

Unit 1 The sun 教材分析

|  |  |   |     |  |    |
|--|--|---|-----|--|----|
| 資料來源   | 康軒版自然與生活科技<br>第五冊  | 設計者   | 鄭穎蔚 | 每週<br>教學節數   | 4  |
|  |  | 撰寫者   | 鄭穎蔚 | 單元教學<br>總節數  | 16 |
| 教材分析   | <p><b>【太陽】</b><br/>從觀察太陽位置的變化，了解可用方位角和高度角來表示太陽在天空中的位置。而且會因所在地的緯度與季節產生規律性的變化，並提出太陽能是一種可永續利用的能源，將嘗試帶領學生利用太陽能鍋的實際操作與探究，體驗太陽光與熱的能量運用。</p> <p>1. Sun and the Solar System 太陽系<br/>(Mercury. Venus. Earth. Mars. Jupiter. Saturn. Uranus. Neptune)</p> <p>2. Our Moving Earth 地球的轉動<br/>(Day and Night. Why Seasons Happen?)</p> <p>3. Solar Energy (<b>Solar Cookers/oven</b>) 太陽能的應用</p> |   |     |  |    |
| <b>Part1: Functions of roots, stems and leaves</b>   |  | <b>Part2: Plant reproduction</b>  |     | <b>Part3: Classification of plants</b>   |    |
| 主要學習內容   |  |   |     |  |    |
| <p>INe-III-7 陽光是由不同色光組成。</p> <p>INc-III-15除了地球外，還有其他行星環繞著太陽運行。</p>   |  | <p>INc-III-13日出日落時間與位置在不同季節會不同。</p> <p>INc-III-1 生活及探究中常用的 測量工具和方法。</p>   |     | <p>INa-II-5 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>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>INg-III-5 能源的使用與地球永 續發展息息相關。</p>                             |    |
| 主要學習表現   |  |   |     |  |    |
| <p>an-III-2發覺許多科學的主張與結論會隨著新證據的出現而改變。</p> <p>ai-III-1透過科學探索了解現象發生的原因或機制，滿足好奇心。</p> <p>ah-III-1利用科學知識理解日常生活觀察到的現象。</p> |  | <p>pe-III-2能正確安全操作適合學習階段的物品、器材儀器、科技設備與資源。能進行客觀的質性觀測或數值量測並詳實記錄。</p> <p>pa-III-1能分析比較、製作圖表、運用簡單數學等方法，整理已有的資訊或數據。</p> <p>pa-III-2能從（所得的）資訊或數據，形成解釋、發現新知、獲知因果關係、解決問題、或是發現新的問題。並能將自己的探究結果和他人的的結果（例如來自同學）比較對照，檢查相近探究是否有相近的結果。</p> |     | <p>ai-III-2透過成功的科學探索經驗，感受自然科學學習的樂趣。</p> <p>ah-III-2透過科學探究活動解決一部分生活週遭的問題。</p> <p>an-III-1透過科學探究活動，了解科學知識的基礎是來自於真實的經驗和證據。</p> <p>ai-III-3參與合作學習並與同儕有良好的互動經驗，享受學習科學的樂趣。</p> |    |

## 課程架構

### 植物世界面觀(Aspects of the plant world)

#### 活動一：植物根、莖、葉的功能

##### (Part1: Functions of roots, stems and leaves)

##### 1-1 植物體內水的移動(The movement of water in plants)

植物由根部吸收水分，再由莖輸送到葉及其他部位。

(Plants absorb water from the roots, and then transport them to the leaves and other parts from the stems.)

##### 1-2 多功能的根(Root function)

根可以吸收水分和養分，還可以抓住土壤、固定植物身體。

(Roots can absorb water and nutrients, and can also grab the soil and fix the plant body.)

##### 1-3 多功能的莖(Stem function)

莖可以輸送水分和養分，還可以支撐植物身體。

(The stem can transport water and nutrients, and can also support the plant body.)

##### 1-4 多功能的葉(Leaves function)

葉子可以蒸散水分，還可以吸收陽光，製造生物所需養分。

(The leaves can evaporate water and absorb sunlight to produce nutrients needed by organisms.)

#### 活動二：植物的繁殖(Plant reproduction)

##### 2-1 花、果實和種子的功能(Functions of flowers, fruits and seeds)

介紹關於花、果實和種子的功用和各種傳播的方法。

(Introduce the functions of flowers, fruits and seeds and various methods of spreading.)

