BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI – 110034

SUBJECT:- PHYSICS CLASS VIII

CHAPTER:FORCE AND PRESSURE

TOPIC:-PRESSURE

GUIDELINES

Dear Students

- This lesson is based on the topic **Pressure Exerted By Liquids And Gases**.
- Attempt the assignment questions in Physics notebook.
- **A video link** has been provided for better understanding of the concept and to enable you to attempt the assignment.
- Read the chapter from the **NCERT textbook** also using the link given below:

http://ncert.nic.in/textbook/textbook.htm?hesc1=11-18

SUB - TOPIC

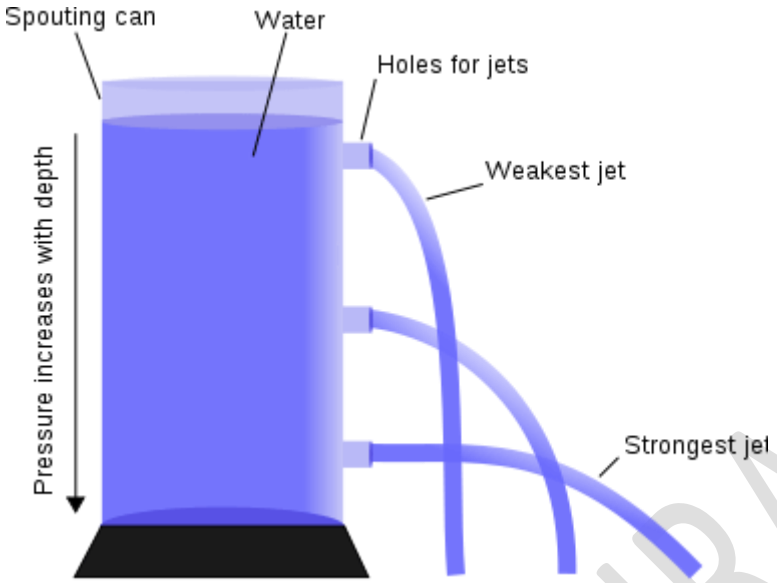
PRESSURE EXERTED BY LIQUIDS

Liquids exert pressure on the base of a vessel. The **pressure exerted** by a **liquid** changes with the depth of a vessel. The **pressure exerted** by a **liquid** is more towards the bottom of the vessel and keeps increasing as we go deeper.

Liquids also exert pressure as we will learn from the following activities.

ACTIVITY-

- **Take a plastic container and make four holes in it at different heights.**
- **Now fill the container with water and let water keep flowing into it from a tap.**
- **Observe that water comes out with greater force from the holes at greater depth.**
- **Also, water flowing out of the hole that is closest to the bottom of the container, flows the farthest.**
- **Thus we conclude that pressure in a liquid increases with increasing depth.**

