnet friend?). Students won’t know the word “iron”, they need to be able to guess based on previous knowledge. Show students Kahoot slide# 6, have them read the sentences. Make sure students learn “iron” in both English and Chinese. 	<p>Kahoot: Magnets</p> <p>iPads</p> <p>magnetic object bags</p> <p>magnets</p>
Practice	15 mins	<ol style="list-style-type: none"> Show students Kahoot slide# 7 and explain the activity. Students will look at pictures and predict if they are iron or not iron. Students will find 	<p>Kahoot: Magnets</p> <p>iPads</p> <p>magnetic object</p>

		<p>the object from their magnetic object bag and test it.</p> <p>2. Show students Kahoot slides# 8-27. For each picture, students need to choose “true” (blue) for iron and “false” (red) for not iron. They will then find the actual object from their object bag and test it with a magnet. Repeat for each object.</p>	<p>bags</p> <p>magnets</p>
總結 Closure			
Wrap-up	5 mins	Ask students to put all the objects back in their bags. Collect the bags, magnets and iPads.	
<p>References:</p> <ol style="list-style-type: none"> 1. Chapter 4, Magnets: What do Magnets Attract? 2. Kahoot: Magnets 3. Domain of Natural Science Chinese Textbook and PPTs 			

教學活動設計：第二節課 (Lesson 2)

Lesson 2: Iron or Not Iron? 含鐵物質或非含鐵物質?

Objectives:

At the end of the lesson, the students will:

- Discuss a magnets ability to attract and repel some objects and other magnets.
- Understand that iron is a kind of metal that magnets attract.
- Explain and describe what they learned in the previous lesson.
- Sort iron and non-iron objects.

在課程結束時學生能夠：

- 討論磁鐵會吸引和排斥某些物體和其他磁鐵。
- 理解鐵是一種磁鐵會吸引的金屬。
- 解釋並描述他們在先前學到的知識。
- 將鐵製物體和非鐵製物體分類。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can participate in group discussions and use their personal experience.

Students can sort "iron" and "not iron" objects.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音詞彙。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能運用個人經驗參與小組討論。

學生能夠將“鐵製物體”和“非鐵製物體”分類。

Teacher will mark Chapter 4 Magnets: What do Magnets Attract? page 28 "Iron or Not Iron?" and page 29 "Sorting Objects: Iron or Not Iron"

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	1. Review the meaning of "repel" and "attract". 2. Review "iron" and "not iron." 3. Show students a selection of objects from the object bag. Ask students the following questions: Is it iron? What material is it?	magnetic object bag
主要內容 Core Part			
Presentation	10 mins	1. Tell students to open their book to page 28 and look at "Iron or Not Iron?" Have students read the first sentence. 2. Ask students the following questions: Which parts of the	Chapter 4 workbook

		<p>magnet attract each other? (north/south) Which parts of the magnet repel each other? (north/north, south/south)</p> <ol style="list-style-type: none"> Students can answer in English or Chinese. Have students read about north and south. Ask students the following questions: Which material do magnets attract? (iron/metal) Do magnets attract all metal? (no) Students can answer in English or Chinese. Have students read the rest of the sentences. 	
Practice	15 mins	<ol style="list-style-type: none"> Tell students to open their book to page 28 and look at "Time to Explore." Have students name each object. Have students read the instructions. Ask students to circle the objects that are made of iron. Have students open their book to page 29 and look at "Sorting Objects: Iron or Not Iron". Have students sort the objects from page 28 and write them on the correct side of the T-chart. Have students choose 1 or 2 other objects for each category and write them on the board. Students can answer in English or Chinese. 	Chapter 4 workbook
Production	5 mins	<ol style="list-style-type: none"> Tell students they need to bring two objects for the next lesson. Students need to choose an object that is iron, and an object that is not iron. 	
總結 Closure			
Wrap-up	5 mins	Check the answers on page 28 and 29. If students have time, they can work on the word list on pages 30-31.	Chapter 4 workbook
<p>References:</p> <ol style="list-style-type: none"> Chapter 4, Magnets: What do Magnets Attract? Domain of Natural Science Chinese Textbook and PPTs 			

教學活動設計：第三節課 (Lesson 3)

Lesson 3: My Objects: Iron or Not Iron? 含鐵製品還是非鐵製品呢?

Objectives:

At the end of the lesson, the students will:

- Choose two objects and test if they are iron or not.
- Share the results with the class/teacher.

在課程結束時學生能夠：

- 選擇兩個物體並測試它們是否是鐵製的。
- 與全班/老師分享測試結果。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can choose 2 objects and determine if they are iron or not iron.

Students can draw and label objects.

Students can share their results with the teacher.

Students can complete the self-assessment.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

學生能夠在老師的協助下識讀相關英語和中文。

學生能夠並判斷兩個物體是否是鐵製的。

學生能夠畫出並標記物體。

學生能夠與老師分享他們的結果。

學生能夠完成自我評估。

Teacher will mark Chapter 4 Magnets: What do Magnets Attract? page 29-30 "My Objects"

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	<ol style="list-style-type: none"> 1. Review the vocabulary (attract, repel, iron, not iron) 2. Ask students if they remembered to bring their two objects for class. If students didn't remember to bring anything, they can use things from their pencil case. Have 1 or 2 magnetic object bags and students can borrow some objects. 	magnetic object bag
主要內容 Core Part			
Practice	10 mins	<ol style="list-style-type: none"> 1. Have students open their books to page 29 and have them look at "My Objects" Have students read the instructions. 2. Have students write the name of 	Chapter 4 PPT

		<p>their 2 objects on the lines.</p> <p>3. If students don't know the English word, remind them to ask the teacher for help. The teacher can write the words on the board.</p>	
Production	10 mins	<ol style="list-style-type: none"> 1. Give each group a few magnets. Have students test each of their objects to see if they are iron or not iron. 2. Have students open their book to page 30 and have them look at "My Objects". Have students read the instructions. 3. Have students draw and write the name of their iron object in the first box. Have students draw and write the name of their "not iron" object in the second box. 4. Advise students they need to circle "is" for singular words and "are" for plural words, i.e. scissors should use "are". 	Chapter 4 PPT
Production	10 mins	<ol style="list-style-type: none"> 1. Have students raise their hands as they finish page 30 "My Objects". Students will read each sentence to the teacher. The teacher will put a tick in the box when students have correctly read the sentence. Have students correct any mistakes in their book. 2. If there is time, students could read their sentences in front of the whole class instead of just for the teacher. 	Chapter 4 workbook
總結 Closure			
Wrap-up	5 mins	<p>Check the answers on page 30. If students have time, they can work on the word list on pages 30-31</p> <p>Have students complete their self-assessment on pages 32-33</p>	Chapter 4 workbook
<p>References:</p> <ol style="list-style-type: none"> 1. Chapter 4, Magnets: What do Magnets Attract? 2. Domain of Natural Science Chinese Textbook and PPTs 			

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Magnets - Details - Kahoot!

Magnets

Let this kahoot template inspire your own quiz with slides!

22 plays - 187 players

A public kahoot



Questions (27)

1 - Slide

Magnets can push and pull.

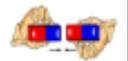
Magnets can attract 吸引 (pull) some objects. Magnets can attract 吸引(pull) and repel 相斥 (push) other magnets.



2 - Quiz

Which word means "pull"?

- repel
- object
- magnet
- attract

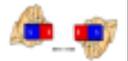


- ✗
- ✗
- ✗
- ✓

3 - Quiz

Which word means "push"?

- repel
- object
- magnet
- attract



- ✓
- ✗
- ✗
- ✗

4 - Slide

Why are some objects magnet friends? Why do magnets attract (吸引) some objects?

Objects are made of different materials (材料). Some materials (材料) are magnet friends and some are not magnet friends.



5 - Quiz

Can you guess which material (材料) is a magnet friend?

- metal
- plastic
- iron
- glass



- ✗
- ✗
- ✓
- ✗

6 - Slide

Magnets do not attract all metals (金屬).

Iron (鐵) is a metal (金屬). Magnets attract objects made of iron (鐵).



7 - Slide

We are going to look at some objects. You will predict 預測(guess) if they are iron (鐵) or not iron.

The magnet will attract the objects made of iron. We will test the objects after you make your prediction (預測). Choose "true" for iron (鐵) and "false" for not iron.



8 - True or false

stapler

- True
- False



- ✓
- ✗

9 - True or false
batteries

- True
- False



✓
✗

10 - True or false
tissue

- True
- False



✗
✓

11 - True or false
box of staples

- True
- False



✓
✗

12 - True or false
paper

- True
- False



✗
✓

13 - True or false
spatulas

- True
- False



✗
✓

14 - True or false
clip

- True
- False



✓
✗

15 - True or false
dice

- True
- False



✗
✓

16 - True or false
paper clip

- True
- False



✓
✗

17 - True or false
coins

- True
- False



✗
✓

18 - True or false
metal spoon

- True
- False



✓
✗

19 - True or false pencil	
<input checked="" type="checkbox"/> True	✗
<input type="checkbox"/> False	✓
20 - True or false plastic rulers	
<input checked="" type="checkbox"/> True	✗
<input type="checkbox"/> False	✓
21 - True or false erasers	
<input checked="" type="checkbox"/> True	✗
<input type="checkbox"/> False	✓
22 - True or false metal ruler	
<input checked="" type="checkbox"/> True	✓
<input type="checkbox"/> False	✗
23 - True or false plastic spoons	
<input checked="" type="checkbox"/> True	✗
<input type="checkbox"/> False	✓
24 - True or false metal box	
<input checked="" type="checkbox"/> True	✓
<input type="checkbox"/> False	✗
25 - True or false string	
<input checked="" type="checkbox"/> True	✗
<input type="checkbox"/> False	✓
26 - True or false tape	
<input checked="" type="checkbox"/> True	✗
<input type="checkbox"/> False	✓
27 - True or false whisk	
<input checked="" type="checkbox"/> True	✓
<input type="checkbox"/> False	✗

Resource credits ^

新北市龍埔國小雙語實驗課程教學活動設計
New Taipei City LongPu Elementary School CLIL Program

實施年級 (Grade Level): 3 Semester 2
 課程名稱 (Name of the Curriculum): Natural Science
 單元名稱 (Name of the Unit): Farming: Planting Seeds
 總節數 (Length of the Unit): 4 Weeks
 設計者 (Lesson Designer): Michelle Vatcher

本單元設計理念 (Unit Overview: Rationale and Philosophy)

General introduction of the unit (objective and rationale):

The "Planting Seeds" unit is designed to allow students to identify different planting methods and understand why we use one method over another. Students will learn which tools and materials are needed to plant seeds and each of their functions. Students will list the steps for different planting methods and compare them. Students will explore a virtual environment to find the information they need to complete a task. Students are encouraged to access previous knowledge and share it with their classmates.