##### 2-2 植物的繁殖方式(The way plants reproduce)

介紹種子繁殖和營養繁殖。

(Introduction to seed propagation and vegetative propagation)

##### 2-3 蕨類植物的繁殖方式(Propagation methods of ferns)

介紹蕨類植物和孢子繁殖。

(Introduction to ferns and spore reproduction)

#### 活動三：植物的分類(Classification of plants)

##### 3-1 選擇分類標準將植物分類(Choose classification criteria to classify plants)

學習利用二分法來分類植物

(Learn to use dichotomy to classify plants)

## Unit 1 The sun

### 應會認讀/聽懂的字彙

#### 1-1

|             |          |         |
|-------------|----------|---------|
| Earth       | distance | surface |
| temperature | age      | mass    |

#### 1-2

|        |             |          |            |
|--------|-------------|----------|------------|
| spring | summer      | fall     | north      |
| winter | compass 指南針 | orbit 軌道 | rotates 旋轉 |
| east   | west        | south    | axis 軸     |

#### 1-3

|              |                  |              |
|--------------|------------------|--------------|
| Solar energy | Renewable energy | Solar panels |
|--------------|------------------|--------------|

### 應聽懂/說出的科學概念

#### 1-1

- 1.The mass of the sun is 333 thousand times the mass of Earth.
- 2.The temperature of the sun's surface is 5,500 degrees °C.
- 3.The age of the sun is 4.5 billion years.
- 4.The distance from the sun to the earth is 150 million kilometers.1-2

#### 1-2

- 1.When the earth rotates, day changes to night and night changes to day.
- 2.Here comes the spring with the flowers in the ground.
- 3.Here comes the summer with the heat from the sun.
- 4.When I face south, my right hand is west.

#### 1-3

- 1.Energy from a source that is not depleted when used, such as wind or solar power.
- 2.A panel designed to absorb the sun's rays as a source of energy for generating electricity or heating.
- 3.Radiant energy emitted by the sun.

## For Further Watching Unit 2

### 1-1

Exploring Our Solar System: Planets and Space for Kids – FreeSchoo

<https://www.youtube.com/watch?v=Qd6nLM2QIWw>

The Planet Song for Kids

<https://www.youtube.com/watch?v=mQrlgH97v94>

How to make 3D Solar System Project for Science Fair or School

[https://www.youtube.com/watch?v=Cxv\\_kxq5vlg](https://www.youtube.com/watch?v=Cxv_kxq5vlg)

The Sun, Earth, and Moon - Solar System for Kids

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

Meet the 5 Dwarf Planets

[https://www.youtube.com/watch?v=1evh\\_ului-w](https://www.youtube.com/watch?v=1evh_ului-w)

### 1-2

Exploring Our Solar System: Planets and Space for Kids – FreeSchoo

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The Planet Song for Kids

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Meet the 5 Dwarf Planets

[https://www.youtube.com/watch?v=1evh\\_ului-w](https://www.youtube.com/watch?v=1evh_ului-w)

### 1-3

What is Solar Energy?

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

How solar works

<https://www.youtube.com/watch?v=HhZitLJ2Zyg>

Solar Energy 101 - How Solar Panels Work

<https://www.youtube.com/watch?v=dHVZ6jEf8To&t=11s>

Renewable Energy Explained in 2 1/2 Minutes

<https://www.youtube.com/watch?v=KEeH4EniM3E>

教學活動規劃

| 週 | 日期        | 活動名稱     | 各節次教學策略                   | 節 |
|---|-----------|----------|---------------------------|---|
| 2 | 9/5-9/11  | 會發光發熱的星球 | 分組 / 影片(熱)/ 影子實驗 / 太陽高度   | 4 |
| 3 | 9/12-9/18 | 太陽位置的變化  | 制作觀測儀 / 製作記錄表 / 觀測 / 觀測   | 4 |
| 4 | 9/19-9/25 | 太陽位置的變化  | 季節不同位置的變化 / 完成習作          | 2 |
| 5 | 9/26-10/2 | 太陽與生活    | 太陽的功能 / 太陽能車 / 太陽能飛機 / 日食 | 4 |

教學活動設計

| 教學活動<br>Teaching activities                                |  | 教學設備<br>/資源<br>Teaching<br>aids/equip<br>ment | 時間<br>(分)<br>Time |
|--|--|---|-------------------|
| 中文<br>In Chinese   | 英文<br>In English   |   |                   |
| 活動一<br>一、建立學習默契<br>說明上課方式：說明這節課的方式和老師的期待。                  | First period<br>1. Establish a tacit understanding of learning<br>Explain the way of class:<br>Explain the style of this class and the expectation of the teacher. | 單槍<br>學習單                                     | 5                 |
| 闡述老師學習經驗，讓學生不致於擔心受怕或拒絕學習。                                  | Explain the teacher's learning experience so that students will not worry about being afraid or refuse to learn.   |   | 5                 |
| 與學生討論關於使用英語的影響。  | Discuss with students about the impact of using English.   |   | 5                 |
| 二、發下學習單，進行進行熱身活動<br>口頭詢問第一個問題：<br>What do you think of the | 2. Send out study orders and conduct warm-up activities<br>Ask the first question verbally:<br>What do you think of the sun?                                       |   | 10                |

