Ch. 13 Review Questions ; 11th edition
pg. 242

1. Give two examples of a fluid.

Ans. Liquids and gasses are fluids. Therefore, air and water are examples of fluids.

2. Distinguish between force and pressure.

Ans. Correctly ask and answer this question in class for + 2 points.

3. What is the relationship between liquid pressure and the depth of a liquid?

Ans. Pressure at depth 'h' = density of fluid x g x h.
Pressure is directly proportional to depth. If you triple the depth, you triple the pressure.

What is the relationship between liquid pressure and the its density?

Ans. Pressure is directly proportional to the density of the liquid. If you use a fluid with double that of the original, the pressure will double.

4. If you swim twice as deep under water, how much more water pressure is exerted on your ears?

Ans. Because fluid pressure is directly proportional to depth, you would experience twice as much pressure if depth were doubled.

How does pressure beneath salt water compare to pressure beneath fresh water at the same depth?

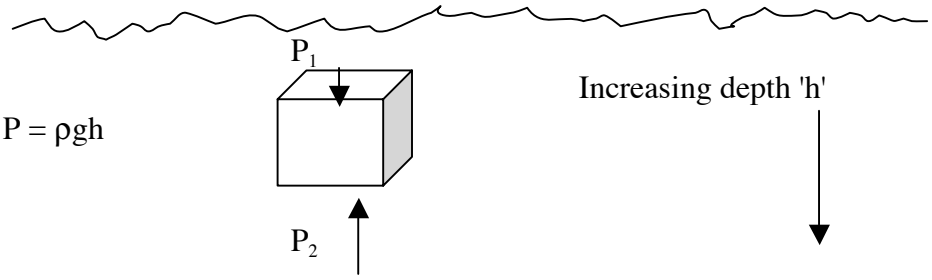
Ans. Salt water is denser than fresh water. Since pressure at depth is proportional to the density of the fluid, pressure will be greater beneath the salt water than the fresh water at the same depth.

5. How does water pressure one meter below the surface of a small pond compare to water pressure one meter below the surface of a large lake?

Ans. The pressures will be equal. The pressure on an object submerged in a fluid does not depend on the surface area of the fluid or object.

7. Why does buoyant force act upward on an object submerged in a fluid?

Ans. The buoyant force on an object submerged in a fluid is caused by the pressure difference between the top and bottom of the object. The larger pressure at greater depth pushes upward on the object.



9. How does the volume of a solid, insoluble object submerged in a fluid compare to the volume of the fluid displaced?

Ans. Their volumes are equal. Archimedes was the first to realize this.

Ch. 13 Review Questions ; 11th edition
pg. 242 continued

16. Does the buoyant force on a submerged object depend on the volume of the object?
Ans. Yes! Yes! Yes!

21. What happens to the pressure in all parts of a confined fluid if the pressure in one part is increased?
Ans. It increases until the pressure is equal in all places within the confined fluid.

Extra: How does the buoyant force acting on a boat floating at rest compare to the weight of the boat?
Ans. They are equal in magnitude and opposite in direction.

Plug and Chug; p. 243

1. Calculate the water pressure at the bottom of the 100-m high water tower shown in fig. 13.2

2. Calculate the water pressure at the base of the Hoover Dam. The depth of the water is 220 meters.

Do the above two problems for a total of 2 pts-Hand it in.

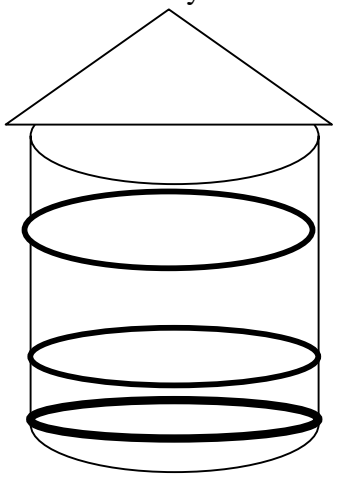
Hewitt, 11th edition
Ch. 13 Exercises pg. 244

2. Why does a sharp knife cut better than a dull knife?
Ans. A sharp knife produces more pressure than a dull knife when the same force is applied. Pressure is inversely proportional to the area of contact.
P = F/A A sharp knife applies the force over a smaller area resulting in a larger pressure.