「播種」單元旨在讓學生識別不同的播種方法，並理解為什麼我們會選擇某一種方法。學生將學習到播種所需的工具和材料以及它們的功能。學生會列出不同播種方法的步驟並進行比較。學生將透過虛擬實境的課程設計尋找完成任務時所需的信息。鼓勵學生利用先備知識並與同學分享。

Objectives of this unit/theme:

The objectives of this unit/theme are:

- Students will recognize the tools and materials needed to plant seeds.
- Students will connect the tools and materials with their functions.
- Students will be able to list and understand the steps for planting seeds.
- Students will be able to explain 2 different methods for planting seeds and identify why we use each method.
- Students will be able to explore a virtual environment and find the information needed to complete a task.

本單元/主題的目標是：

- 學生能識別播種所需的工具和材料。
- 學生能將工具和材料與其功能聯結起來。
- 學生能列出並理解播種的步驟。
- 學生能解釋兩種不同的播種方法並瞭解使用不同方法的原因。
- 學生能探索虛擬實境找到完成任務所需的信息。

本單元整體目標 (Learning Objectives for This Unit)

學習重點
Essential
Learning Focuses

學習表現 (Learning Performance):

pe-II-2

Students can correctly and safely operate items, devices, scientific equipment, and use chemicals suitable for their learning stage. And they can observe and record the experimental process.

能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和紀錄。

	<p>ai-II-3 Students can enjoy the pleasure of pursuing their own ideas via hands-on practices. 透過動手實作，享受以成品來表現自己構想的樂趣。</p> <p>an-II-1 Students can experience that all science inquiry begins with questions. 體會科學的探索都是由問題開始。</p>
	<p>學習內容 (Learning Content): INa-II-7 Organisms need energy (nutrients), sunlight, air, water, and soil to sustain life, growth, and activities. 生物需要能量子力(養分)、陽光、空氣、水和土壤，維持生命、生長和活動。</p>

<u>內容 Content (New knowledge, skills and understanding)</u>	<u>預計進行的節數 Corresponding Lesson</u>
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<p>Students will:</p> <ul style="list-style-type: none"> • Review what plants need to grow. • Identify the tools and materials needed to plant seeds. • Connect the tools and materials with their functions. • Explain the methods for planting seeds. • Recognize that different types of seeds need different planting methods. • Examine the special tools that can be used for the dibbling method. • Understand why using the correct planting method is important. • Identify characteristics of seeds (size) to determine which planting method is used. • Inspect and measure seeds to determine the planting method that should be used. • Organize information about the 2 planting methods using diagrams. • Explore a virtual environment and find the information needed to complete a task. 	<p>Lesson 1</p> <p>Lesson 1</p> <p>Lesson 1</p> <p>Lesson 2</p> <p>Lesson 2</p> <p>Lesson 2</p> <p>Lesson 2 & 3</p> <p>Lesson 2 & 3</p> <p>Lesson 3</p> <p>Lesson 3</p> <p>Lesson 4</p>
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<u>認知 Cognition (High-order thinking skills, problem-solving, challenges and reflection)</u>
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<ul style="list-style-type: none"> • Students will be able to apply previous knowledge to answer questions. • Students will be able to connect the tools and materials and their functions. • Students will be able to explain why we need to use each planting method. • Students will be able to categorize seeds based on their physical characteristics in order to choose the correct planting method. • Students will be able to organize information using diagrams. • Students will be able to explore a virtual environment and find the information needed to complete a task.
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溝通 Communication (What and how)

Language of Learning (Key vocabulary-content-obligatory)

grow	soil	larger
planting	watering can	smaller
vegetables	function	evenly spaced
equipment	drain	layer
tools	move	dibbler
materials	container	scattered
seeds	method	cover
pots	bottom	add
screening	dibbling	lightly
stones	broadcasting	iPad
trowel		

Language for learning (Functional language e.g. language while learners participate in the lesson—thinking skills)

Get in groups. Open your book to page ____. Look at the PPT and find the answer in your book. Write the number in the box. Find the important / key / special words. Draw ____. What do you see in the picture? What do we do 1 st / 2 nd / 3 rd etc.?	Put the steps in order. Read with me. How do you say ____ in Chinese? Write the correct number. Write each English word one time. Open the iPad. Open the APP. Explore the virtual environment.
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What do plants need to grow? Look at the tools and materials. Match the picture to the function. What tools / materials / equipment do we need to plant our vegetables? Why do we need ____? What do we use ____ for? How do we plant seeds? Is this evenly spaced? Why do we use the dibbling / broadcasting method? Why should we spread the seeds evenly? Why should we only put 2 or 3 seeds in each hole?	Measure the seeds. If the seed is ____ mm or larger/smaller, use the ____ method. Which seeds need the dibbling / broadcasting method? What can you do if you don't have a pot to plant seeds? Which method uses the most seeds? Which steps are the same and which steps are different for each method? What are the steps for the dibbling / broadcasting method?
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Language through learning (Language progression, practice and extension—emerging language)

- Be able to name different tools, materials and equipment needed to plant seeds.
- Be able to describe the functions of different equipment.
- Be able to explain the steps for different planting methods.
- Be able to discuss why each step is important.
- Be able to explain why we should use each planting method.
- Be able to discuss how to use an APP and explain what they have learned.

文化 Culture (Awareness of self and other, identity, citizenship, and multicultural understanding)

- Students will be able to understand that some experiences and processes are the same no matter where you are in the world.
- Students can use their life experiences to make predictions and answer questions about planting seeds.
- Students will see how different planting methods are done in different places.

教學活動設計：第一節課 (Lesson 1)

Lesson 1: Tools and Materials for Planting 種植需要的工具和材料

Objectives:

At the end of the lesson, the students will:

- Review what plants need to grow.
- Identify the tools and materials needed to plant seeds.
- Connect the tools and materials with their functions.

在課程結束時學生將能夠：

- 複習植物生長所需的條件。
- 識別播種所需的工具和材料。
- 將工具和材料與其功能聯結起來。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with the assistance from the teacher.

Students can participate in group discussions and use their previous knowledge.

Students can name the tools, materials and equipment needed to plant seeds.

Students can connect the tools and materials to their functions.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能運用他們的先備知識參加小組討論。

學生能夠說出播種所需的工具、材料和設備。

學生能夠將工具和材料與其功能聯結起來。

Teacher will mark Chapter 1 Farming: Planting Seeds page 4 "Tools and Materials for Planting"

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	1. Introduce the name of the chapter, "Farming: Planting Seeds" 2. Show students PPT slide# 2 and have students read the sentence and questions. 3. Review the 4 things that plants need to grow. (air, water, soil, sun)	Chapter 1 PPT
主要內容 Core Part			
Presentation	15 mins	1. Show students PPT slide# 3-8. Have students look at the pictures. Ask students the following questions: What is it? (seeds, soil, watering can, trowel, screening and stones, pots) How do you say ___ in Chinese?	Chapter 1 PPT

		<ol style="list-style-type: none"> 2. Make sure students learn both the English and the Chinese. 3. If possible, have real examples of the tools and materials. 4. Ask students the following question: What do we use a ____ for? What do we do with ____? Students can answer in English or Chinese. 5. Show students the answers. Have students read the function on each slide. 	
Presentation	5 mins	<ol style="list-style-type: none"> 1. Tell students to open their book to page 4 and look at “Tools and Materials for Planting”. 2. Have students read the instructions. 3. Have students look at the pictures and read the name of each tool/material. 4. Have students look at the 6 sentences. Tell students these are the functions of each tool. Explain the meaning of “function”. Make sure students learn both the English and Chinese words. 5. Have students read each function and highlight or underline the special words in bold. 6. Tell students they will write the function number in the box next to the picture. 	Chapter 1 workbook
Practice	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide#3-8 and have them look at the functions again. Explain that the blue words are the same words they highlighted in their book. 2. Have students look at each slide and ask them to find the matching picture, write the letter on the board. 3. Have students look at the sentence and find the special words in their book. Write the number next to the letter on the board. 4. Do this for every tool/material. 	Chapter 1 PPT and workbook
總結 Closure			
Wrap-up	5 mins	Check the answers on page 43. If students have time, they can work on the word list on pages 9-10	Chapter 1 workbook

References:

1. Grade 3: Domain of Natural Science Book 2
2. PPT Farming: Planting Seeds
3. Domain of Natural Science Chinese Textbook and PPTs

教學活動設計：第二節課 (Lesson 2)

Lesson 2: Planting Seeds 動手種種看

Objectives:

At the end of the lesson, the students will:

- Explain the methods for planting seeds.
- Recognize that different types of seeds need different planting methods.
- Examine the special tools that can be used for the dibbling method.
- Understand why using the correct method is important.

在課程結束時學生能夠：

- 理解播種的方法。
- 體會不同種類的種子需要不同的播種方法。
- 檢視可用於點播法的特殊工具。
- 理解使用正確的方法很重要。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with the assistance from the teacher.

Students can participate in group discussions and use their personal experience.

Students can explain why we need to use each planting method.

Students can list the steps for planting in the correct method.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠參加小組討論並分享他們的個人經驗。

學生能夠解釋為什麼我們需要使用不同的播種方法。

學生能夠列出正確的播種步驟。

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	1. Show students PPT slide# 3-8 and review the tools and materials needed for planting seeds. 2. Review the function of each tool/material.	Chapter 1 PPT
主要內容 Core Part			
Presentation	5 mins	1. Show students PPT slide# 9 and ask students the following questions: Did you plant seeds with Teacher ____ (local Subject Teacher)? Do you remember what you had to do? What did you do first? Students can answer in English or Chinese. 2. Show students PPT slide# 10 and have students read the English and	Chapter 1 PPT

		<p>Chinese. Explain why it is important to put screening and stones in the bottom of the pot (so water can drain).</p> <p>3. Show students PPT slide# 11-12 and have students read the English and Chinese.</p>	
Presentation	15 mins	<ol style="list-style-type: none"> 1. Show students PPT slides#13-14 and have them read the English and Chinese. Explain to students why we only put 2-3 seeds in each hole for the dibbling method (too many seeds will crowd each other, if there is only one seed, it might not grow) 2. Show students the 2 videos about dibblers. 3. Show students PPT slide#15-16 and have them read the English and Chinese. Explain to students why we need to spread the seeds evenly for the broadcasting method (if they are too close together, they won't grow properly) 4. Show students the 2 videos about broadcasting. 	<p>Chapter 1 PPT</p> <p>YouTube videos for dibbling and broadcasting</p>
Presentation	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 11-12 and have students read the English and Chinese. Make sure students understand why we need a thin layer of soil over the seeds, and why we should only water them lightly. 2. Show students PPT slide#19 and ask them the following questions: How many steps are there when we plant seeds? What is step (1-5)? 	Chapter 1 PPT

總結 Closure

Wrap-up	5 mins	If students have time, they can work on the word list on pages 9-10.	Chapter 1 workbook
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References:

1. Grade 3: Domain of Natural Science Book 2
2. PPT Farming: Planting Seeds
3. YouTube videos (dibblers): <https://youtu.be/XD1VIOLxj1g?si=Km884Nqj2L2zDfEu>
<https://youtu.be/lyzpd3ydi1g?si=3kpAJ61O3rShAwYe>
4. YouTube videos (broadcasting): <https://youtube.com/shorts/FLlLgGt2jo?si=IneX4Of-KXaXbKL9> <https://youtube.com/shorts/onl4yKTOiCk?si=tosXLHdL2TUjCf5y>
3. Domain of Natural Science Chinese Textbook and PPTs

教學活動設計：第三節課 (Lesson 3)

Lesson 3: Planting Methods: Dibbling and Broadcasting 種植的方法: 點播及撒播

Objectives:

At the end of the lesson, the students will:

- Understand why using the correct planting method is important.
- Identify characteristics of seeds (size) to determine which planting method is used.
- Inspect and measure seeds to determine the planting method that should be used.
- Organize information about the 2 planting methods using diagrams.