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| <p>sun?</p> <p>解釋當學生想到太陽，會想到哪個單詞或是句子，利用簡單的單詞嘗試學生利用英語回答。</p>                     | <p>Explain which word or sentence students will think of when they think of the sun, and use simple words to try students' answers in English.</p>            |  |    |
| <p>經由學生回答，複習太陽的特性「光」和「熱」</p>  | <p>Through students' answers, review the characteristics of the sun, "light" and "heat"</p>   |  |    |
| <p>詢問第二個問題</p> <p>What kinds of shadow can you do in playing shadows games?</p> | <p>Ask the second question</p> <p>What kinds of shadow can you do in playing shadows games?</p>   |  | 10 |
| <p>透過實際操作，讓學生瞭解光的特性，並對於影子與光的位置更加理解。</p>   | <p>Through practical operation, students can understand the characteristics of light and have a better understanding of the position of shadow and light.</p> |  |    |
| <p>三、總結</p> <p>由老師對於今日課程進行總結，並讓學生說一下關於今天上課使用英語的狀況進行回饋。</p>                      | <p>Three, summary</p> <p>The teacher summarizes the lesson today and asks the students to give feedback on the use of English in class today.</p>             |  | 5  |
| <p>活動二</p> <p>一、熱身活動</p> <p>複習我們上一堂課</p>  | <p>Second period</p> <p>Review our last class</p>   |  | 10 |
| <p>詢問第三個問題</p> <p>3.The relationship between of sun position</p>                | <p>Ask the third question</p> <p>3.The relationship between of sun position and shadow?</p>   |  |    |

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| and shadow?<br><br>透過討論，並簡單的繪製出相關位置於下表最後部分                             | Through discussion, and simply draw the relevant position in the last part of the table below   |  | 10 |
| 進行第二部分 Language<br>先讓學生討論5分鐘，然後老師與學生進行討論。                              | Let the students discuss for 5 minutes, and then the teacher discusses with the students.   |  | 10 |
| 完成第三部分 content<br>看影片 <a href="#">The Sun (3:35)</a><br>並進行小組討論完成三個提問。 | Complete the third part of content<br>Watch the video The Sun (3:35)<br>And have a group discussion to complete three questions.  |  | 10 |
| 下課   |   |  |    |
| 活動三<br>先暖身活動，利用三個提問複習太陽每天位置的變化。  | Thrid period<br>Warm-up activities first, use three questions to review the changes in the position of the sun every day.   |  | 10 |
| 接著進行 Language 的活動，讓學生自行練習填入正確的單字。<br>再透過老師與學生一同討論正確的答案。                | Then carry out the Language activity, let the students practice filling in the correct words by themselves.<br>Then discuss the correct answer with the students through the teacher. |  | 5  |
| 播放 <a href="#">Seasons Song (2:27)</a> ，透過英文歌曲強化學生對於四季變化的認識，並探討太陽與四    | Play Seasons Song (2:27) to strengthen students' understanding of the changes of the four seasons through   |  | 10 |

|   |   |  |    |
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| <p>季的關係。</p>  | <p>English songs and explore the relationship between the sun and the four seasons.</p> <p>Fourth period</p>  |  |    |
| <p>完成 Thinking 的紀錄，將之前自然課堂的太陽位置紀錄，記錄進學習單中，進行複習和熟悉。</p>  | <p>Complete the Thinking record, record the position of the sun in the previous nature class, and record it in the study sheet for review and familiarization.</p>                                |  | 5  |
| <p>活動四<br/>透過熱身活動兩題，跟學生一起複習並討論太陽的功能與使用太陽能的科技產品。</p>   | <p>Through the warm-up activity two questions, review and discuss the function of the sun and the technology products using solar energy with the students.</p>                                   |  | 10 |
| <p>請學生自行作答<br/>Language 活動，透過句子判斷所表示的單字。老師與學生討論並完成答案。</p>   | <p>Ask students to answer the Language activity by themselves, and judge the words represented by sentences. The teacher discusses with the students and completes the answers.</p>               |  | 10 |
| <p>觀賞影片 <a href="#">What is Solar Energy? (5:07)</a> 並討論三個問題。對於太陽能有更深更廣了認識。<br/>最後利用三個問題審思這次課程。</p> | <p>Watch the video What is Solar Energy? (5:07) and discuss three questions. Have a deeper and broader understanding of solar energy. Finally, use three questions to reflect on this course.</p> |  | 10 |





## Observing the sun-A planet that glows

### Warmer

1. What do you think of the sun?
2. What kinds of shadow can you do in playing shadows games?
3. The relationship between of sun position and shadow?