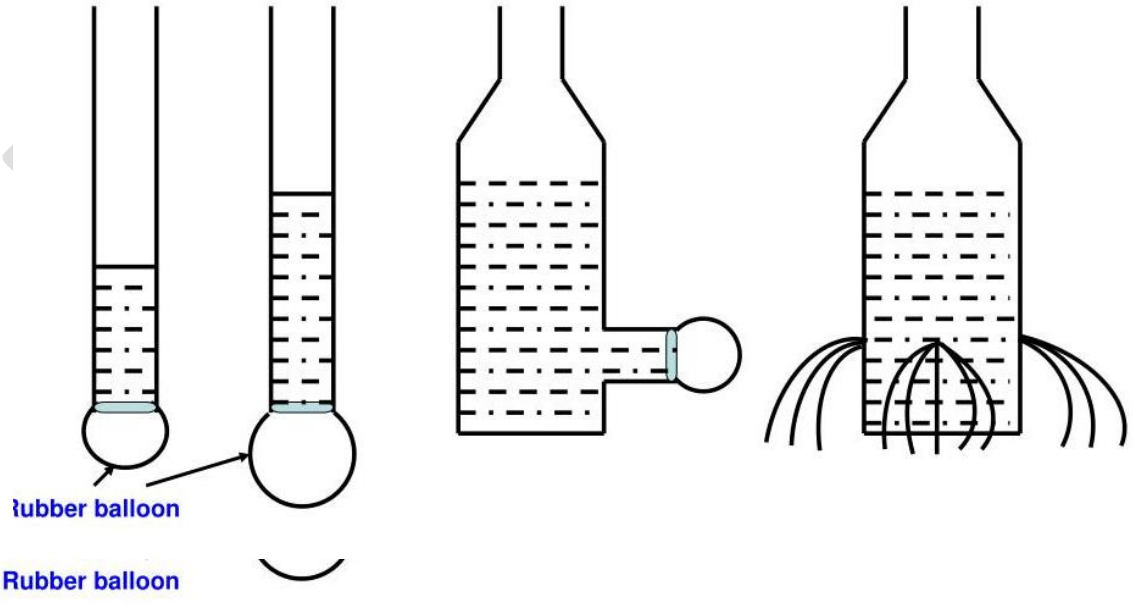


WATER PRESSURE INCREASES WITH DEPTH

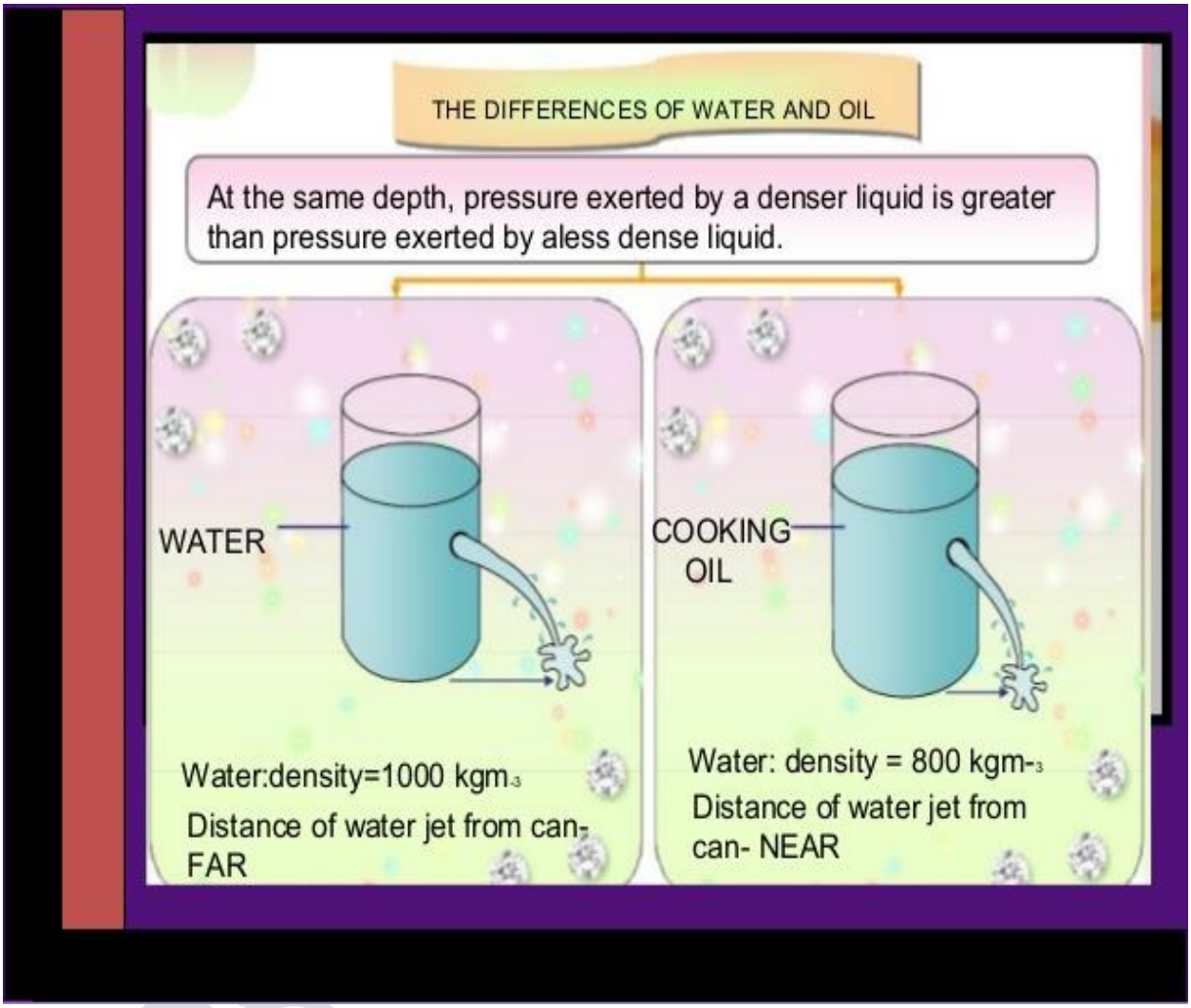
Please Note:

Pressure exerted by liquids:-

Liquids exert pressure on the walls of a container.
Liquids exert pressure on the bottom of a container. It depends upon the height of the liquid column.
Liquids exert sideways pressure.
Liquids exert equal pressure at the same height.