在課程結束時學生能夠：

- 理解為什麼使用正確的播種方法很重要。
- 識別種子的特徵（如大小），以確定使用哪種播種方法。
- 檢查並測量種子大小以確定應使用的播種方法。
- 使用圖表整理有關二種播種方法的資訊。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with the assistance from the teacher.

Students can examine the size of their seeds to determine the correct planting method to use.

Students can create a diagram to illustrate each planting method.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠測量種子的大小以確定適合的播種方法。

學生能夠製作圖表來說明每種播種方法。

Teacher will mark Chapter 1 Farming: Planting Seeds page 5-6 "Two Methods for Planting Seeds"

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	1. Review the steps for planting seeds. 2. Review "dibbling" and "broadcasting".	Chapter 1 PPT
主要內容 Core Part			
Production	15 mins	1. Tell students to open their book to page 5 and look at the "Let's Think" questions. Have students read the questions. 2. Students can answer the questions in English or Chinese.	Chapter 1 PPT
Presentation	10 mins	1. Tell students to look at "Two	Chapter 1 PPT

and Practice		<p>Methods for Planting: Dibbling” and have students read #1.</p> <ol style="list-style-type: none"> 2. Give each group a selection of different sized seeds. Have students test the size of the seeds using the circle on page 5. Ask students the following question: Which seeds should be planted with the dibbling method? 3. Have students read #2-3. Make sure students understand “evenly spaced” in both English and Chinese. 4. Ask students to draw the dibbling method on the bottom of the page. They should include the pot, the screening and/or stones, soil line with the holes drawn, 2-3 seeds per hole and a top layer of soil. 	different sized seeds
Presentation and Practice	5 mins	<ol style="list-style-type: none"> 1. Tell students to open their book to page 6 and look at “Two Methods for Planting: Broadcasting” and have students read #1. 2. Give each group a selection of different sized seeds. Have students test the size of the seeds using the circle on page 5. Ask students the following question: Which seeds should be planted with the broadcasting method? 3. Have students read #2-3. Make sure students understand “scattered” in both English and Chinese. 4. Ask students to draw the broadcasting method on the bottom of the page. They should include the pot, the screening and/or stones, soil line with small seeds evenly spread along the top and a top layer of soil. 	Chapter 1 workbook different sized seeds
總結 Closure			
Wrap-up	5 mins	Check the answers on page 5-6. If students have time, they can work on the word list on pages 9-10.	Chapter 1 workbook
<p>References:</p> <ol style="list-style-type: none"> 1. Grade 3: Domain of Natural Science Book 2 2. PPT Farming: Planting Seeds 3. Domain of Natural Science Chinese Textbook and PPTs 			

教學活動設計：第四節課 (Lesson 4)

Lesson 4: Planting Seeds iPad Activity 種植種子-iPad 活動

Objectives:

At the end of the lesson, the students will:

- Explore a virtual environment and find the information needed to complete a task.

在課程結束時學生能夠：

- 探索虛擬實境並找到完成任務所需的信息。

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with the assistance from the teacher.

Students can explore a virtual environment and find specific information to complete a task.

Students can complete the self-assessment.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠探索虛擬實境並在活動中找到完成任務所需的信息。

學生能夠完成自我評估。

Teacher will mark Chapter 1 Farming: Planting Seeds page 7-8 "Video Activity: Dibbling Method and Broadcasting Method"

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	10 mins	<ol style="list-style-type: none"> 1. Tell students to open their books to pages 7-8. Explain that they will be using the iPads to explore a virtual world and find videos about dibbling and broadcasting. Students will use the videos to put the planting steps in order. 2. Have students read each step. Make sure to point out that "Cover the seeds with soil" and "Add soil to the pot" look similar. Ask students the following question: What is the difference between these two pictures? (one has seeds, one doesn't). 	Chapter 1 workbook
主要內容 Core Part			
Production	20 mins	<ol style="list-style-type: none"> 1. Give each student an iPad and headphones. 2. Show students how to open the CoSpaces APP and find the 	Chapter 1 workbook class set of iPads

		<p>correct virtual world.</p> <p>3. Have students explore the virtual world and complete page 7 and 8.</p>	class set of headphones
Practice	5 mins	<p>1. Have students close the APP.</p> <p>2. Tell students to open their book to page 6 and look at "Video Activity: Let's Think". Ask students to answer each of the questions.</p>	Chapter 1 workbook
總結 Closure			
Wrap-up	5 mins	<p>Collect the iPads and headphones. Make sure students have completed pages 7 and 8.</p> <p>Check the answers on page 7-8. If students have time, they can work on the word list on pages 9-10.</p> <p>Have students complete their self-assessment on pages 11-12.</p>	Chapter 1 workbook
<p>References:</p> <p>1. Grade 3: Domain of Natural Science Book 2</p> <p>2. Domain of Natural Science Chinese Textbook and PPTs</p> <p>3. CoSpaces APP</p>			

新北市龍埔國小雙語實驗課程教學活動設計
New Taipei City LongPu Elementary School CLIL Program

實施年級 (Grade Level): 3

課程名稱 (Name of the Curriculum): Natural Science

單元名稱 (Name of the Unit): The Different States of Water: All About Water

總節數 (Length of the Unit): 3 Weeks

設計者 (Lesson Designer): Michelle Vatcher

本單元設計理念 (Unit Overview: Rationale and Philosophy)

General introduction of the unit (objective and rationale):

The "All About Water" unit is designed to allow students to make observations about water and learn to describe their observations. Students will learn about the three states of matter as they apply to water. Students will be able to compare the physical characteristics of ice and water. Students will observe how both water and ice act in the same situations. Students will identify the different applications of the three states of water in our daily lives. Students will be able to define a drought and discuss ways we can save water. Students will use individual tasks to fully immerse themselves in the materials and create a deeper understanding. Students are encouraged to access previous knowledge and share it with their classmates.

「水的奧秘」單元旨在讓學生觀察水並學會描述觀察的結果。學生將學習關於三種物態在水的應用。學生將比較冰和水的物理特性。學生將觀察水和冰在相同情況下的變化。學生將辨識在我們日常生活的三種水的應用。學生將能夠定義乾旱並討論我們如何節約用水。學生將利用個別任務來充分習得學習內容中並獲得更深入的理解。鼓勵學生利用先備知識並與同學分享。

Objectives of this unit/theme:

The objectives of this unit/theme are:

- Students will identify the 3 states of matter.
- Students will recognize water as a solid, liquid and gas.
- Students will compare water and ice.
- Students will make observations about the physical characteristics of water and ice.
- Students will describe the applications of ice, water, and water vapor in daily life.
- Students will discuss the importance of saving water.
- Students will discuss ways we can save water.

本單元/主題的目標是：

- 學生將識別三種物態。
- 學生將認識水的固態、液態和氣態。
- 學生將比較水和冰。
- 學生將觀察水和冰的物理特性。
- 學生將描述冰、水和水蒸氣在日常生活中的應用。
- 學生將討論節約用水的重要性。
- 學生將討論我們如何節約用水。

本單元整體目標 (Learning Objectives for This Unit)

學習重點 Essential Learning Focuses	學習表現 (Learning Performance): po-II-1
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	<p>Students can make observations from daily experiences, learning activities, and the natural environment, and then they are able to become aware of problems. 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。</p> <p>pc-II-1 Students can listen attentively to their classmates' reports, ask questions, or make comments. And they can conduct a review of the method, process, or outcome of the inquiry. 能專注聆聽同學報告，提出疑問或意見。並能對探究方法、過程或結果，進行檢討。</p>
	<p>學習內容 (Learning Content):</p> <p>INg-II-1 There are many resources in the natural environment. The survival and life of humans depend on various resources in the natural environment. Natural resources are limited; we need to cherish them. 自然環境中有許多資源。人類生存與生活需依賴自然環境中的各種資源，但自然資源都是有限的，需要珍惜使用。</p> <p>INg-II-2 Making the resources of the Earth sustainable can be achieved with low-carbon and water-saving methods in daily life. 地球資源永續可結合日常生活中低碳與節水方法做起。</p>
內容 Content (New knowledge, skills and understanding)	預計進行的節數 Corresponding Lesson
<p>Students will:</p> <ul style="list-style-type: none"> Identify the three states of matter and connect them to water (ice, water, water vapor). Compare water and ice. Make observations about the physical characteristics of water and ice. Record and organize your observations. Discuss and describe the applications of the 3 states of water in daily life. Understand the effects of a drought. Discuss why it is important to save water. Discuss and explain ways to save water. 	<p>Lesson 1</p> <p>Lesson 1</p> <p>Lesson 1</p> <p>Lesson 2</p> <p>Lesson 2</p> <p>Lesson 3</p> <p>Lesson 3</p> <p>Lesson 3</p>
認知 Cognition (High-order thinking skills, problem-solving, challenges and reflection)	
<ul style="list-style-type: none"> Students will be able to apply knowledge about the 3 states of matter to water. Students will be able to compare water and ice. Students will be able to make observations and organize them. Students will be able to recognize the applications of the different states of water in our daily lives and understand their importance. Students will be able to identify the effects of a drought. 	

- Students will be able to discuss the importance of saving water.
- Students will be able to describe ways to save water.

沟通 Communication (What and how)

Language of Learning (Key vocabulary-content-obligatory)

states	fluidity	steam engine
solid	characteristics	rainwater
liquid	shaped	drought
gas	containers	save
ice	change	enough
water	shape	conservation
water vapor	daily lives	water saving label
differences	applications	rinse
hot	watercolor paint	drips
cold	fresh	soap
cool	ice skate	bath
warm	steam	shower
fluid	crops	reuse
not fluid		

Language for learning (Functional language e.g. language while learners participate in the lesson—thinking skills)

Get in groups. Open your book to page ____. Fill in the gaps. Read with me. How do you say ____ in Chinese? Write your answer in English or Chinese. What did / can you see?	Write your answers on the T-chart / table. Fill in the table using the answers in the word bank. Circle the correct answer. Put a check next to ____. Write the correct number. Write each English word one time.
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What do you call water when it is a solid / liquid / gas? Is this a solid / liquid / or gas? What are the differences between water and ice? What happens to water / ice if we put it in different shaped containers? Water is fluid. Ice isn't fluid. What are the characteristics of water and ice? Can water / ice change shape?	Is water / ice fluid? Which one is a solid / liquid / gas? How do we use water in our daily life? What are the applications of water / ice / gas? We use water / ice / water vapor to ____. What is a drought? What happens if we don't have enough water? How can we save water? Think of your own way to save water and write your answer in English or Chinese.
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Language through learning (Language progression, practice and extension—emerging language)

- Be able to name the states of water.
- Be able to describe the differences between water and ice.
- Be able to explain the characteristics of water and ice.
- Be able to share their experiences using the states of water in their daily lives.
- Be able to share their experiences saving water in their daily lives.
- Be able to discuss why water is important and what can happen if there isn't

enough water.

