

中一至中三教材

Secondary 1 to 3 Teaching Materials

實驗1 | 「測量浮力」

Experiment 1 | “Measuring Buoyancy Force”



所需材料

Materials
Required



一個彈簧秤
A spring scale



一個裝滿水的燒杯
A beaker filled with water



各種重物(例如:小重物或物體)
Various weights
(e.g. small weights or objects)



一把尺子
Ruler



步驟

Procedure

1

用彈簧秤測量空氣中的物體重量

Measure the weight of an object in air using the spring scale.



2

將物體完全浸入水中，並測量新的重量

Submerge the object in the water and measure the new weight.



3

計算浮力(重量的差值)

Calculate the buoyant force (the difference in weight)



4

用不同的物體重複實驗並記錄結果

Repeat with different objects and record results.



控制實驗

Control
Experiments



在不同的液體(例如:鹽水)中使用相同的物體以觀察浮力的變化

Use the same object in different liquids
(e.g. saltwater) to observe changes in buoyancy.



討論

Discuss

浮力 如何等於 排開水 的重量？

How does the buoyant force equate the weight of the water displaced?

定量地說明阿基米德原理

Please illustrate Archimedes' principle quantitatively.

討論

Discuss

是什麼令物件下跌/下沉？

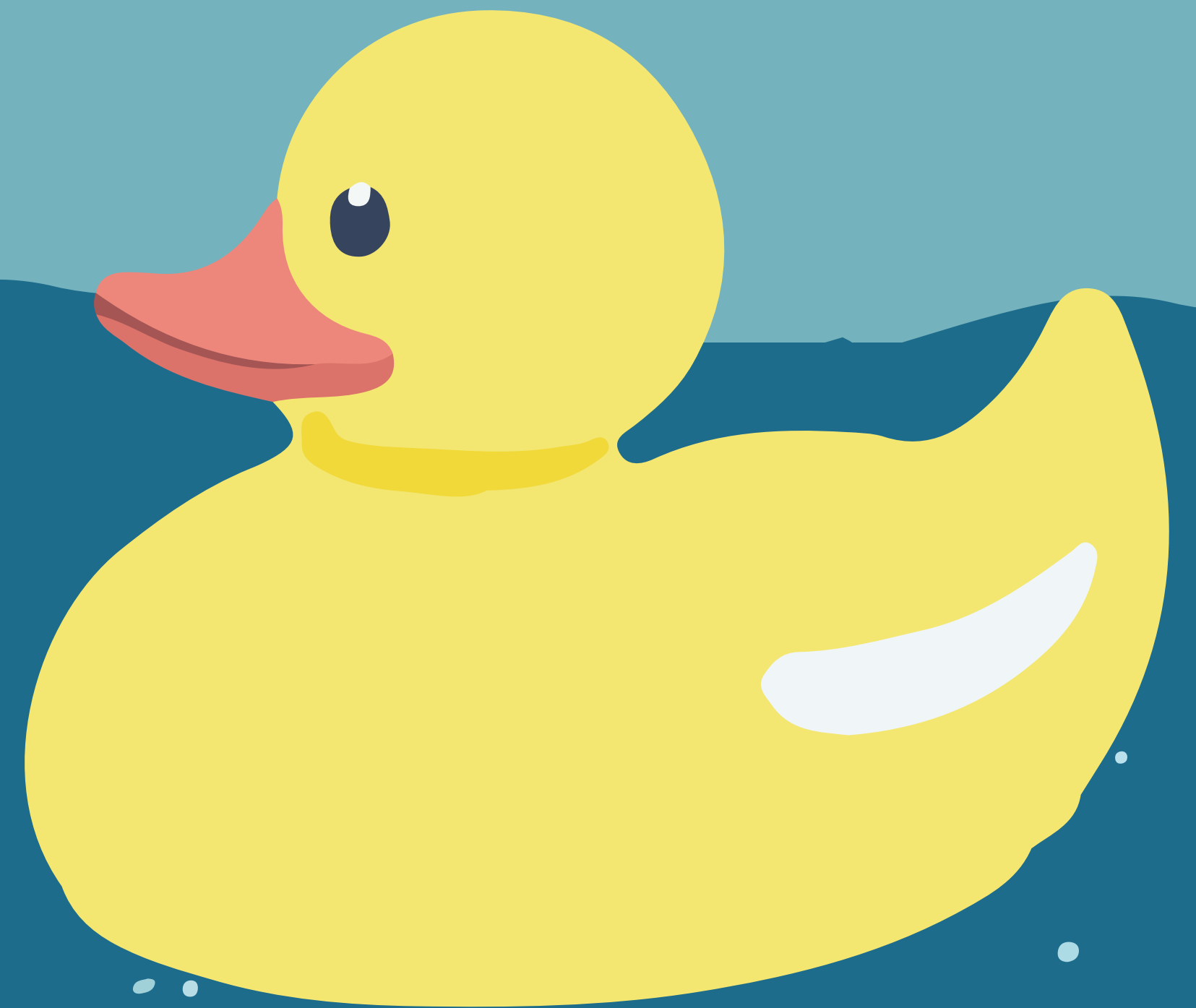
What causes an object to fall/sink?