### Language

|             |          |         |
|-------------|----------|---------|
| Earth       | distance | surface |
| temperature | age      | mass    |

1. The mass of the sun is 333 thousand times the \_\_\_\_\_ of \_\_\_\_\_.
2. The \_\_\_\_\_ of the sun's \_\_\_\_\_ is 5,500 degrees °C
3. The \_\_\_\_\_ of the sun is 4.5 billion years.
4. The \_\_\_\_\_ from the sun to the earth is 150 million kilometers.

### Content

Watch a video of [The Sun](#) (3:35) and discuss the following questions in a small group.

1. Why does the sun seems much bigger and brighter than any other star?
2. How long has it been shining in Space?
3. How many planets the size of our earth can fit inside the sun?

|               |
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| <b>Notes:</b> |
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|               |

### Thinking

1. Please draw the tree, the sun and the shadow.



## Observing the sun- Changes in the position of the sun

### Warmer

1. How to use the compass?
2. What are the maximum and minimum height angles?
3. When are the vernal equinox, summer solstice, autumnal equinox, and winter solstice?

### Language

|        |             |          |            |
|--------|-------------|----------|------------|
| spring | summer      | fall     | north      |
| winter | compass 指南針 | orbit 軌道 | rotates 旋轉 |
| east   | west        | south    | axis 軸     |

1. When the earth \_\_\_\_\_, day changes to night and night changes to day.
2. Here comes the \_\_\_\_\_ with the flowers in the ground.
3. Here comes the \_\_\_\_\_ with the heat from the sun.
4. When I face south, my right hand is \_\_\_\_\_.

### Content

Watch a video of [Seasons Song \(2:27\)](#) and discuss the following questions in a small group.

1. Please write down one sentence that you remember the most about the four seasons.

|               |
|---------------|
| <b>Notes:</b> |
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|               |

### Thinking

1. Complete the solar observation record sheet

|                                |  |  |                 |  |  |
|--------------------------------|--|--|-----------------|--|--|
| Solar Observation Record Sheet |  |  |                 |  |  |
| Date: _____                    |  |  | Observer: _____ |  |  |
| Place: _____                   |  |  |                 |  |  |
| Time(clock)                    |  |  |                 |  |  |
| Shadow azimuth                 |  |  |                 |  |  |
| sun azimuth(方位角)               |  |  |                 |  |  |
| solar altitude(°)              |  |  |                 |  |  |

## Observing the sun- Sun and life

### Warmer

1. What role does the sun play in our daily lives?
2. Which technological products run on solar energy?

### Language

|              |                  |              |
|--------------|------------------|--------------|
| Solar energy | Renewable energy | Solar panels |
|--------------|------------------|--------------|

|  |  |
|--|--|
|  | Energy from a source that is not depleted when used, such as wind or solar power.                      |
|  | A panel designed to absorb the sun's rays as a source of energy for generating electricity or heating. |
|  | Radiant energy emitted by the sun.   |

### Content

Watch a video of [What is Solar Energy? \(5:07\)](#) and discuss the following questions in a small group.

1. Do these wind, water and fossil fuels also need solar energy?
2. How many times the temperature of the sun is the temperature of baking pizza?
3. How many years will it take us to run out of oil and coal?

|               |
|---------------|
| <b>Notes:</b> |
|               |
|               |

### Thinking

| K<br>what I know | W<br>What I want to know? | L<br>What I learned |
|------------------|---------------------------|---------------------|
|                  |                           |                     |

## The Sun

Think Earth is the most important spot in the solar system? Think again. The sun is the real star of the show—literally!

The sun is the real star of the show—literally! The closest star to Earth, it's the source of all the heat and light that makes flowers bloom, songbirds croon, and sunbathers swoon. Life wouldn't exist without it. It's also the center of our solar system and by far its largest object. More than a million Earths would fit inside the sun! Our star's enormous gravity grips the planets, dwarf planets, asteroids, comets, keeping them from spinning into deep space. Put simply, we wouldn't have a solar system without the sun.

Despite its importance in the grand scheme of things, the sun isn't unique or particularly complex. It's average in size and middle-aged compared to the billions of other stars in our galaxy. And although the sun accounts for 99.8 percent of the total mass of the solar system, it's really just a big ball of gas. A process called nuclear fusion converts hydrogen to helium deep in the sun's core, where temperatures hit a balmy 18 million degrees Fahrenheit (15.7 million degrees Celsius). Fusion creates energy that travels to the sun's surface in a journey that lasts a million years. The core will run out of hydrogen gas eventually, which will put an end to our fun in the sun. But fear not: That day won't come for at least another five billion years.

Source of information : <https://kids.nationalgeographic.com/space/article/sun>