文化 Culture (Awareness of self and other, identity, citizenship, and multicultural understanding)

- Students will be able to recognize that droughts can affect anywhere, and they have the same consequences.
- Students can use their life experiences to make predictions and answer questions about the applications of the different states of water and how to save water.
- Students will see how applications of water can affect their life experiences and can shape the way we live.
- Students will be able to understand that some experiences and processes are the same no matter where you are in the world.
- Students will see how different places try to save water.

教學活動設計：第一節課 (Lesson 1)

Lesson 1: The Three States of Water 水的三態

Objectives:

At the end of the lesson, the students will:

- Identify the three states of matter and connect them to water (ice, water, water vapor).
- Compare water and ice.
- Make observations about the physical characteristics of water and ice.

在課程結束時學生能夠：

- 識別三種物態並將它們與水（冰、水、水蒸氣）聯結起來。
- 比較水和冰。
- 對水和冰的物理特性進行觀察。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistances from the teacher.

Students can participate in group discussions and use their previous knowledge.

Students can express differences between different states of water.

Students can organize information on a T-chart.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能運用他們的先備知識參加小組討論。

學生能夠表達水的不同物態之間的區別。

學生能夠在圖表上整理出相關訊息。

Teacher will mark Chapter 2 The Different States of Water: All About Water page 14 "Ice and Water."

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	3 mins	<ol style="list-style-type: none"> 1. Introduce the name of the chapter "The Different States of Water." 2. Show students PPT slide#1 and look at each picture and ask them the following questions: What is this? (water, ice/snow, steam/water vapor). Students can answer in English or Chinese. If students don't know the answers, the teacher can help them. 	Chapter 2 PPT
主要內容 Core Part			
Presentation	5 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 2 and have students read the title. Explain the meaning of "states". Make sure 	Chapter 2 PPT

		<p>students learn both the English and Chinese words.</p> <ol style="list-style-type: none"> Have students look at each picture and teach them the correct state (solid, liquid, gas). Make sure students learn both the English and Chinese words. Ask students the following questions: What is the solid state of water? (ice) What is the liquid state of water? (water) What is water when it is a gas? (water vapor). Note: if students ask about steam, explain that it is <i>hot</i> water vapor. 	
Practice	10 mins	<ol style="list-style-type: none"> Tell students to open their books to page 14 and look at "The 3 States". Have students read the instructions. Have students write the correct state above each picture (1. Water – liquid 2. Water vapor – gas 3. Ice – solid) Have students look at page 14 "Water and Ice". Have students read the instructions. Students will write the differences between water and ice. Show students PPT slide# 3 and have students read and answer the question. Write students answers on the slide, or show the PPT answers (Water: liquid, hot/cool/cold 1°C-100°C, no color, fluid. Ice: solid, very cold 0°C ↓, no color or white, not fluid.) Prompt students to help get the correct answers. Students can answer in English or Chinese. Have students write the answers from the PPT on page 14 in their book. 	Chapter 2 PPT and workbook
Production	10 mins	<ol style="list-style-type: none"> Show students PPT slide# 4 and have students read the question in English and Chinese. Show students a selection of different shaped, clear containers. Show students a bottle of water. Add coloring to the water to make it easier to see. Ask students the following questions: Is the water bottle shaped right now? (yes) Will 	<p>Chapter 2 PPT</p> <p>selection of different shaped containers (cylinder, cube, rectangular prism, triangular prism etc.)</p> <p>bottle of water</p>

		<p>the water change shape when we put it in a different shaped container? (yes)</p> <p>3. Pour the water in different containers. After each pour, ask students the following question: Did the water change shape? (yes) Is it ___ (shape of the container) shaped? (yes)</p> <p>4. Show students PPT slide# 5 and have students read the English and Chinese.</p>	food coloring
Production	10 mins	<p>1. Show students PPT slide# 6 and have students read the question in English and Chinese.</p> <p>2. Show students some ice and ask them the following questions: What is this? (ice) Will the ice change shape when we put it in different shaped containers? (no)</p> <p>3. Put the ice in different containers. After putting the ice in each container, ask students the following question: Did the ice change shape? (no) Is it ___ (shape of the container) shaped? (no)</p> <p>4. Show students PPT slide#7 and have students read the English and Chinese.</p>	<p>Chapter 2 PPT</p> <p>selection of different shaped containers (cylinder, cube, rectangular prism, triangular prism etc)</p> <p>bag of ice cubes</p>
總結 Closure			
Wrap-up	2 mins	Check the answers on page 14. If students have time, they can work on the word list on pages 18-19.	Chapter 2 workbook
<p>References:</p> <p>1. Grade 3: Domain of Natural Science Book 2</p> <p>2. PPT The Different States of Water</p> <p>3. Domain of Natural Science Chinese Textbook and PPTs</p>			

教學活動設計：第二節課 (Lesson 2)

Lesson 2: Characteristics and Applications of the 3 States of Water 水的三態特性及其應用

Objectives:

At the end of the lesson, the students will:

- Record and organize your observations.
- Answer questions based on your observations.
- Discuss and describe the applications of the 3 states of water in daily life.

課程結束時學生能夠：

- 記錄並組織觀察的結果。
- 根據觀察的結果回答問題。
- 討論並描述水的三態在日常生活中的應用。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistances from the teacher.

Students can record their observations.

Students can participate in group discussions and use their personal experience.

Students can use pictures to help them answer questions.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠記錄他們觀察的結果。

學生能運用他們的個人經驗參加小組討論。

學生能夠利用圖片幫助他們回答問題。

Teacher will mark Chapter 2 The Different States of Water: All About Water page 15 "Let's Think" and "The Characteristics of water and Ice," and page 16 "The Applications of Water in Daily Life."

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	2 mins	1. Review the 3 states of water. (solid/ice, liquid/water, gas/water vapor) 2. Review the results of the experiment from the previous lesson. If there is time, do a simple demonstration again with the water.	bottle of colored water selection of different shaped containers (cylinder, cube, rectangular prism, triangular prism etc)
主要內容 Core Part			
Practice	5 mins	1. Tell students to open their book to page 15 and look at "Let's Think!". Have students read question 1, and the 2 possible answers. Have students circle the correct answer.	Chapter 2 workbook

		<ol style="list-style-type: none"> 2. Have students read question 1, and the 2 possible answers. Have students circle the correct answer. 3. Make sure the students understand the answers in both English and Chinese. 	
Practice	10 mins	<ol style="list-style-type: none"> 1. Tell students to open their book to page 15 and look at "The Characteristics of Water and Ice". Have students read the instructions. 2. Read the possible answers in the word bank. Show students all the parts of the table and make sure they understand it. 3. Have students write the correct answers into each cell of the table. 	Chapter 2 workbook
Presentation	5 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 8 and have students read the words on each picture. Make sure students know both the English and Chinese words. 2. Have students read and answer the 3 questions. 3. Ask students the following questions: Look at the picture, what can we use water/ice/water vapor for? (drinking, make our drinks cold, relax in sauna) 4. Students can answer in English or Chinese. 5. Explain the meaning of "applications". 	Chapter 2 PPT
Practice	10 mins	<ol style="list-style-type: none"> 1. Ask students the following question: What do we use water for? 2. Students can answer in English or Chinese. 3. Show students PPT slide# 9 and have them look at the pictures. Ask students the following question: What is the application of water? 4. Ask the question for each picture. 5. Complete the previous steps for PPT slide #10-11 (ice and water vapor) 	Chapter 2 PPT
Practice	5 mins	<ol style="list-style-type: none"> 1. Tell students to open their book to page 16 and look at "The Application of Water in Daily Life". 2. Have students read the instructions. 3. Have students read #1-6, and write 	Chapter 2 workbook

		the number for each picture next to the correct applications (applications of water, ice, water vapor)	
總結 Closure			
Wrap-up	3 mins	Check the answers on page 15-16. If students have time, they can work on the word list on pages 18-19.	Chapter 2 workbook
References: 1. Grade 3: Domain of Natural Science Book 2 2. PPT The Different States of Water 3. Domain of Natural Science Chinese Textbook and PPTs			

教學活動設計：第三節課 (Lesson 3)

Lesson 3: Save Water 節約用水一起來

Objectives:

At the end of the lesson, the students will:

- Understand the effects of a drought.
- Discuss why it is important to save water.
- Discuss and explain ways to save water.

課程結束時學生能夠：

- 理解乾旱的影響。
- 討論為何節約用水很重要。
- 討論並說明節約用水的方法。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistances from the teacher.

Students can define "drought."

Students can participate in group discussions and use their personal experience.

Students can listen to their classmates, ask questions, and share opinions.

Students can complete the self-assessment.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠定義“乾旱”。

學生能運用他們的個人經驗參加小組討論。

學生能夠聆聽同學的發言，提出問題並分享意見。

學生能夠完成自我評估。

Teacher will mark Chapter 2 The Different States of Water: All About Water page 17 "Water Conservation."

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	3 mins	1. Review the 3 states of water.	
主要內容 Core Part			
Presentation	5 mins	<ol style="list-style-type: none"> 1. Show students PPT slide#12 and ask students the following question: What do you see in the picture? 2. Students can answer in English or Chinese. 3. Have students read the question and try to answer it. 4. Have students read the definition of "drought" in English and Chinese. Make sure students learn both the English and Chinese 	Chapter 2 PPT

		meanings.	
Presentation and Production	15 mins	<ol style="list-style-type: none"> 1. Show students PPT slide#13 and read the question in English and Chinese (What happens if we don't have enough water?). Students can answer in English and Chinese. 2. Show students each picture and read the captions. Explain what is happening in each picture. 3. Show students PPT slide# 14 and ask the following question: How can we save water? Students can answer in English and Chinese. 4. Show students PPT slide#15-17 and have them read the English and Chinese. Discuss how each activity can save water, and have students share their own related experiences. 	Chapter 2 PPT
Practice	10 mins	<ol style="list-style-type: none"> 1. Tell students to open their book to page 17 and look at "Water Conservation". Have students read the instructions and the sentence under each picture. 2. Have students put a check next to each activity that can save water. 3. For #6, students will write something they can do at home to save water. Students can write their answer in English or Chinese. 	Chapter 2 workbook
總結 Closure			
Wrap-up	7 mins	<p>Check the answers on page 17. If students have time, they can work on the word list on pages 18-19.</p> <p>Have students complete their self-assessment on pages 20-21.</p>	Chapter 2 Workbook
References: <ol style="list-style-type: none"> 1. Grade 3: Domain of Natural Science Book 2 2. PPT The Different States of Water 3. Domain of Natural Science Chinese Textbook and PPTs 			

新北市龍埔國小雙語實驗課程教學活動設計
New Taipei City LongPu Elementary School CLIL Program

實施年級 (Grade Level): 3
課程名稱 (Name of the Curriculum): Natural Science
單元名稱 (Name of the Unit): Weather: Weather Forecasting
總節數 (Length of the Unit): 4 Weeks
設計者 (Lesson Designer): Michelle Vatcher

本單元設計理念 (Unit Overview: Rationale and Philosophy)

General introduction of the unit (objective and rationale):

The "Weather Forecasting" unit is designed to allow students to examine a weather forecast to find information about weather conditions. Students will learn about the format of a weather forecast and the different information they provide. Students will identify different sources of weather information. Students will explore a weather APP to learn about daily forecasts and short-range forecasts (5-10 days). Students will learn how to construct their own weather forecast using information found in a weather APP. Students will present information both verbally and visually. Students will use both group activities and individual tasks to fully immerse themselves in the materials and create a deeper understanding. Students are encouraged to access previous knowledge and share it with their classmates.