討論

Discuss

什麼令物件不跌卻浮？

What causes an object to not sink but float?



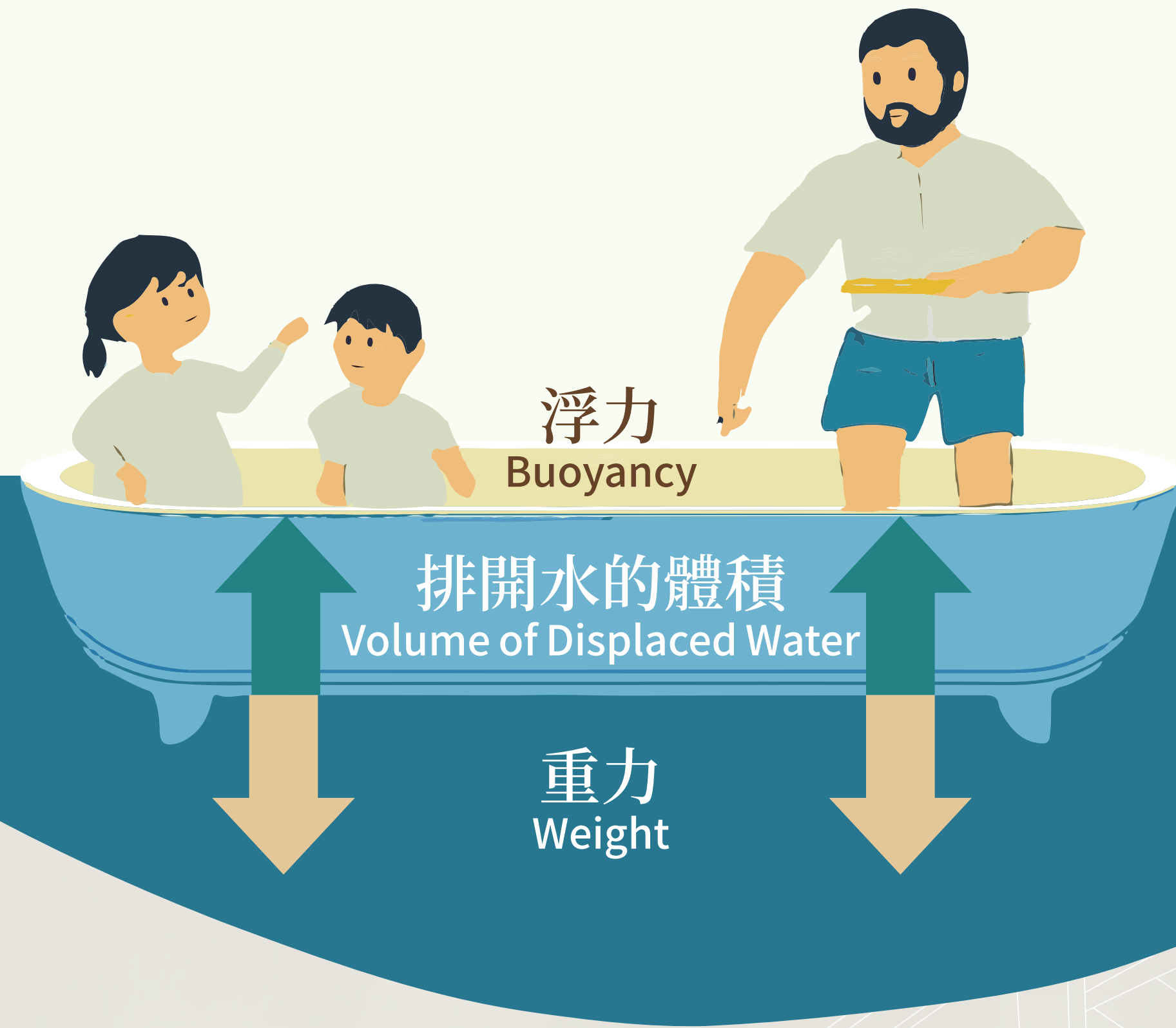
討論

Discuss

什麼情況下會沉、會浮？

Under what circumstances will an object sink or float?





實驗2 | 「阿基米德原理實驗」

Experiment 2 | "Archimedes' Principle in Action"