5. Why are persons confined to bed less likely to develop bedsores on their bodies if they use a waterbed rather than an ordinary mattress?
Ans. Ask in class.

6. An exciting demonstration is walking on glass with bare feet. Although I don't recommend that you try this at home, it is based on a sound physics principle. Can you explain the concept?
Ans. If you use the right glass, you can break it up into a lot of small pieces that don't have narrow points. When you walk on the glass, the total area of contact is large and because pressure is inversely proportional to area, the pressure on your feet will be small.

12. Why is a water tower elevated?
Ans. Water pressure is directly proportional to the height or depth of the water.
$\text{Presure at depth} = \rho_{fluid} \bullet g \bullet \text{depth}$. The higher the tower is above the faucet, the greater the water pressure will be. If you double the height, you will double the pressure.



Why are the hoops closer together near the bottom of the water tower?
Ans. The increase pressure at depth produces a larger force pushing out on the walls of the tower.

Ch. 13; 11th edition
Exercises pg. 244

14. An aluminum block and a lead block, each with the exact same volume of 10 cm^3 are submerged in water. How does the volume of water displaced compare?
Ans. They have the same volume, so they displace the same amount of water. Volume is a measure of the amount of space that an object occupies.

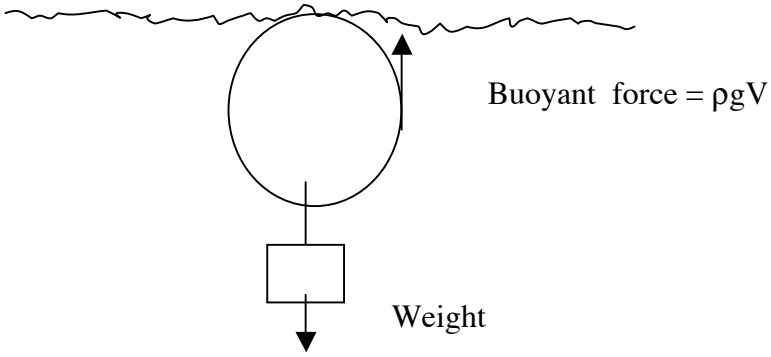
23. Why do you appear to weigh less when you wade out into the water?
Ans. There is a buoyant force pushing you up. It is caused by the larger water pressure at depth, pushing you upward.

32. Is it always true that heavy objects sink and light objects float?

Ans. No. A boat that is too heavy to lift will float while a coin that is not very heavy will sink. In order for an object to float, the buoyant force must equal the objects weight before the object is completely submerged. This is a good one to ask about in class.

35. As Styrofoam is loaded into a boat, will it sink deeper into the water or rise?
Ans. The Styrofoam has weight and will cause the boat to sink deeper into the water until the buoyant force increases to equal the larger total weight of the boat and foam.

41. An air filled balloon is weighted until it is just barely submerged. If the balloon is then placed a little deeper in the water, will it float up, remain at the new location or sink?
Ans. It will sink. When you place the balloon deeper, the increased water pressure surrounding the balloon compresses it, reducing its volume 'V' and therefore reduces the upward buoyant force on it. The object's weight remains constant and pulls the balloon down.



Extra: Stand on a bathroom scale and read your weight. When you lift one foot off so you're standing on one foot, does the reading change? Does the force read force or pressure?
Ans. The reading does not change because the scale reads force and not pressure.

Extra: If you cut your finger, why does it bleed less when you hold it above your head?
Ans. When you hold your finger above your head, you have increased the height of the blood. This increases the pressure pushing back against that caused by the heart.