“天氣預報”單元旨在讓學生檢視天氣預報，找到有關天氣狀況的信息。學生將學習天氣預報的格式以及它們提供的不同訊息。學生將能夠辨識不同的天氣信息來源。學生將探索天氣預測的app，以了解每日預報和短期間預報（5-10天）。學生將學習如何使用天氣預測app中的訊息完成自己的天氣預報。學生將以口語和視覺的方式呈現相關訊息。學生將通過小組活動和個人任務來習得學習內容中並獲得更深入的理解。鼓勵學生利用先備知識並能夠與同學分享。

Objectives of this unit/theme:

The objectives of this unit/theme are:

- Students will examine a weather forecast and be able to find specific information.
- Students will demonstrate how to properly read a thermometer.
- Students will explain where we can find information about the weather.
- Students will recognize weather icons and what they represent.
- Students will find weather information and construct their own weather forecast.
- Students will be able to explore a weather APP and find the information needed to complete a task.
- Students will be able to present information both visually and verbally.

本單元/主題的目標是：

- 學生將檢視天氣預報並能夠找到具體可用的訊息。
- 學生將展示如何正確閱讀溫度計。
- 學生將解釋我們可以在哪裡找到有關天氣的訊息。
- 學生將識別氣象圖示及其含義。
- 學生將找到天氣信息並完全自己的天氣預報。
- 學生將能夠探索天氣預測app並找到完成任務所需的訊息。
- 學生將能夠以視覺和口語的方式呈現信息。

本單元整體目標 (Learning Objectives for This Unit)

學習重點

學習表現 (Learning Performance):

<p>Essential Learning Focuses</p>	<p>po-II-2 Students can ask questions based on observation, data collection, reading, thinking, and discussion. 能依據觀察、蒐集資料、閱讀、思考、討論等，提出問題。</p> <p>pa-II-2 Students can use the information or data they receive to generate explanations, get answers, and solve problems. And they can compare their own inquiry results with others (e.g., from a teacher) and check if the results are similar or not. 能從得到的資訊或數據，形成解釋、得到答案、解決問題。並能將自己的探究結果與他人的結果(例如：來自老師)相比較，檢查是否相近。</p>
	<p>學習內容 (Learning Content):</p> <p>INd-II-6 The temperatures in the four seasons of a year are varied; similarly, the weather in each season is different. We can know the possible changes in weather through weather reports. 一年四季氣溫會有所變化，天氣也會有所不同。氣象報告可以讓我們知道天氣的可能變化。</p> <p>INd-II-7 Rainfall, temperature, wind direction, wind speed, and other data are usually used in the weather forecasts to show the weather status. These data are measured by using appropriate instruments. 天氣預報常用雨量、溫度、風向、風速等資料來表達天氣狀態，這些資料可以使用適當儀器測得。</p> <p>INf-II-1 Common technology products in daily life. 日常生活中常見的科技產品。</p>
<p>內容 Content (New knowledge, skills and understanding)</p> <p>Students will:</p> <ul style="list-style-type: none"> Review previous knowledge about the weather. Explore a weather forecast and identify the different information provided. Examine a thermometer and understand the correct way to read it. Connect the negative symbol with temperatures below zero degrees Celsius. Explain where to find weather information. Inspect the Central Weather Bureau website and discover the different information provided. Explore a weather APP and discuss the information provided. 	<p>預計進行的節數 Corresponding Lesson</p> <p>Lesson 1 Lesson 1 Lesson 1 Lesson 1 Lesson 2 Lesson 2 Lesson 2</p>

<ul style="list-style-type: none"> • Connect weather icons with the weather they represent. • Compare a daily forecast to a short-term forecast (5-10 days) • Find weather information in a weather APP and construct their own weather forecast. • Cooperate in a group to complete a task. • Present information both visually and verbally. 	<p>Lesson 2</p> <p>Lesson 3</p> <p>Lesson 3</p> <p>Lesson 3 & 4</p> <p>Lesson 4</p>
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認知 Cognition (High-order thinking skills, problem-solving, challenges and reflection)

- Students will be able to apply previous knowledge to answer questions and complete activities.
- Students will be able to list types of weather.
- Students will be able to explore weather forecasts from different sources, i.e. weather websites and weather APPs, and identify the different information provided about weather.
- Students will be able to connect symbols to the information they represent (the negative sign for temperature, weather icons).
- Students will be able to compare a daily forecast to a short-term forecast (5-10 days)
- Students will be able to find weather information using a weather APP to construct their own weather forecast.
- Students will be able to cooperate to complete a task.
- Students will be able to present information both visually and verbally.

溝通 Communication (What and how)

Language of Learning (Key vocabulary-content-obligatory)

windy	thermometer	foggy
stormy	phone	heavy rain
cloudy	radio	drizzle
rainy	TV news	library
sunny	website	current
snowy	APP	Monday
weather	newspaper	Tuesday
forecast	icons	Wednesday
now	sunrise	Thursday
later	sunset	Friday
temperature	partly cloudy	Saturday
degrees Celsius	hazy	Sunday

Language for learning (Functional language e.g. language while learners participate in the lesson—thinking skills)

<p>Get in groups.</p> <p>Open your book to page ____.</p> <p>Fill in the gaps.</p> <p>Read with me.</p> <p>How do you say ____ in Chinese?</p> <p>The scissors/glue are in the white box.</p> <p>The colored pencils are in the white box.</p>	<p>Put a check next to the correct answers.</p> <p>Write each English word one time.</p> <p>Open the iPad.</p> <p>Open the APP.</p> <p>Share your iPad with your partner.</p> <p>Give your iPad to the teacher.</p>
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Which weather words do you know?
What's the weather like?
What do you see?
What place is this?
What does ____ mean?
What does this picture mean?
Read the temperature.
Write the temperature using degrees Celsius.
What is the temperature today?
What does the negative symbol mean?
Where can you find a weather forecast?

What does this icon mean?
Look at the website.
Do you use a ____ to look at the weather forecast?
What is the ____? (chance of rain, forecast high/low temperature)
Look at the 10-day forecast.
What day of the week is it?
Look at the APP and fill in the gaps.
Draw the weather icon.
Write the (day, weather, low and high temperature, chance of rain).

Language through learning (Language progression, practice and extension—emerging language)

- Be able to name different kinds of weather.
- Be able to describe the information found in a weather forecast.
- Be able to explain the meaning of weather icons.
- Be able to share where they can find a weather forecast.
- Be able to explain the steps for a task to a group member.
- Be able to discuss the format of a weather forecast.
- Be able to ask questions about a task.

文化 Culture (Awareness of self and other, identity, citizenship, and multicultural understanding)

- Students will be able to recognize that different parts of the world experience different kinds of weather.
- Students can use their life experiences to discuss weather and weather forecasts.
- Students will understand that they can use technology to explore weather around the world.

教學活動設計：第一節課 (Lesson 1)

Lesson 1: What is a Weather Forecast? 什麼是天氣預報?

Objectives:

At the end of the lesson, the students will:

- Review previous knowledge about the weather.
- Explore a weather forecast and identify the different information provided.
- Examine a thermometer and understand the correct way to read it.
- Connect the negative symbol with temperatures below zero degrees Celsius.

課程結束時學生能夠：

- 複習有關天氣的先備知識。
- 探索天氣預報並識別天氣預報所提供的不同訊息。
- 檢視溫度計並能夠正確的閱讀溫度計。
- 將負號與攝氏零度以下的溫度聯結起來。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can participate in group discussions and use their previous knowledge.

Students can make observations using pictures.

Students can recognize the different information found in a weather forecast.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能運用他們的先備知識參加小組討論。

學生能夠透過圖片進行觀察。

學生能夠識別天氣預報中所包含的不同訊息。

Teacher will mark Chapter 3 Weather: Weather Forecasting Page 24 "What's the Temperature?"

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	1. Introduce the name of the chapter, "Weather: Weather Forecasting." 2. Show students PPT slide# 2 and ask students the following questions: Which weather words do you know?	Chapter 3 PPT
主要內容 Core Part			
Presentation	10 mins	1. Show students PPT slide# 3 and have students look at each picture and ask the following question: What is the weather? (windy, stormy, cloudy, rainy, sunny, snowy)	Chapter 3 PPT

		<ol style="list-style-type: none"> 2. Ask students the following questions: Which weather do we experience in Taiwan? Where can we see snow in Taiwan? Have you ever seen snow before? Where did you see snow? The teacher can share any experience they may have with snow, if any. 3. Show students PPT slide# 4 and have them read the question. Read the sentences together as a class. Explain the meanings of “forecast”, “now” and “later”. Make sure students learn both the English and Chinese words. 4. Show students the weather forecast. Go through all the different information that students can get from the forecast. (location, date, time of day, weather, temperature, chance of rain, period of time) 	
Presentation	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 5 and have students read the question. Make sure students learn the word “temperature” in both English and Chinese words. 2. Review the temperature words that students have learned previously (cold, cool, warm, hot, very hot). 3. Ask students the following question: What is this? (a thermometer) Explain the purpose of a thermometer. 4. Teach students “degrees Celsius” and the symbol used to represent it. Make sure students learn both the English and Chinese words. 5. Explain the different ways that thermometers represent temperature (one line = 1 degree / one line = 2 degrees) and explain negative temperatures. 6. Have students practice reading a thermometer using the picture. 	Chapter 3 PPT
Practice	10 mins	<ol style="list-style-type: none"> 1. Tell students to open their book to page 24 and look at “What's the Temperature”. Have students read the instructions. 2. Have students read each 	Chapter 3 workbook

		thermometer and write the correct temperature.	
總結 Closure			
Wrap-up	5 mins	Check the answers on page 24. If students have time, they can work on the word list on pages 27-28	Chapter 3 workbook
References: 1. Grade 3: Domain of Natural Science Book 2 2. PPT Weather: Weather Forecasting 3. Domain of Natural Science Chinese Textbook and PPTs			

教學活動設計：第二節課 (Lesson 2)

Lesson 2: Finding a Weather Forecast 天氣預報哪裡找?