所需材料

Materials
Required



一個量筒
A graduated cylinder



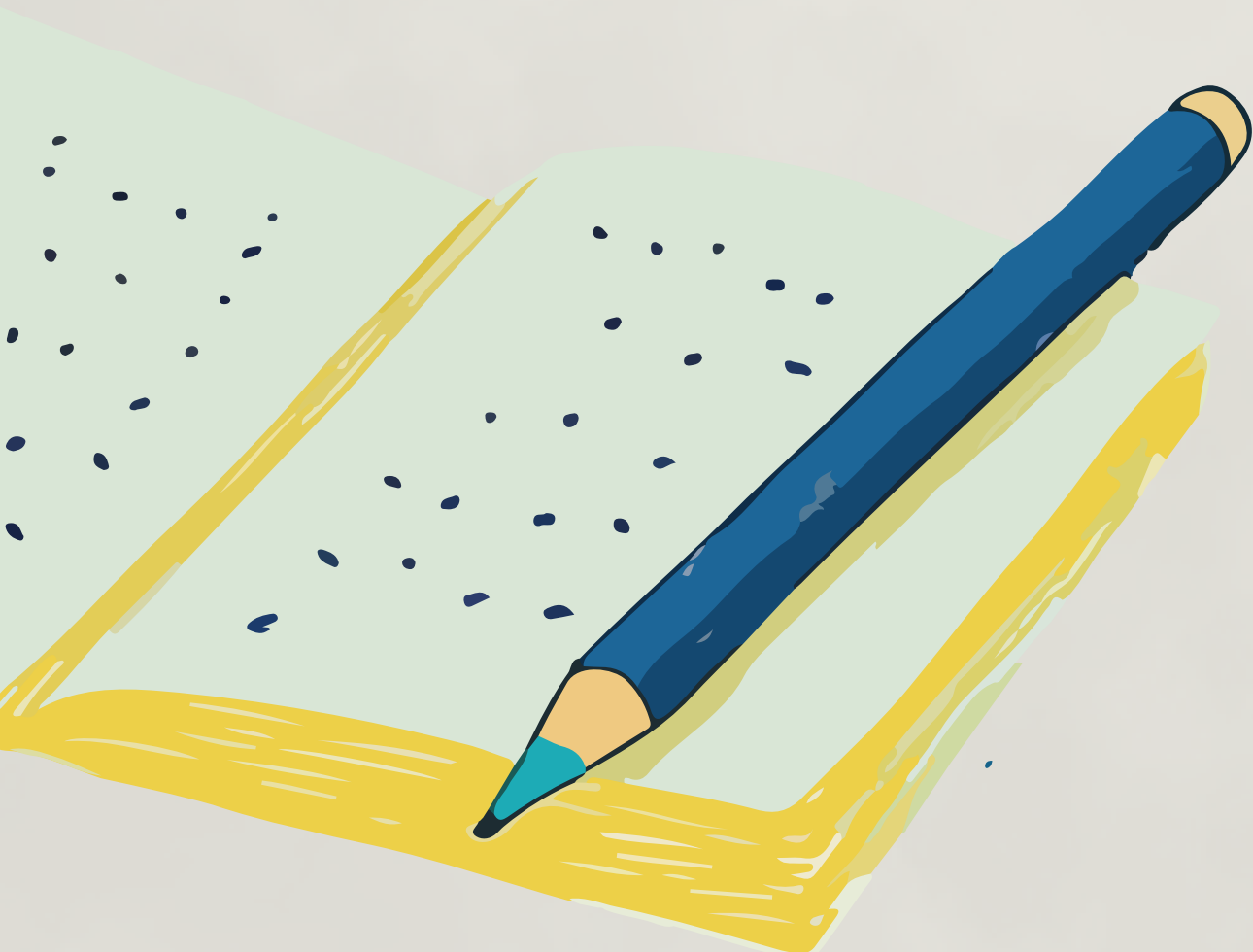
一個秤
A scale



各種固體物體 (例如: 金屬立方體、橡膠球)
A variety of solid objects (e.g. metal cube, rubber ball)



