

## The Wind is Coming 起風了

### Renewable Energy

Wind turbines work on a simple principle: instead of using electricity to make wind—like a fan—wind turbines use wind to make electricity. Wind turns the propeller-like blades of a turbine around a rotor, which spins a generator, which creates electricity. As we look towards a more sustainable future along with a booming wind turbine industry in Taiwan it was fascinating for the students to discover Taiwan's prominent role in implementing this technology.

### Wind Turbines

During the early stages, the students learned about wind and where wind comes from. This knowledge was tied into why certain locations are good for turbines and others might not be. The students asked many questions about why the turbines are build offshore and how they survive storms.

Once the foundation was laid we challenged the students to plan and design their own turbine with the added incentive to see which one can rotate the fastest and remain stable while rotating in its base. The base was representative of the "Jacket" style used around the Taiwan coast. We focused on the design of the blades introduced several different options for the groups to plan and construct a propeller that will meet the criteria. The best part was testing the turbines to see the blades spin. Students were able to make adjustments to their designs after testing to make improvements where needed.

### 可再生能源

風力渦輪機的工作原理很簡單：它不像風扇那樣使用電力來產生風，而是利用風力來發電。風推動渦輪機的螺旋葉片轉動，帶動發電機並產生電能。當我們展望永續的未來，以及臺灣蓬勃發展的風力渦輪機產業時，學生們發現在臺灣這項科技其實非常突出。

### 風力渦輪機

在專題初期，學生們學習風以及風從哪裡來。這些知識與渦輪機適合放置的地點密切相關。學生們問了很多問題，如為什麼要在近海建造渦輪機，以及如何抵擋暴風雨等。

奠定基礎知識後，老師們要求學生規劃並設計自己的渦輪機，且測試哪個渦輪機在其底座旋轉時轉速最快且保持穩定。此底座代表臺灣沿海渦輪機使用的「套筒式」底座。老師著重介紹葉片的設計，以及其不同的種類，使學生能規劃和建造符合標準的螺旋葉片。最棒的是測試渦輪機的階段，學生可以觀察葉片旋轉，並在測試後對自己的設計進行調整及改進。

### 1 ASK + IMAGINE 提問 + 創思

We learned about wind turbines and their role in supplying green energy. 我們了解到風力渦輪機及其在提供綠色能源中扮演的角色。



### 3 PLAN 計畫



We designed different turbine blades to show how shape and size will affect their spin rate. 我們設計出不同的渦輪葉片，以展示形狀和尺寸如何影響其轉速。



### 4 CREATE 創造



Testing showed us if our designs were successful and how fast they rotated. 經由測試，我們得知設計是否成功以及它們的轉速。

### 5 IMPROVE 改進



We had a chance to improve or redesign the blades after testing. 測試後，我們有機會改進或重新設計葉片。