Objectives:

At the end of the lesson, the students will:

- Explain where to find weather information.
- Inspect the Central Weather Bureau website and discover the different information provided.
- Explore a weather APP and discuss the information provided.
- Connect weather icons with the weather they represent.

課程結束時學生能夠：

- 說明哪裡可以找到天氣訊息。
- 檢視中央氣象局網站並發現不同訊息。
- 探索不同的天氣預報 app 並討論獲得的訊息。
- 將天氣圖示與其代表的天氣聯結起來。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can recognize the weather information found on a weather website.

Students can recognize the weather information found on a weather APP.

Students can participate in group discussions and use their personal experience.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠識別天氣網站上的天氣訊息。

學生能夠識別天氣預報 app 上的天氣訊息。

學生能夠參加小組討論並運用他們的個人經驗。

Teacher will mark Chapter 3 Weather: Weather Forecasting Page 26 "Finding the Weather Forecast"

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	3 mins	1. Review what you can find in a weather forecast and how to read a thermometer.	
主要內容 Core Part			
Presentation	10 mins	1. Show students PPT slide# 6 and have them read the question. Have students share their answers. 2. Ask students if they or their family use any of these methods to find the weather forecast. 3. The teacher can share their own	Chapter 3 PPT

		preference.	
Practice	5 mins	<ol style="list-style-type: none"> 1. Tell students to open their book to page 26 and have them look at "Finding the Weather Forecast". Have students read the instructions. 2. Have students put a check next to the correct answers. 	Chapter 3 workbook
Presentation	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 7 and then go to the Central Weather Bureau Website. 2. Show students the different functions of the website, including the daily forecast, the hourly forecast, the short-range and long-range forecast, finding the forecast for different locations in Taiwan, and special weather information (typhoon information, earthquake information etc.) 	Chapter 3 PPT Central Weather Bureau Website
Presentation	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 8-9 and show students 2 different examples of weather APPS. 2. Show students the daily forecast section of the Apple Weather APP and explain all the different information available. 3. Tell students to open their book to page 25 and look at "Look at the Weather APP!" and have them read the sentence. 4. Have students look at each weather icon and explain what they represent. 	Chapter 3 PPT and workbook
總結 Closure			
Wrap-up	2 mins	Check the answers on page 26. If students have time, they can work on the word list on pages 27-28.	Chapter 3 workbook
References: <ol style="list-style-type: none"> 1. Grade 3: Domain of Natural Science Book 2 2. PPT Weather: Weather Forecasting 3. Domain of Natural Science Chinese Textbook and PPTs 4. Central Weather Bureau Website https://www.cwa.gov.tw/eng/ 5. Apple Weather APP 			

教學活動設計：第三節課 (Lesson 3)

Lesson 3: Creating a Multiple Day Forecast 我的天氣預報

Objectives:

At the end of the lesson, the students will:

- Compare a daily forecast to a short-term forecast (5-10 days)
- Find weather information in a weather APP and construct their own weather forecast.
- Cooperate in a group to complete a task.

課程結束時學生能夠：

- 將每日預報與短期間預報（5-10天）進行比較。
- 在天氣預報 app 中找到天氣訊息並構建自己的天氣預報。
- 在小組合作中完成任務。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can examine a weather APP and find specific information to complete a task.

Students can work together in a group to complete a task.

Students can participate in group discussions and use their personal experience.

Students can listen to their classmates, ask questions, and share opinions.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠檢視天氣預報 app 並找到完成任務所需的訊息。

學生能夠在小組合作下完成任務。

學生能運用個人經驗參加小組討論。

學生能夠聆聽同學的發言，提出問題並分享意見。

Teacher will mark Chapter 3 Weather: Weather Forecasting weather forecast worksheet

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	1. Review the information found in the daily forecast in the Apple Weather APP.	Chapter 3 PPT
主要內容 Core Part			
Presentation	15 mins	1. Show students PPT slide# 10 and explore the information in the 10-day forecast. 2. Explain that students will be making a ___ day forecast in their group. (days depend on the number of students in each group) 3. Show students the weather forecast slip and go over the	Chapter 3 PPT weather forecast slips

		<p>information they have to find and fill in.</p> <ol style="list-style-type: none"> Show students PPT slide# 11-12 and review the days of the week. Assign each student a day of the week. Hand out the weather forecast slips and have students write the day of the week. 	
Production	15 mins	<ol style="list-style-type: none"> Give each group 2 or 3 iPads, students can work in pairs. Have students open the weather APP. Students will use the information in the APP to complete their weather forecast slip. When students have finished the slip, they can trim the sides of the slip. If there is time, show students how to glue the slips to the large worksheet to complete their weather forecast. Make sure students write their class, group number, and the number of days their forecast covers. 	<p>Chapter 3 PPT</p> <p>weather forecast slips</p> <p>"Our ____ Day Weather Forecast" worksheet</p> <p>class set iPads</p> <p>scissors</p> <p>glue</p>
總結 Closure			
Wrap-up	5 mins	Check the weather forecast slips and collect the iPads. If students have time they can work on the word list on pages 5-6	<p>Chapter 3 Workbook</p> <p>Weather Forecast Slips</p> <p>"Our ____ Day Weather Forecast" worksheet</p>
<p>References:</p> <ol style="list-style-type: none"> Grade 3: Domain of Natural Science Book 2 PPT Weather: Weather Forecasting Domain of Natural Science Chinese Textbook and PPTs Apple Weather APP Weather Forecast Slips "Our ____ Day Weather Forecast" worksheet 			

教學活動設計：第四節課 (Lesson 4)

Lesson 4: Presenting a Weather Forecast 我是氣象小主播

Objectives:

At the end of the lesson, the students will:

- Cooperate in a group to complete a task.
- Present information both visually and verbally.

課程結束時學生能夠：

- 在小組合作下完成任務。
- 以視覺和口語的方式發表訊息。

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can work together to create a 4 to 6-day weather forecast.

Students can share their weather forecast with the teacher.

Students can listen to their classmates, ask questions, and share opinions.

Students can complete the self-assessment.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠共同合作創建4至6天的天氣預報。

學生能夠與老師分享他們的天氣預報。

學生能夠聆聽同學的發言，提出問題並分享意見。

學生能夠完成自我評估。

Teacher will mark Chapter 3 Weather: Weather Forecasting Page 25 "My Weather Forecast" and "Our ____ Day Weather Forecast" worksheet.

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	1. Have students complete their weather forecast slips and posters if they haven't finished them yet.	Weather Forecast Slips "Our ____ Day Weather Forecast" worksheet (see attachment below)
主要內容 Core Part			
Presentation	10 mins	<ol style="list-style-type: none"> 1. Draw an example of the weather forecast slip on the board with the information already written in from PPT slide# 13. 2. Show students PPT slide# 13 and have students read the sentences. 3. Show students the matching information from the slide and the weather forecast slip. 	Chapter 3 PPT weather forecast slips "Our ____ Day Weather Forecast" worksheet

Production	20 mins	<ol style="list-style-type: none"> 1. Tell students to open their books to page 25 and have them look at "My Weather Forecast". 2. Have students read the sentences. 3. Show students how to finish the sentences using the weather forecast slip drawn on the board. 4. Have students use their own weather forecast slip to fill in the gaps on page 25. 5. When students have finished filling in the weather forecast, have them read it to the teacher. 6. Have students read to the teacher or the class, depending on time and students' abilities. 	<p>Chapter 3 workbook</p> <p>weather forecast slips</p> <p>"Our ____ Day Weather Forecast" worksheet</p>
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總結 Closure

Wrap-up	5 mins	<p>Check the answers on page 25. If students have time, they can work on the word list on pages 27-28.</p> <p>Have students complete their self-evaluation on pages 29-30</p>	Chapter 3 workbook
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References:

1. Grade 3: Domain of Natural Science Book 2
2. PPT Weather: Weather Forecasting
3. Domain of Natural Science Chinese Textbook and PPTs
4. Weather Forecast Slips
5. "Our ____ Day Weather Forecast" worksheet

Class: _____ Group #: _____ Our _____ Day Weather Forecast	

Day: _____	
	Temperature (low to high) _____ °C - _____ °C
	Chance of Rain _____ %
	_____ Group # ___ Class: ___ Name: _____ ()

新北市龍埔國小雙語實驗課程教學活動設計
New Taipei City LongPu Elementary School CLIL Program

實施年級 (Grade Level): 3

課程名稱 (Name of the Curriculum): Natural Science

單元名稱 (Name of the Unit): The Animal Kingdom: Animal Bodies

總節數 (Length of the Unit): 4 Weeks

設計者 (Lesson Designer): Michelle Vatcher

本單元設計理念 (Unit Overview: Rationale and Philosophy)

General introduction of the unit (objective and rationale):

The "Animal Bodies" unit is designed to allow students to make observations about the body structures of animals and learn to describe them. Students will learn about animal bodies and their different structures. Students will be able to compare the bodies of different animals and recognize shared body structures. They will be able to identify the 3 main body structures (head, trunk, limbs). Students will learn about special body structures and their functions. They will be able to look at the shape of the special structures and predict their function. Finally, students will learn about how the shape of body structures are related to their functions. Students will use both group activities and individual tasks to fully immerse themselves in the materials and create a deeper understanding. Students are encouraged to access previous knowledge and share it with their classmates.

「動物身體」單元旨在讓學生觀察動物的身體結構並能夠描述它們。學生將了解動物身體及其不同的結構。學生能夠比較不同動物的身體並識別共通的身體結構。學生能夠識別出三個主要的身體結構（頭部、軀幹、四肢）。學生將了解特殊的身體結構及其功能。他們將能夠觀察特殊結構的形狀並預測其功能。最後，學生將學習身體結構的形狀如何與其功能相關。學生將通過小組活動和個人任務來習得教學內容並獲得更深入的理解。鼓勵學生利用先備知識並與同學分享。

Objectives of this unit/theme:

The objectives of this unit/theme are:

- Students will recognize the different structures that make up an animal's body
- Students will be able to describe the function of the various body structures.
- Students will understand that not all animals share the same body structures.
- Students will examine the form of a body structure and be able to predict its function.
- Students will be able to begin to categorize animals based on their physical characteristics.
- Students will be able to work together to organize an activity and complete a task.