THE PRESSURE EXERTED BY A DENSER LIQUID IS GREATER THAN THE PRESSURE EXERTED BY A LESS DENSE LIQUID.THIS WILL GET CLEAR WITH THE HELP OF THE FOLLOWING DIAGRAM:



Click on the link given below and watch the video for better understanding:

https://youtu.be/Cvp6mLWbgaM

Why do liquids have pressure?

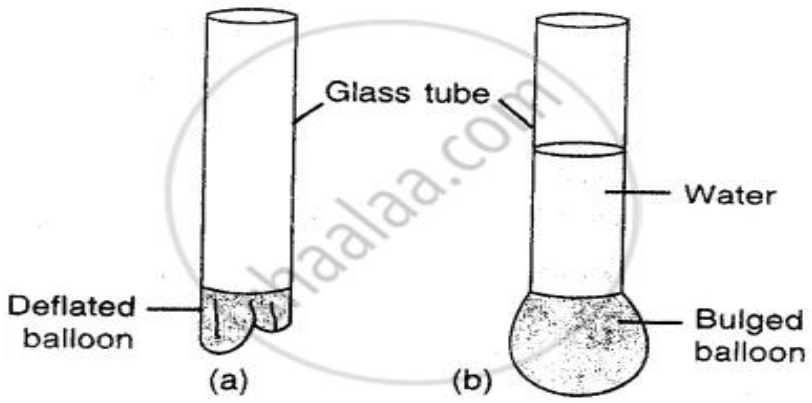
A **liquid** is a nearly incompressible **fluid** that conforms to the shape of its container but retains a (nearly) constant volume independent of **pressure**. As such, it is one of the four fundamental states of matter (the others being solid, gas, and plasma), and is the only state with a definite volume but no fixed shape.

Let us try a few more activities to gain more clarity

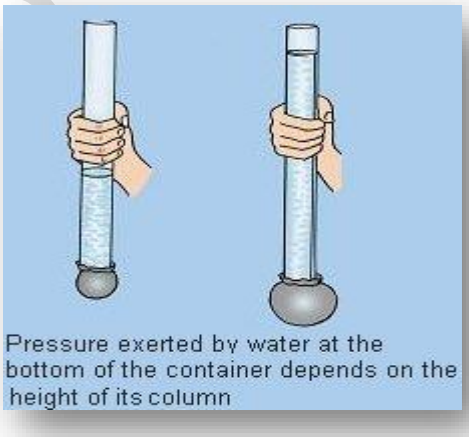
ACTIVITY 1 – LIQUIDS EXERT PRESSURE DOWNWARDS

STEP 1: Take a transparent glass tube or a plastic pipe. The length of the pipe/ tube should be about 15 cm and its diameter should be 5-7.5 cm.

STEP 2: Take a piece of thin sheet of good quality rubber, say, a rubber balloon. Stretch and fix the rubber



sheet tightly over one end of the pipe. Hold the pipe at the middle, keeping it in a vertical position. Ask one of your friends to pour some water in the pipe.
Does the rubber sheet bulge out?
Also note the height of the water column in the pipe. Pour some more water.



STEP 3: Observe again the bulge in the rubber sheet and the height of the water column in the pipe.
Repeat this process a few more times. Can you see any relation between the amount of the bulge in the rubber sheet and the height of the water column in the pipe?

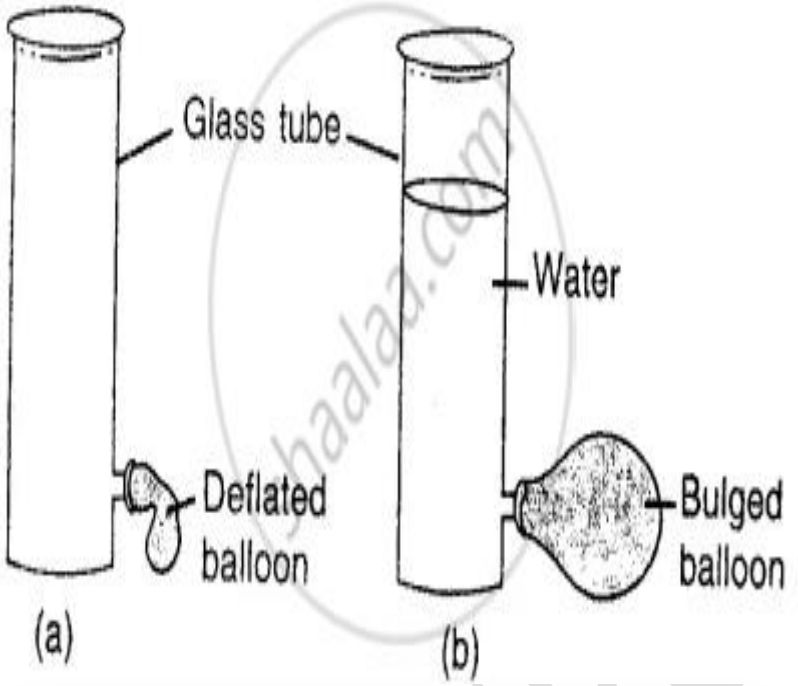
Thus the conclusion is that pressure exerted by water at the bottom of the container depends on the height of the column.

