

無名碳捕手

Carbon Catcher

學校：高雄市新興區七賢國小

指導老師：

程怡婷、吳堯文、胡鳳育、毛河邑

類別：環境教育

一、活動旨趣(目的)：

植物是地球的小超人，它們透過光合作用吸收空氣中的二氧化碳，並將碳固定下來形成養分，釋放出氧氣，這個過程就叫做碳匯。碳匯能幫助減少大氣中的二氧化碳，是對抗氣候變遷的重要力量，也是 SDG 13：氣候行動 的核心精神。

邀請闖關者成為「無名碳捕手」，挑選一片葉子，仔細觀察葉脈，那些像道路的線條正是二氧化碳運輸與轉換的管道。接著，用葉拓的方式留下葉子的紋路，將這條碳匯的拓印下來。

最後，將拓印作品製作成專屬的碳匯魔法心願卡，成為一個守護氣候開始行動的紀念。種下一株植物，累積一份碳匯，守護氣候從你開始！

Plants are Earth's quiet heroes. Through photosynthesis, they absorb carbon dioxide from the air and turn carbon into organic matter while releasing oxygen. This process is called carbon sequestration, and plants are one of Earth's major carbon sinks. Carbon sinks reduce the amount of carbon dioxide in the atmosphere, making them essential in the fight against climate change. This reflects the core spirit of SDG 13: Climate Action.

Participants of this activity are invited to become "Carbon Catchers." They will choose a leaf and carefully observe its veins - nature's pipelines for transporting water, nutrients, and gases. Then they will transfer the leaf's patterns onto paper through leaf rubbing.

Participants will turn their rubbing into a personalized Carbon Wish Card - a keepsake and a pledge to the climate. Plant a tree, capture some carbon, and protect the climate - it all starts with you!

二、使用器材：

Surface Go 2、水蘊草(Hydrilla verticillata)、植物生長燈(plant growth light)、各類葉片(various leaves)、色鉛筆(colored pencils)、宣紙(xuan paper)、剪刀(scissors)、口紅膠(glue stick)、小卡片(note cards)。

三、 活動過程：

(一) 關主事前準備好實驗器具。

The game host prepares the materials in advance.

(二) 關主解說【碳匯】概念，並利用 Surface Go 2 投放圖卡說明。解說後，請闖關者觀察水箱中的水蘊草。

「植物透過光合作用，把空氣中的二氧化碳吸進去，固定下來形成碳匯。今天，你要成為無名碳捕手，把這份力量拓印下來！」

The game host explains the concept of carbon sinks and uses the Surface Go to display visual aids. After the explanation, participants are invited to observe the aquatic plant Hydrilla in the water tank.

“Through photosynthesis, plants absorb carbon dioxide from the air and store it, creating a carbon sink. Today, you will become an invisible carbon catcher and imprint this power!”

(三) 請闖關者挑選了一片喜歡的葉子，用放大鏡 App 仔細觀察。

「葉子上葉脈，就像一條條小道路，幫助二氧化碳和水在葉子裡運輸，完成光合作用，釋放氧氣。」

Participants choose a leaf they like and use a magnifying glass app to examine it closely.

“The veins on the leaf are like tiny roads, carrying water and nutrients through the leaf to help with photosynthesis and the release of oxygen.”

(四) 關主帶著闖關者進行葉拓，完成碳匯魔法心願卡。

The game host guides participants in making leaf rubbings and completing the Carbon Sink Magic Wish Card.

四、 原理探討：

(一) 光合作用 (Photosynthesis)

1. 植物利用葉綠素，將二氧化碳 (CO₂) + 水 (H₂O) 在陽光作用下，轉化為 葡萄糖 (C₆H₁₂O₆) + 氧氣 (O₂) + 水(H₂O)

With sunlight, plants use chlorophyll to convert carbon dioxide (CO₂) and water (H₂O) into glucose (C₆H₁₂O₆) and oxygen (O₂) and water (H₂O).

2. 化學反應式：6CO₂+12H₂O+光能→C₆H₁₂O₆+6O₂+6H₂O

Chemical reaction formula: 6CO₂+6H₂O+light energy→C₆H₁₂O₆+6O₂

(二) 碳匯 (Carbon Sink)

植物把二氧化碳固定下來，儲存在自己體內，成為減少大氣 CO₂ 的力量。

Plants capture carbon from carbon dioxide and store it in their tissues as organic matter. This storage process reduces the amount of carbon dioxide in the atmosphere, making plants important carbon sinks.

(三) 葉片結構與功能 (Leaf Anatomy & Function)

1. 葉脈：運輸水分、礦物質、養分。

Veins: Transport water, minerals, and organic nutrients throughout the leaf.

2. 氣孔：吸收 CO₂，排出 O₂ 和水氣。

Stomata: Allow carbon dioxide (CO₂) to enter and release oxygen (O₂) and water vapor.

(四) 永續發展與 SDG 13 (氣候行動)

「完備減緩調適行動，以因應氣候變遷及其影響」

Target 13.3 在氣候變遷的減緩、適應、影響減少與早期警示上，改善教育、提升意識，增進人與機構的能力。

SDG 13: Climate Action calls for strengthening mitigation and adaptation measures to address climate change and its impacts. Target 13.3 specifically emphasizes enhancing education, awareness, and human and institutional capacity on climate change mitigation, adaptation, and early warning.

五、 參考資料：

1. 台灣氣候聯盟，取自 <https://www.tcp.org.tw/>
2. The Global Goals，取自 <https://globalgoals.tw/>
3. 南一五上自然科學第二單元植物世界、南一七上自然科學第二單元生物體的營養。