Provincial Department of Education - Sabaragamuwa - Weekly School

Subject - Science

Week - November IV

Grade - 10

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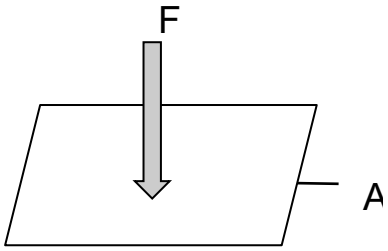
3rd Term – Revision Exercises

Pressure is the force acting on unit area. Pressure is caused by solids, liquids and gases.

Pressure due to solid objects



$$\text{Pressure} = \frac{\text{Perpendicular force applied (F)}}{\text{Area (A)}}$$

1. What are the units of pressure?.....
2. Is the pressure a scalar quantity or a vector quantity?.....
3. A cubic shaped box is placed on a table. The weight of the box is 300N and the area of the box is 0.5 m^2. What is the pressure exerted by the box on the table?

   .....

   .....

Hydrostatic pressure

Characteristics of hydrostatic pressure :-

- ★ The water pressure acts in every direction.
- ★ The pressure at the same level of a liquid is the same.
- ★ As the depth of a liquid increases the pressure increases. Similarly in shallow places the liquid pressure decreases.
- ★ Liquid pressure depends on the vertical height of the liquid column. It does not depend on the shape of the liquid column.

1. In a liquid in which density is ρ, write a statement for the pressure at point A, which is at a depth of "h" from the surface.
   .....
2. Find the pressure exerted on a point at the bottom of an indoor water tank which is 2m deep. (Density of water = 1000 kgm^{-3}, g = 10 ms^{-2})
   .....
   .....
   .....
3. The length, depth and width of a water-filled tank are 10m, 4m, and 5m, respectively. What is the pressure at the bottom of the tank? (Density of water = 1000 kgm^{-3}, g = 10 ms^{-2})
   .....
   .....
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Pressure due to gases

There are two ways in which pressure can be produced by a gas.

- ★ The pressure caused by the weight of a column of gas.
- ★ The pressure arises when a compressed gas is attempting to expand.

At any point in the atmosphere, the pressure exerted by the weight of the air above it is called atmospheric pressure.

1. Does the atmospheric pressure decrease / increase as the height of the air column decreases when going above sea level ?
2. Who first measured atmospheric pressure? Draw and label the instrument used for that purpose.
3. Write two applications of the atmospheric pressure in daily life.
4. A hydrometer is an instrument used to measure the density of a liquid. Hydrometer is produced based on the Archimedes principle. In a liquid with high density, it submerges less and float. Explain this using Archimedes principle.
5. Create a simple hydrometer using resources available from the environment and compare the densities of the following liquids.
   - Kerosene
   - Coconut oil
   - Salt solution