水
Water



步驟

Procedure



1

測量量筒中的初始水位

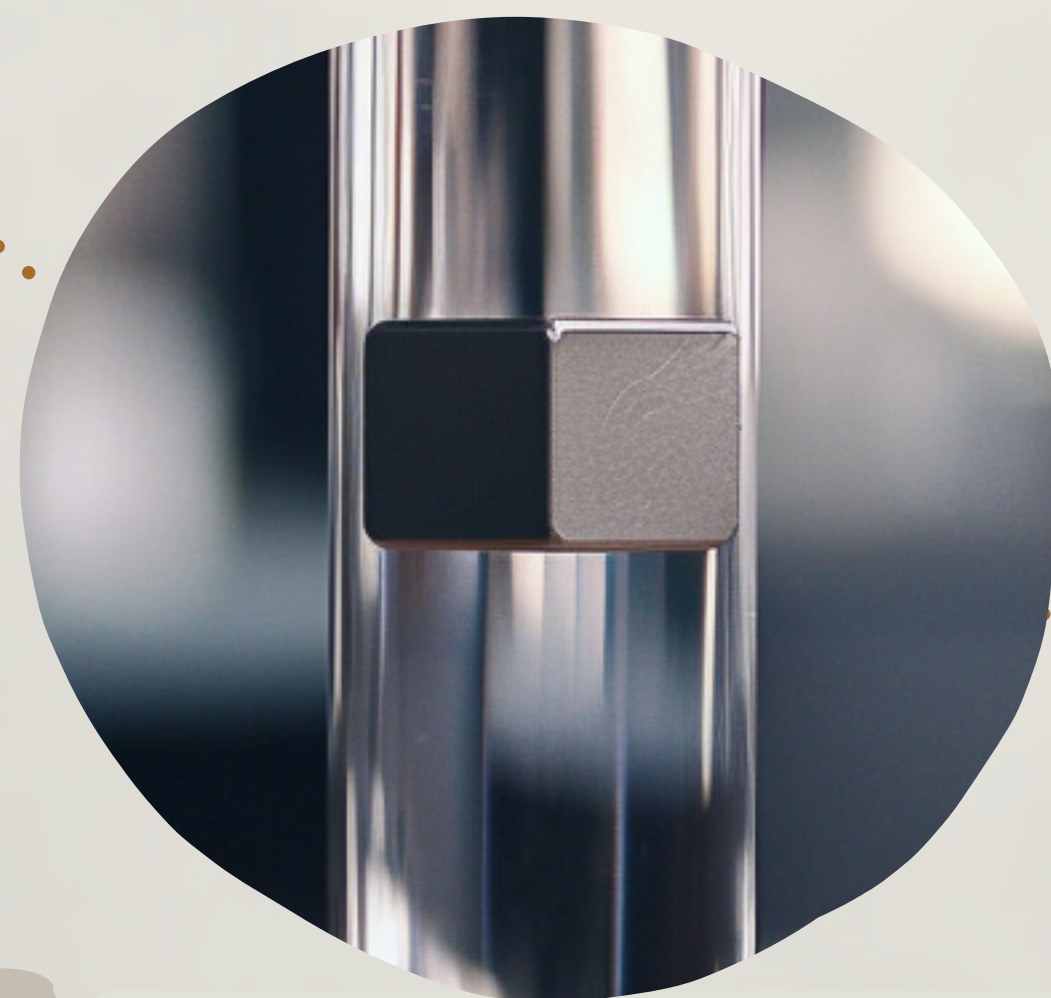
Measure the initial water level in the graduated cylinder.



