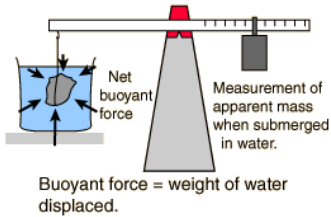


Archimedes' Principle

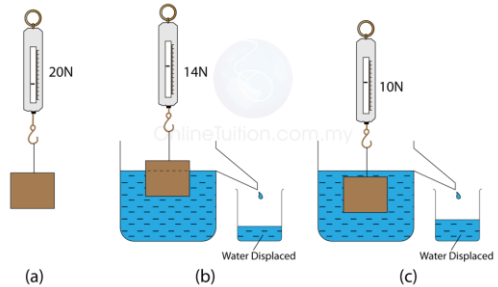
- The buoyant force acting on an object in a fluid is equal to the _____ of the fluid

_____.



Archimedes' Principle

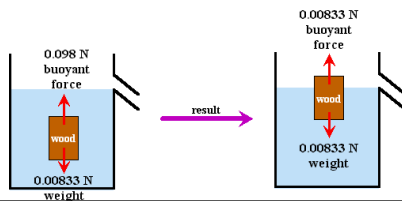
- What is the buoyant force for (b) and (c)?



Archimedes' Principle

- Why does the floating object have less buoyant force?

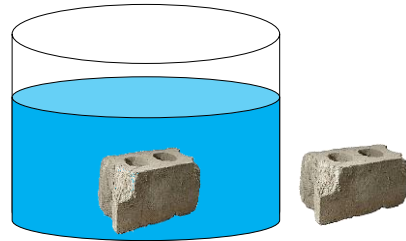
Answer:



Archimedes' Principle

Which block is easier to pick up? Why?

Answer:



Check your Understanding

- Where does the man weigh the least, when he is completely out of the water, partially submerged as shown, or when he is completely submerged? Or is the answer none of the above, he weighs the same regardless of his position in the water.



Buoyancy

- If the buoyant force of the fluid is equal to or greater than the weight of the object, the object _____. If the buoyant force of the fluid is less than the weight of the object, the object _____.
- If an object is buoyant, it will float.



Weight vs. Buoyancy-- which one wins?

Think of **gravity** & **buoyancy** as 2 opposing forces.

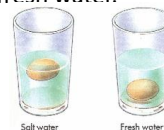
_____ (gravity) pulls down,

_____ pushes up.

Buoyancy

Do objects float differently in different fluids?

Fluids that are more _____ provide more _____. Salt water is more dense than fresh water because of the salt. This gives it more **buoyancy**, and as a result objects float _____ in salt water than they do in fresh water.



Example

- A 5-cm³ block of lead weighs 0.55 N. The lead is carefully submerged in a tank of mercury. One cm³ of mercury weighs 0.13 N. What is the weight of the mercury displaced by the block of lead? Will the block of lead sink or float in the mercury?

A coin floats in mercury.
Will a lead weight float?



Practice

A 15 cm³ block of gold weighs 2.8 N. It is carefully submerged in a tank of mercury. One cm³ of mercury weighs 0.13 N.

- a. Will the mercury be displaced by the gold?
- b. Will the gold sink or float in the mercury?

Check your Understanding

An object with a weight of 25 Newtons displaces 30 Newtons of water. Will the object sink or float? Explain your answer.

Check your Understanding

Suppose a rock's weight is measured as 7 newtons when suspended by a string. When the rock is lowered by the string into the water, it displaces an amount of water that weighs 3 newtons. What is the buoyant force on the rock? What is the weight of the rock when submerged in the water?