這個單元/主題的目標是：

- 學生能夠識別構成動物身體的不同結構。
- 學生能夠描述各種身體結構的功能。
- 學生了解並不是所有動物都有相同的身體結構。
- 學生檢視身體結構的形態並能夠預測其功能。
- 學生能夠開始根據動物的身體特徵對其進行分類。
- 學生能夠共同合作並完成任務。

本單元整體目標 (Learning Objectives for This Unit)

學習重點 Essential Learning Focuses	學習表現 (Learning Performance): po-II-1 Students can make observations from daily experiences, learning activities, and the natural environment, and then they are able to become aware of problems. 能從日常經驗、學習活動、自然環境，進行觀察，進而能察覺問題。 ai-II-1 Students can maintain their curiosity about natural phenomena. They can explore and probe continuously to find new discoveries. 保持對自然現象的好奇心，透過不斷的探尋和提問，常會有新的發現。
	學習內容 (Learning Content): INb-II-5 The external morphology of common animals mainly divides into head, trunk, and limbs. But the characteristics and names of the body parts of different animals are different. 常見動物的外部形態主要分為頭、軀幹和四肢，但不同類別動物之各部位特徵和名稱有差異。

<u>內容 Content</u> (New knowledge, skills and understanding)	<u>預計進行的節數</u> Corresponding Lesson
Students will: <ul style="list-style-type: none"> • Students will learn the three main structures of the human body (head, trunk, limbs). • Students will compare the body structures of different animals. • Students will learn that some animals do not have the 3 main body structures. • Students will discuss the function of the 3 main body structures for humans. • Students will learn that there are special body structures. • Students will observe the special structure and predict their function based on their shapes and what the students know about animals who have these special structures. • Students will learn that body structures can have different shapes, and these shapes can affect how the structures function. • Students will compare the limbs of rabbits and dogs to determine how the shape of their limbs is related to how they move. • Students will look at the shape of different animals' limbs and determine if they are more similar to the rabbit or the dog. • Students will use what they have learned about 	Lesson 1 Lesson 1 Lesson 1 Lesson 1 Lesson 2 Lesson 2 Lesson 3 Lesson 3 Lesson 3 Lesson 4

body structures to create their own unique animal. • Students will report how the different body structures they have chosen function.	Lesson 4
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認知 Cognition (High-order thinking skills, problem-solving, challenges and reflection)

- Students will be able to recognize and compare the body structures of different animals, including humans.
- Students will be able to infer the function of a body structure based on its shape.
- Students will be able to compare the same body structures of different animals.
- Students will be able to find animals with similarly shaped body structures that have comparable functions.
- Students will be able to decide which group members are best suited for a task.
- Students will be able to create a unique animal by combining multiple body structures.
- Students will be able to explain how the body structures of their unique animal function.

溝通 Communication (What and how)

Language of Learning (Key vocabulary-content-obligatory)

humans	stop	lizard
main	swim	dog
body structures	fly	fish
head	move	sparrow
trunk	walk	ant
limbs	left	koala
divided	right	duck
function	stay balanced	butterfly
special structures	faster	earthworm
webbed feet	forward	pigeon
wings	in the air	kangaroo
tail	thickness	horse
tail feathers	length	frog
fins	running	grasshopper
toes	jumping	deer
tail fins	almost the same	tiger
climb	squirrel	rabbit
turn		

Language for learning (Functional language e.g. language while learners participate in the lesson—thinking skills)

Get in groups. Open your book to page ____. Read with me. How do you say ____ in Chinese? Write the word in the box. What can you see?	Look at the pictures. Write the correct number in each box. Write each English word one time. Collect your scissors. Collect your glue. Complete the sentence and fill in the gap.
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What are the 3 main body structures?
 Show me the ____.
 Does a ____ have a ____?
 Are humans animals?
 What body structures do humans/people and animals both have?
 Can you think of an animal that has/doesn't have ____?
 Which animals don't have limbs?
 What is the function of this body structure?
 Can you guess?
 Look at the structure, what is its function?
 Are wings/fins limbs?
 Some animals have special structures with different functions.
 Some animals have ____, so they can ____.
 ____ help animals ____.
 What body structures are the same?

Can you show me the special structures?
 Do they have the same function?
 How many parts does the ant's trunk have?
 How many legs does an ant have?
 How do ____ move?
 How are their ____ different?
 Which animals have limbs with the same function as the ____?
 How many limbs do ____ have?
 Does a ____ have ____?
 Choose a ____ for your animal.
 Your animal must have ____.
 Each student must choose a job, the ____ does ____.
 Share your animal with the class.
 If you need help, ask your classmate or the teacher.

Language through learning (Language progression, practice and extension—emerging language)

- Students will be able to define the functions of different body structures by examining their shapes.
- Students will be able to use appropriate language to describe animals' bodies and how they function.
- Students will be able to explore how different body structures function by creating their own unique animal.
- Students will be able to share their work with the class and explain what they have done.
- Students will be able to discuss their roles in the group and make decisions to complete a task.

文化 Culture (Awareness of self and other, identity, citizenship, and multicultural understanding)

- Students will be doing group work where they must work together to create something and be able to divide tasks based on each student's abilities.
- Students will learn about how we can work together to achieve goals. The students' different strengths will allow them to support each other. Group work can be an example on the micro scale of how working together makes our communities stronger and function more effectively.

教學活動設計：第一節課 (Lesson 1)

Lesson 1: Body Structures 身體各部份的構造

Objectives:

At the end of the lesson, the students will:

- Students will learn the three main structures of the human body (head, trunk, limbs).
- Students will compare the body structures of different animals.
- Students will learn that some animals do not have the 3 main body structures.
- Students will discuss the function of the 3 main body structures for humans.

課程結束時學生能夠：

- 學習人體的三個主要結構（頭部、軀幹、四肢）。
- 比較不同動物的身體結構。
- 了解到某些動物並不具備三個主要的身體結構。
- 討論人類的三個主要身體結構的功能。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can participate in group discussions.

Students can listen to their classmates, ask questions, and share opinions.

Students can recognize the 3 main body structures.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠參加小組討論。

學生能夠聆聽同學的發言，提出問題並分享意見。

學生能夠識別三個主要的身體結構。

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	1. Introduce the name of the chapter, "The Animal Kingdom: Animal Bodies" 2. Show students PPT slide# 1 and ask students the following question: What is a "body"?	Chapter 4 PPT
主要內容 Core Part			
Presentation	10 mins	1. Show students PPT slide# 2 and ask students the following question: What do you see in the picture? (people, man and woman, humans). Make sure students learn "human" in both English and Chinese.	Chapter 4 PPT

		<ol style="list-style-type: none"> 2. Explain that bodies can be divided into 3 main structures. Make sure students learn “body structures” in English and Chinese. 3. Teach students the 3 main structures, “the head”, “the trunk” and “the limbs”. Make sure students learn both the English and Chinese words. 4. Have students point out each structure on their bodies. 5. Show students PPT slide# 3 and have students read the question, “What can you see?” Show students the pictures and have them answer the question. 6. Students can answer in English and Chinese. 7. Have students read the answer on the slide in English and Chinese. 	
Practice	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 4 and have students look at the pictures and name each one. Make sure students learn both the English and Chinese words. 2. Ask students the following question: Do humans have a head? 3. When students answer, circle the humans’ heads. Ask students the same question for each animal and choose one student to come to the board and circle the body structure. 4. Repeat this for the trunk and the limbs. <i>NOTE: explain to students that wings are limbs, but fins are not limbs.</i> 	Chapter 4 PPT
Presentation and Practice	10 mins	<ol style="list-style-type: none"> 1. Tell students to open their books to page 32 and look at “Body Structures and Their Functions”. 2. Have students read the sentences at the top of the page and identify the 3 main body structures. 3. Have students name the 6 animals on the page. Ask students the following questions: Do all the animals have a head? (yes) Do all the animals have a trunk? (yes) Do all the animals have limbs? (no) 	Chapter 4 workbook

		<ol style="list-style-type: none"> 4. Have students look at the “Let’s Think!” questions and read #1. Students can answer in English or Chinese. (fish, earthworms, sharks, dolphins, oysters, clams, snakes, snails etc.) 5. Have students read #2. Explain the meaning of the word function, make sure students learn both the English and Chinese words. 6. Ask students the following questions: What is the function of the head / limbs / trunk? Students can answer in English or Chinese. 	
總結 Closure			
Wrap-up	5 mins	If students have time, they can work on the word list on pages 35-36.	Chapter 4 Workbook
References: <ol style="list-style-type: none"> 1. Grade 3: Domain of Natural Science book 2 2. PPT The Animal Kingdom: Animal Bodies 3. Domain of Natural Science Chinese Textbook and PPTs 			

教學活動設計：第二節課 (Lesson 2)

Lesson 2: Special Structures 特殊的身體構造

Objectives:

At the end of the lesson, the students will:

- Students will learn that there are special body structures.
- Students will observe the special structure and predict their function based on their shapes and what the students know about animals who have these special structures.

課程結束時學生能夠：

- 學習有些特殊的身體結構的存在。
- 觀察這些特殊結構並根據它們的形狀以及學生對具有這些特殊結構的動物的了解，預測它們的功能。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can participate in group discussions and use their personal experience.

Students can explain the function of different special body structures.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能運用個人經驗參加小組討論。

學生能夠解釋不同特殊身體結構的功能。

Teacher will mark Chapter 4 The Animal Kingdom: Animal Bodies page 33 "Special Body Structures"

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	2 mins	1. Review the 3 main body structures and their functions.	
主要內容 Core Part			
Presentation	5 mins	1. Show students PPT slide# 5 and have them read the sentence. Explain that there are more body structures than the head, trunk and limbs. Show students some special structures on humans (fingers). 2. Have students read the Chinese. 3. Show students PPT slide# 6 and have them look at the picture. Ask students the following questions: What is the special structure? (wings) Are wings limbs? (yes) What	Chapter 4 PPT

		<p>is the function of wings? (flying)</p> <p>4. Have students read the sentences in English and Chinese.</p>	
Presentation	10 mins	<ol style="list-style-type: none"> 1. Tell students to open their book to page 4 and look at the special structures. 2. Have students read the instructions. 3. Have students look at the pictures and read the name of each special structure. 4. Have students look at the 6 sentences. Tell students these are the functions of each special structure. Ask students the following question: What is "function" in Chinese? Make sure students know both the English and Chinese words. 5. Have students read each function and highlight or underline the special words in bold. 6. Ask students the following questions: Which picture is a wing? (B) Which number is the correct function? (1) 7. Write the number in the box next to the body structure. 8. Write the answer on the board as well. 	Chapter 4 workbook
Presentation and Practice	15 mins	<ol style="list-style-type: none"> 1. Show students PPT slide#7-12 and have them look at the pictures. Ask students the following questions: What is the special structure? Which animal has ____? Can you guess the function? 2. Have students read all the sentences in English and Chinese. 3. Explain that the purple words are the same words they highlighted in their book. 4. Have students look at each slide and ask them to find the matching picture and then write the letter on the board. 5. Have students look at the sentence and find the special words in their book. Write the number next to the letter on the board. 6. Do this for every special structure. 	Chapter 4 PPT and workbook

		<i>NOTE: PPT slide# 9 "tail fins" is not in the students' book.</i>	
Presentation	5 mins	<ol style="list-style-type: none"> Show students PPT slide#13 and ask students the following questions: What is this? (an ant) Does an ant have a head / limbs / trunk? (yes) Is the ant's trunk the same as a human's trunk? (no) How are they different? (the ant's trunk has 2 parts, humans don't) Have students read the sentence and the ant's body structures. Teach students the names of the new body structures, "thorax", "abdomen" and "antenna". Make sure students can learn both the English and Chinese words. 	Chapter 4 PPT
總結 Closure			
Wrap-up	3 mins	Check the answers on page 33. If students have time, they can work on the word list on pages 35-36	Chapter 4 workbook
References: <ol style="list-style-type: none"> Grade 3: Domain of Natural Science book 2 PPT The Animal Kingdom: Animal Bodies Domain of Natural Science Chinese Textbook and PPTs 			

教學活動設計：第三節課 (Lesson 3)

Lesson 3: How Animals Move 動物的移動

Objectives:

At the end of the lesson, the students will:

- Students will learn that body structures can have different shapes, and these shapes can affect how the structures function.
- Students will compare the limbs of rabbits and dogs to determine how the shape of their limbs is related to how they move.
- Students will look at the shape of different animals' limbs and determine if they are more similar to the rabbit or the dog.

