

Building a Spirometer! 製作肺量計！

Inquiries and Extension of Learning

What is the one thing that we need to survive, that space does not have? Yes, air! In this project, the students learned about our Respiratory System and Circulatory System, and what their functions are. They also learned how to measure their “tidal volume”, how much air you exhale in one breath. They then used this knowledge to design and create a spirometer to measure their “tidal volumes”.

Application of Knowledge

They first had to measure how many times they breathe in one minute, and then they used that number to calculate how many times they would breathe in 8 months. After testing their tidal volume, they had to calculate how much air their group (four members), would need to make the eight month journey to Mars. They worked very closely together to not make any mistakes in their calculations.

Reflection

After testing their spirometers, the students discovered that it is not always the biggest person that can exhale the most air in one breath. Sometimes the smallest, fittest person can exhale more air in one breath than a bigger person can. The students learned a lot through this project and enjoyed it thoroughly!

學習的探究與延伸

有什麼是外太空沒有，但人類卻仰賴其存活的？沒錯，是空氣！在這個專題中，學生們學到人類呼吸和循環系統的功能。他們還學會如何測量他們的「潮氣量」，也就是你一口氣呼出多少空氣。於是，他們運用這些知識設計並製作了一個肺量計來進行測量。

知識的應用

學生首先必須測量他們在一分鐘內呼吸的次數，並使用該數字來計算他們在8個月內會呼吸幾次。在測試了他們的潮氣量之後，他們開始計算他們的團隊（四名成員）在八個月的火星之旅中需要多少空氣。團隊間必須密切合作，以免在計算中出現任何錯誤。

反饋

學生們在測試他們的肺量計時發現，一口氣能呼出最多空氣的並不總是最高壯的人。有時，最瘦小的人一口氣能呼出更多的空氣。他們通過這個專題學到了很多，並且非常享受！

1 ASK + IMAGINE 提問 + 創思

We conducted several inquiries to study breathing and the effects of Carbon dioxide.

我們進行了幾次調查來研究呼吸和二氧化碳的影響。



3 PLAN 計畫



Groups used the material to plan their Spirometer designs.

小組運用這些材料來設計他們的肺量計。

4 CREATE 創造



We tested the effectiveness of our spirometers.

我們測試我們的肺量計可不可行。

5 IMPROVE 改進



Several improvements were made following the testing.

在測試後，我們對肺量計進行許多改造。

6 PRESENT 展現



Results of testing and any other findings were shared and recorded.

小組們分享並記錄測試結果和任何新發現。