

臺北市立中山國民中學素養導向課程教案設計

學校名稱 School	臺北市立中山國民中學	學習領域 Domain/Subject	科學探究 Scientific Inquiry
單元名稱 Unit	低碳生活 Low-Carbon Life	教案設計者 Designer	楊雅然老師 Ms. Ya Jan Yang 潔西卡老師 Ms. Jessica
實施年級 Grade	七年級 Grade 7	授課時間 Time	本單元共三節課， 觀課為第二節課
教學 設計理念 Design Concepts	<p>本教案以低碳生活為主題，依序介紹(1)溫室效應和溫室氣體(2)溫室效應對環境的影響(3)認識碳足跡、提出減碳方案並於日常生活中具體實踐。透過此課程，了解人類活動所製造的碳排放量，已大於地球上森林的固碳速度，因此我們要選擇低碳生活，落實永續發展。</p> <p>The topic of this lesson plan is low-carbon life, including the following :</p> <p>(1) Greenhouse effect and greenhouse gases (2) Greenhouse effect's impact on the environment (3) Recognizing carbon footprint and designing a carbon reduction plan to practice in daily life</p> <p>Through this course, students will understand that carbon emission rates produced by humans are greater than the carbon absorption rates. Therefore, we must choose a low-carbon life and achieve sustainable development.</p>		
單元學習目標 Learning Objectives	學科領域 Content	英文領域 Language of learning	
	能解釋溫室效應 能說出溫室氣體的種類 能探究溫室效應對環境的影響 能認識碳足跡和其標章 能提出減碳計畫並具體實踐	能理解基本課室用語 能認識溫室氣體常用名詞，如 greenhouse effect, greenhouse gases, carbon footprint, global warming	
學科先備知識 Subject Prior Knowledge	學生已觀察到氣候改變，並了解人類行為會影響環境。 Students have observed climate change and understand that human behavior affects the environment.		
中英文使用時機 Timing for Using Chinese/English	教師 Teacher	學生 Students	
	帶領活動、下達指令、引導提問	聆聽指令、回應教師提問	
教學方法 Teaching Methods	講述法、討論法、合作學習教學法		
評量方法 Assessment Methods	小組討論與報告、口頭回答問題、學習單		
教學流程 Teaching Procedures			時間

準備階段 Preparation stage

1. The teacher explains the topic - low-carbon life.
2. The teacher provides the following sentences and ask students to explain a warming photo.



I see _____.

It's happening because _____.

3. The teacher introduces the topic - greenhouse effect.

發展階段 Development stage

1. Greenhouse Effect and Greenhouse Gases

- (1) The teacher introduces the greenhouse effect and greenhouse gases.
- (2) Students use iPads to search for types of greenhouse gases and share their results on their touch TV.

2. Greenhouse Gases in Our Life

- (1) The teacher uses SF₆ as an example : SF₆ is caused by human activities.

Gas name : SF₆ 六氟化硫

Natural causes	Human causes
	冷凍業:冷媒
	電氣業:高壓開關、電纜等絕緣材料




- (2) Each group explores the causes of different greenhouse gases :

CO ₂ 二氧化碳	O ₃ 臭氧	CH ₄ 甲烷
HFCs 氫氟碳化物	H ₂ O 水氣	N ₂ O 一氧化二氮

- (3) Group presentation and finish the worksheet.

總結階段 Summary stage

1. Review greenhouse gases and their causes
2. Play Kahoot!

		
Cow's farts will produce _____.	Organism's breath will produce _____.	Air conditioner refrigerant will produce _____.

5mins

10mins

25mins

5mins



Exhaust gas from cars will produce CO₂ and ____.



Burning fossil fuels will produce ____ and N₂O.



Deforestation will produce ____.



Using a photocopier will produce CO₂ and ____.



Landfills will produce CO₂ and ____.

準備階段 Preparation stage

Sea level rise activity :

- (1) Select a city you are interested in and share the impact of rising sea levels on this city.
- (2) The teacher provides the following sentences and asks students to explain the impact of rising sea levels on this city.



1. I chose _____ (city name).

2. After _____ meters of sea level rise,

the north / south / east / west part of the land is dry/flooded .

發展階段 Development stage

1. In addition to rising sea levels, each group explores the impact of global warming on the following different topics and presents real cases :

climate change 氣候變遷	aquatic ecosystem 水域生態	terrestrial ecosystem 陸域生態
economic and society 經濟社會	food 糧食	disease 疾病

2. Group presentation and finish the worksheet.

5mins

30mins

	<p>總結階段 Summary stage</p> <ol style="list-style-type: none"> The teacher summarizes the reports of each group. The teacher introduces the policy on global warming- UNFCCC 聯合國氣候變化綱要公約 The teacher explains homework : find a product that has a carbon footprint. 	10mins
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	<p style="text-align: center;">準備階段 Preparation stage</p> <p>Carbon Footprint in Our Life</p> <ol style="list-style-type: none"> Students share the product that has a carbon footprint. The teacher introduces carbon footprint and carbon footprint label. 	10mins
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<p>第三節</p>	<p>發展階段 Development stage</p> <ol style="list-style-type: none"> Leave Carbon Behind activity : <ol style="list-style-type: none"> Students use an iPad to complete the wordwall game.  <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;"> <p>Low carbon footprint</p> <table border="1" style="width: 100%; height: 100%;"> <tr> <td style="width: 33%; height: 30px;"></td> <td style="width: 33%; height: 30px;"></td> <td style="width: 33%; height: 30px;"></td> </tr> <tr> <td style="width: 33%; height: 30px;"></td> <td style="width: 33%; height: 30px;"></td> <td style="width: 33%; height: 30px;"></td> </tr> <tr> <td style="width: 33%; height: 30px;"></td> <td style="width: 33%; height: 30px;"></td> <td style="width: 33%; height: 30px;"></td> </tr> </table> </div> <div style="text-align: center;"> <p>High carbon footprint</p> <table border="1" style="width: 100%; height: 100%;"> <tr> <td style="width: 33%; height: 30px;"></td> <td style="width: 33%; height: 30px;"></td> <td style="width: 33%; height: 30px;"></td> </tr> <tr> <td style="width: 33%; height: 30px;"></td> <td style="width: 33%; height: 30px;"></td> <td style="width: 33%; height: 30px;"></td> </tr> <tr> <td style="width: 33%; height: 30px;"></td> <td style="width: 33%; height: 30px;"></td> <td style="width: 33%; height: 30px;"></td> </tr> </table> </div> </div>																			5mins

	<ol style="list-style-type: none"> The teacher explains that human behavior will increase the carbon footprint. Low-carbon life : <ol style="list-style-type: none"> Each group explores how to reduce carbon in the following five areas: Food 、Clothing 、Housing 、Transportation 、Entertainment Group presentation. Each group designs a two-day carbon-reduction trip plan. <p style="text-align: center;">總結階段 Summary stage</p> <ol style="list-style-type: none"> Carbon reduction plan implementation and sharing. Finish the worksheet. 	25mins
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