2

秤量每個物體並記錄其重量

Weight each object and record its weight.



3

將物體完全浸入水中並測量新的水位

Submerge the object completely in the water and measure the new water level.



4

計算排開水的體積

Calculate the volume of water displaced.



5

將排開水的重量與物體的重量進行比較

Compare the weight of the displaced water to the weight of the object.

控制實驗

Control
Experiments



測試相同大小但不同材料的物體以討論密度

Test objects of the same size but different materials to discuss density

討論

Discuss

浮力

Buoyancy

重量

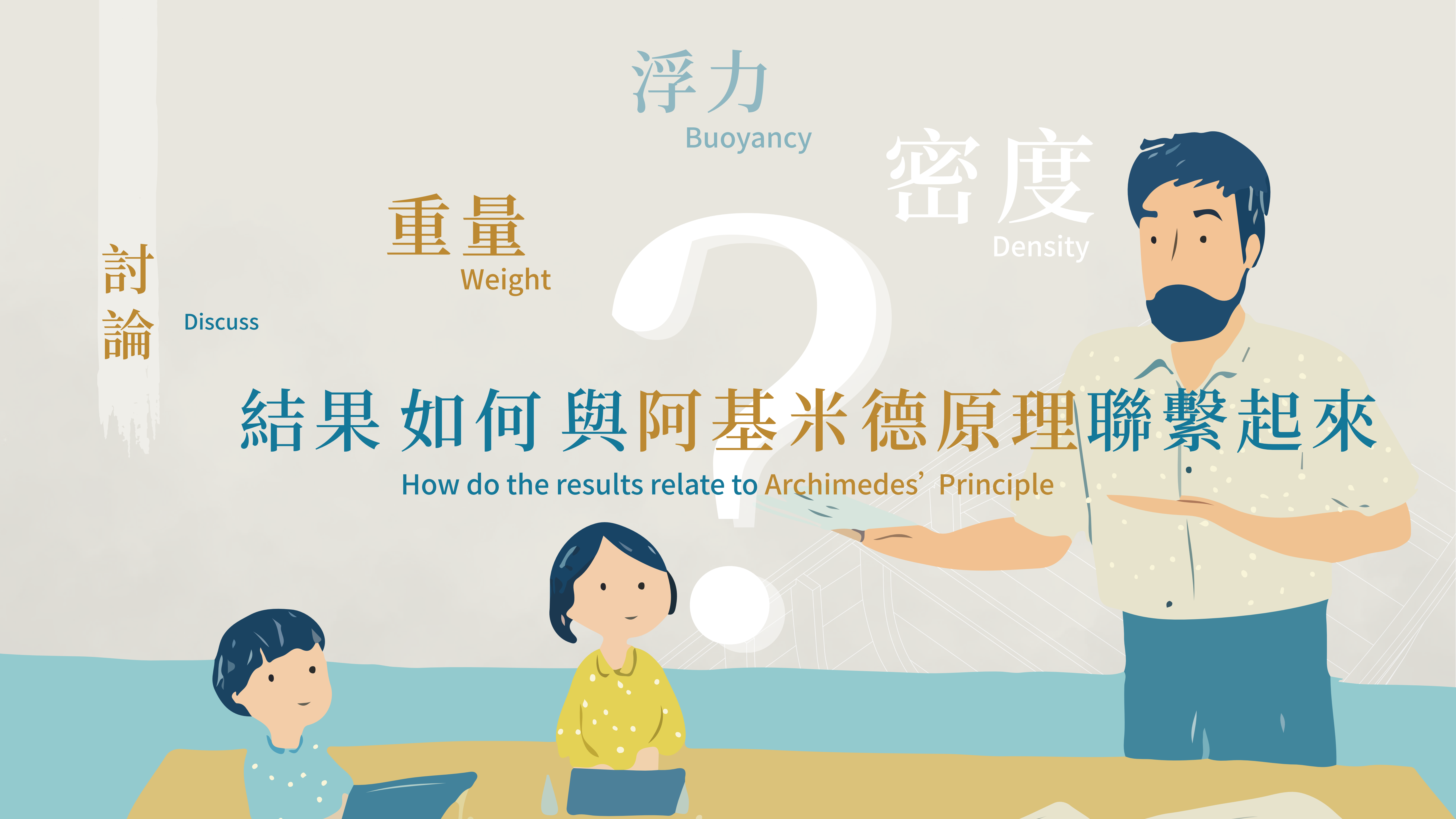
Weight

密度

Density

結果如何與阿基米德原理聯繫起來

How do the results relate to Archimedes' Principle



理解問題

Understanding
Questions



密度如何影響浮力
What makes an object float

為什麼船即使是金屬 製造的也能漂浮

Why do ships float even though they are
made of metal

多項選擇

Multiple
Choice

浮力等於...?

The buoyant force is equal to...?

A

物體的重量

The weight of the object

B

排開水的重量

The weight of the water displaced

C

物體的體積

The volume of the object

D

物體的密度

The density of the object

多項選擇

Multiple
Choice

浮力等於...?

The buoyant force is equal to...?

A

物體的重量

The weight of the object

B

排開水的重量

The weight of the water displaced



C

物體的體積

The volume of the object

D

物體的密度

The density of the object

多項選擇

Multiple
Choice

什麼情況會增加物體的浮力？

Which condition would increase the buoyant force on an object?

A

增加物體的重量

Increasing the object's weight

B

增加排開的水的體積

Increasing the volume of water displaced

C

減少物體的密度

Decreasing the object's density

D

減少水位

Decreasing the water level

多項選擇

Multiple
Choice

什麼情況會增加物體的浮力？

Which condition would increase the buoyant force on an object?

