Gravitation - Lesson 19
Buoyancy

We all must have wondered at some point in our lives how a ship, which is made of metal, remains afloat on the water, whereas a spoon, which is also made up of metal, sinks? There must be some force that pushes the ship out of the water. What is this force? To remain afloat on any fluid (water, air, liquid nitrogen, concentrated H_2SO_4), we need to keep only one thing in mind, the upward force experienced by the object must be equal to the object's weight. When this is balanced, the object remains still at a point as no external forces act upon it, and the object is at equilibrium. **This upward force is called the buoyant force, and the phenomenon of experiencing this is called buoyancy. Buoyant force always acts opposite to gravity.** But, what is the upward force, and how do we know if it is enough to push an object on the surface of the water?

You should, now, be able to answer the following questions:

1. Define buoyancy?
2. What is the condition under which a body will float when immersed in fluid?

Conclusion

When an object is immersed in a fluid, it experiences a buoyant force which is always acting opposite to gravity.

Note to Teacher

The lesson aims to establish the concept of buoyancy. The text states facts about buoyancy to instigate thought and enquiry into the reader. It does not describe the "Why?". The conclusion of the text is that the buoyant force always acts opposite to gravity.

Student Worksheet

1. What is the force experienced by an object when immersed under water?
2. Force of buoyancy always acts:
    (a) opposing the motion of the object
    (b) opposing gravity
    (c) towards gravity
    (d) None of the above
3. Force of buoyancy is also known as _____.

Answers

1. When an object is immersed in a fluid, it experiences a buoyant force which is always acting opposite to gravity, and the phenomenon of experiencing this is called buoyancy.
2. When an object is immersed in a fluid, if the upward or the buoyant force experienced by the object is equal or greater than the object's weight, the object will float.

Student Worksheet Answers

1. Force of buoyancy
2. (b) opposing gravity
3. Buoyant force