課程結束時學生能夠：

- 理解身體結構可以有不同的形狀，而這些形狀可以影響結構的功能。
- 比較兔子和狗的四肢，以確定它們的形狀如何與它們的移動方式相關。
- 觀察不同動物的四肢形狀，並確定它們更像兔子還是狗。

Evaluation:

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can participate in group discussions.

Students can compare the shape and function of the same type of body structure.

Students can sort animals based on how they move and the function of their limbs.

Students can complete the self-assessment.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠參加小組討論。

學生能夠比較相同類型身體結構的形狀和功能。

學生能夠根據動物的移動方式和四肢的功能進行分類。

學生能夠完成自我評估。

Teacher will mark Chapter 4 The Animal Kingdom: Animal Bodies page 34 "How Animals Move"

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	5 mins	1. Review "body structures" and "functions". 2. Review the main body structures.	
主要內容 Core Part			
Practice	10 mins	1. Show students PPT slide# 6-12 and review the special structures and their functions. 2. Show students PPT slide#13 and review the ant's body structures.	Chapter 4 PPT

Presentation	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 14 and have them read the question. Explain the meaning of the question. Have students compare the wings of a penguin and a pigeon as an example. Ask students the following questions: Do penguins/pigeons have wings? (yes) Can penguin fly? (no) What is the function of a penguin's wings? (to swim) What is the function of a pigeon's wings? (to fly) Students can answer in English or Chinese. 2. Explain that both birds have wings, but they have different shapes and functions. 3. Show students the Chinese question and have them read it. 4. Show students the pictures and ask the following question: What animal is it? (dog, rabbit) 5. Show students each question and have them answer them. Students can answer in English or Chinese. <ol style="list-style-type: none"> a. Dogs walk or run b. Rabbits hop or jump c. Both animals have heads, trunks and limbs d. Their limbs have different functions, a dog's limbs are for running/walking and a rabbit's limbs are for jumping/hopping e. A dog's legs are almost the same length, thickness and strength. Rabbits have short front legs and long back legs; the back legs are stronger. <i>NOTE: if possible, draw on the pictures of the animals' limbs to indicate length and width.</i> 	Chapter 4 PPT
Practice	10 mins	<ol style="list-style-type: none"> 1. Show students PPT slide# 15-16 and have students read the sentences and look at the videos of how the animals move. 2. Tell students to open their book to page 34 and have them read the description for each animal. 3. Have students read the "Let's Think!" questions. 4. Students will write the names of the 	Chapter 4 PPT and workbook

		<p>animals with similar limbs in the boxes next to the dog or rabbit.</p> <ol style="list-style-type: none"> Show students PPT slide# 27 and read the names of each animal. Make sure students learn both the English and Chinese words. Have students look at each animal and ask the following questions: Are the front and back legs almost the same length or different? Are the front and back legs almost the same strength? (if no) Which legs are stronger? How does a ____ move? Is a ___ like a dog or a rabbit? Students can answer in English or Chinese. Have students write their answers in the book. 	
總結 Closure			
Wrap-up	5 mins	<p>Check the answers on page 34. If students have time, they can work on the word list on pages 35-36.</p> <p>Have students complete their self-assessment on pages 38-39</p>	Chapter 4 workbook
<p>References:</p> <ol style="list-style-type: none"> Grade 3: Domain of Natural Science book 2 PPT The Animal Kingdom: Animal Bodies Domain of Natural Science Chinese Textbook and PPTs 			

教學活動設計：第四節課 (Lesson 4)

Lesson 4: Create Your Own Animal 我的神奇動物

Objectives:

At the end of the lesson, the students will:

- Students will use what they have learned about body structures to create their own unique animal.
- Students will report how the different body structures they have chosen function.

課程結束時學生能夠：

- 利用他們對身體結構的學習，創造出自己獨特的動物。
- 說明他們選擇的不同身體結構如何發揮作用。

Students can follow the teacher's instructions.

Students can answer the teacher's questions.

Students can pronounce the vocabulary words in English and Chinese.

Students can read in English and Chinese with assistance from the teacher.

Students can complete a group task and give out roles based on their classmates' skills.

Students can listen to their classmates, ask questions, and share opinions.

學生能夠遵循老師的指示。

學生能夠回答老師的問題。

學生能夠用英語和中文發音單詞。

在老師的幫助下，學生能夠識讀相關英語和中文。

學生能夠完成小組任務，並根據同學的技能分配角色。

學生能夠聆聽同學的發言，提出問題並分享意見。

Teacher will mark the "Create Your Own Animal" worksheet

活動順序 Order of Activity	時間 Time	活動內容 Content of Activity	教材資源 Materials
課程導入 Lead-in			
Warm-up	3 mins	1. Review the 7 special structures and their functions.	Chapter 4 PPT
主要內容 Core Part			
Presentation	10 mins	<ol style="list-style-type: none"> 1. Hand out the "Create Your Own Animal" worksheets to each group. 2. Have students read each part of the worksheet and explain what students will do. (names/class, group jobs, sentences for reading and writing, making your animal) 3. Have students look at the 2 sentences at the bottom of the worksheet. Students will write the name of the body structure and its function. Students can find the special structures and functions on page 33 in their 	"Create Your Own Animal" Worksheet (see attachemnt below)

		<p>books.</p> <ol style="list-style-type: none"> 4. Each group must make one animal and it must have a head, a trunk, limbs and at least one special structure. 5. Explain each job the students must do and make sure they have picked one or two students for each job. <ol style="list-style-type: none"> a. Leader: collects materials for the group, helps other students if they need it, turns in the worksheet to the teacher. b. Cutting: cut out all the body structures (if there are not enough students for at least 2 cutters, students can have more than one job) c. Gluing: figure out how to construct the animal and glue it to the worksheet. d. Writer: fill in the two sentences, using page 33 in their book to help with vocabulary and spelling e. Reader: read the 2 sentences during the presentation. There can be 1 or 2 readers. If none of the students feel comfortable reading, the whole group can read together. 	
Production	25 mins	<ol style="list-style-type: none"> 1. Show students PPT with all the body structures they can choose from. Have students look at each type of body structure. (trunks, heads, limbs/wings, tails, fins, tail feathers, toes, webbed feet) 2. Have the students discuss which body structures they want to use. They must try to come to an agreement. 3. Show students where they can find glue, scissors, body structures and colored pencils. 4. Have the group leader collect scissors, glue, and colored pencils. 2 students can go and collect the body structures. 	<p>Animal Parts PPT</p> <p>“Create Your Own Animal” Worksheet</p> <p>body structure pages and containers</p> <p>glue</p> <p>scissors</p> <p>colored pencils</p>

		<ol style="list-style-type: none"> 5. Have students cut out the body structures, glue them to the worksheet, fill in the sentences and color their animal. 6. Have students clean as they work. They must return any unused body structures to the correct containers. They must also return the scissors and glue as they finish using them. 	
總結 Closure			
Wrap-up	2 mins	Check the "Create Your Own Animal" worksheet. If students have time they can work on the word list on pages 35-36	Chapter 4 Workbook "Create Your Own Animal" Worksheet
References: <ol style="list-style-type: none"> 1. Grade 3: Domain of Natural Science book 2 2. PPT The Animal Kingdom: Animal Bodies 3. Domain of Natural Science Chinese Textbook and PPTs 4. "Create Your Own Animal" worksheet 5. PPT Animal Parts 			

Class: _____ Group #: _____ Names: _____ () _____ () _____ () _____ ()
_____ () _____ ()

Create Your Own Animal

Cut out a trunk, limbs and any special body structures you want. Create your own animal. Chose 2 body structures and complete the sentences.

Group Jobs:

1. leader _____

2. cutting _____

3. cutting _____

4. gluing _____

5. writer _____

6. reader _____

Our animal has _____, so it can _____.

Our animal has _____, so it can _____.

柒、執行省思

一、自然科為定期評量考試科目之一，受限於考試範圍進度壓力，無法將外師資源充分利用協助學生在有限時間裡將教學內容配合科普閱讀加深加廣。

解決策略：

(一)中外師每週定期共備，在共備時即商定由外師主導的課程內容。外師針對指定內容並參酌教科書編寫學生手冊，學生不僅在外師主導課程時大量聽說英語，在中師獨立授課時也配合學生手冊內容一再使用相關英語字詞，讓學生能充分沈浸在英語學習自然學科的環境裡。

(二)配合定期評量範圍，在當中以6-8%的範圍以雙語授課內容命題，為檢視學生對雙語授課學科內容之總結性評量，做為調整教學方式的依據。

二、本校從低年級開始實施的雙語生活課程內容多處為中年級自然科的知識基礎，語言及知識鷹架之建立至為重要。

解決策略：

(一)自然科學概念的建立需要循序漸進，尤以雙語自然課堂上更不能讓語言成為學習的障礙。

(二)低年級生活課一週6節的高度沈浸式的聽說關鍵字詞，讓龍埔的學生雙語自然的課堂上，無論在語言和學科學習時都有穩穩的鷹架支持著孩子逐步向前向上。課堂上此起彼落的舉手和回答，很開心看到外師教學和語言沒有阻攔學生求知的熱忱，更是隨著課程內容的加深加廣習得更多的學科和英語相關知識。

附件三：授權書

【授權書】

本校同意「新北市110-112學年度國民小學雙語實驗課程領航計畫雙語成果專輯」(包含其相關內容圖文與電子檔)，授權新北市教育局享有使用權；得以運用至各類宣傳、推廣、展覽及一切出版品(含印製、發行等)，提供各級學校教學參考使用不另付酬勞或任何費用。

校長及參與本成果專輯製作之成員簽章：

黃清海

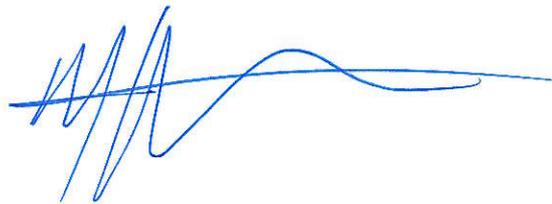
高文謙

李曼臻

褚美惠

江明儀

陳柏汝



蔡怡貞

中華民國 113 年 6 月 13 日