A

增加物體的重量

Increasing the object's weight

C

減少物體的密度

Decreasing the object's density

B

增加排開的水的體積

Increasing the volume of water displaced

D

減少水位

Decreasing the water level



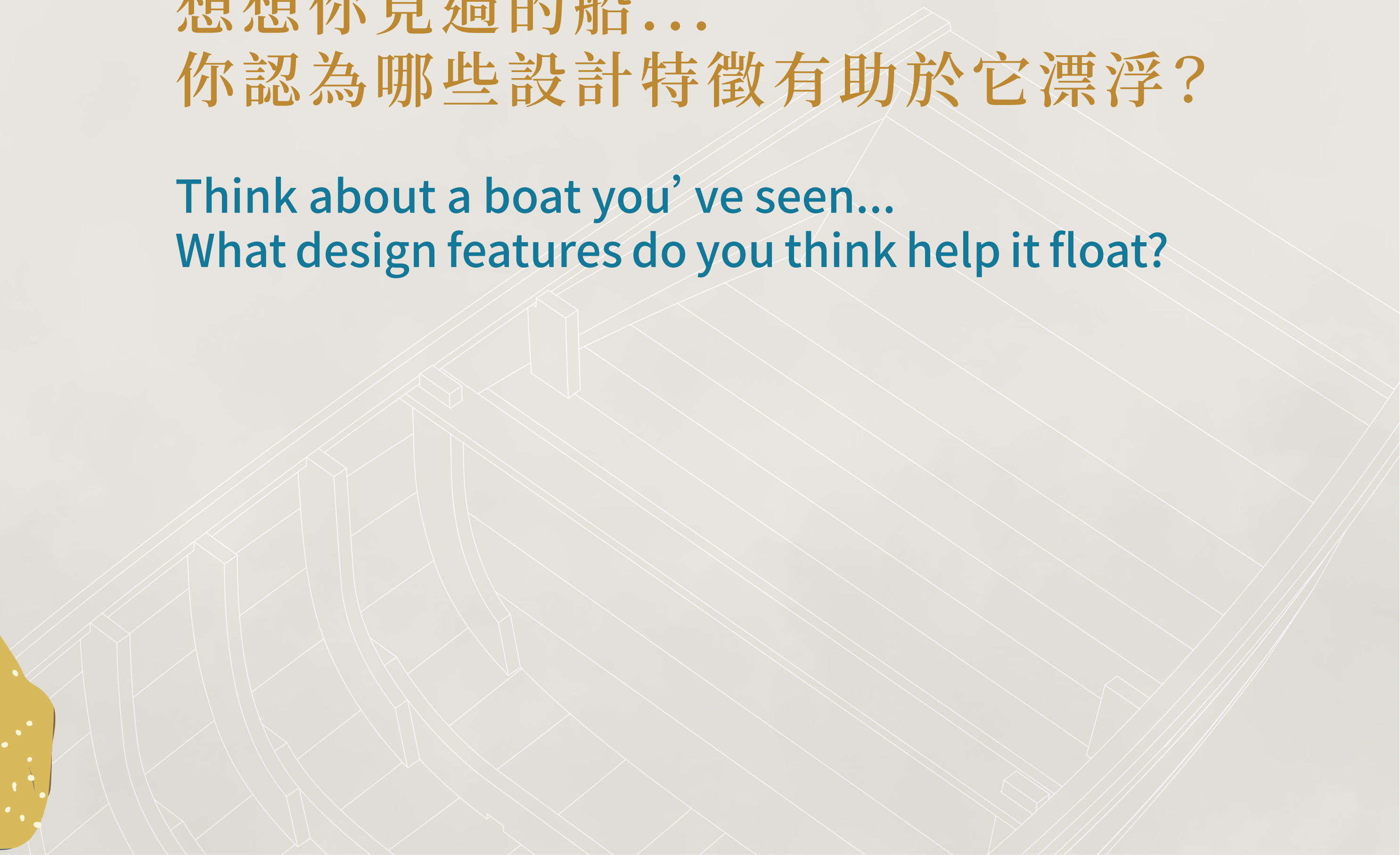
反思

Reflect



想想你見過的船...
你認為哪些設計特徵有助於它漂浮？

Think about a boat you've seen...
What design features do you think help it float?



答

反思

Reflect



浮力：

浮力是允許物體漂浮的力量，取決於排開水的重量

設計特徵：

寬大的形狀可以排開更多水，使得更重的物體能漂浮

Buoyant Force:

The buoyant force is the force that allows objects to float, determined by the weight of displaced water.

Design Features:

A wide shape can displace more water, enabling heavier objects to float.