ACTIVITY 2 – LIQUIDS EXERTS PRESSURE SIDEWAYS

STEP 1: Take a plastic bottle. (You can take a discarded water bottle or a soft drink bottle.)

STEP 2: Fix a cylindrical glass tube, a few centimeters long, near its bottom. You can do so by slightly heating one end of the glass tube and then quickly inserting it near the bottom of the bottle (refer to the figure given below). Make sure that the water does not leak from the joint. If there is any leakage, seal it with molten wax.

STEP 3: Cover the mouth of the glass tube with a thin rubber sheet. Now fill of the bottle with water. What do you observe? Why does the rubber sheet fixed to the glass tube bulge this time? Pour some more water in the bottle. Is there any change in the bulge of the rubber sheet? **Yes, the rubber sheet bulges out.**



WE CONCLUDE THAT WATER EXERTS PRESSURE ON THE SIDES OF THE CONTAINER AS WELL

ACTVITY 3- PRESSURE AT THE SAME DEPTH IS THE SAME IN ALL DIRECTIONS

STEP 1: Take an empty plastic bottle or a cylindrical container. (You can take a used tin of talcum powder or a plastic bottle.)

STEP 2: Drill four holes all around near the bottom of the bottle. Make sure that the holes are at the same height from the bottom .

STEP 3: Now fill the bottle with water. We observe that the water coming out of the holes falls at the same distance from the bottle. What does this indicate? This indicates that liquids exert equal pressure at the same depth.

LIQUID EXERTS EQUAL PRESSURE ON THE WALLS OF THE CONTAINER

ASSIGNMENT :-

Q1.One student says that water exerts pressure on the bottom of the bucket but another student says that water exerts pressure on the sides of the bucket. What would you like to say?

Q2.Two tiny holes are made in a plastic bucket, one near the middle part and other just above the bottom. When the bucket is filled with water, the water rushes out from the bottom hole much faster than from the upper hole. What conclusion do you draw from these observations?

Q3. Why do deep sea divers have to wear specially designed suits?

Q4. Does pressure exerted by a liquid increases or decreases with depth? Explain with the help of an activity.

Q5. Observe the vessels A, B, C and D shown in Fig.11.10 carefully.

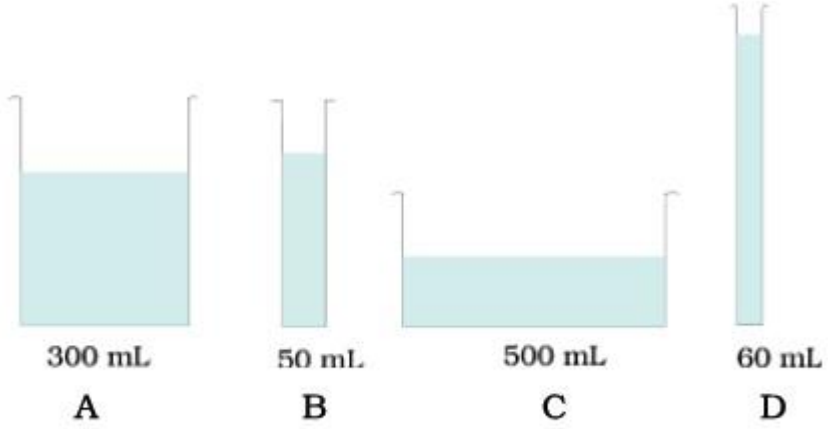


Fig. 11.10

Volume of water taken in each vessel is as shown. Arrange them in the order of decreasing pressure at the base of each vessel. Justify your arrangement.

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