*Name*_____
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*Date*_____

Guided Reading Chapter 6: Forces in Fluids

Section 6-1: Pressure

1. What do snowshoes do that make it easier for the person wearing them to travel in deep snow?

2. Is the following sentence true or false? Force and pressure are the same thing.

3. What is pressure equal to?

4. Circle the letter of the term that is an SI unit of pressure.
   a. newton
   b. liter
   c. weight
   d. pascal

5. Circle the letter of the *two* answers below that are equal to each other.
   a. 1 Pa
   b. 1 N/cm^2
   c. 1 N/m^2
   d. 1 N

6. What unit of measure is used when a smaller unit is more practical for an area?

7. Is the following sentence true or false? You can produce a lower pressure by decreasing the area a force acts on.

8. A substance that can easily flow is a(n) _____.

9. Circle the letter of each of the following that are fluids.
   a. helium gas
   b. liquid water
   c. ice
   d. air

10. Describe how molecules move in fluids.

11. What causes the pressure exerted by a fluid?

12. The pressure exerted by a fluid is the total force exerted by the fluid divided by the _____ over which the force is exerted.

13. What is another term for air pressure?

14. What causes air pressure?

15. Is the following sentence true or false? In a fluid that is not moving, pressure at a given point is exerted equally in all directions.

16. On the illustration of the hand, draw arrows that indicate where the atmosphere is exerting air pressure on the hand. The size of each arrow should indicate the amount of air pressure on that part of the hand.

17. Is the following sentence true or false? Air pressure increases as elevation increases.

18. Why is air pressure lower at a higher elevation than at a lower elevation?

19. Is the following sentence true or false? Water pressure increases as depth increases.

20. Why is water pressure greater at a greater depth than at a shallow depth?

21. The total pressure at a given point beneath the water results from the weight of the water above plus the weight of the _____ above it.

Section 6-2: Transmitting Pressure in a Fluid

1. What happens to the pressure in a bottle of water if you press the stopper at the top down farther?

2. What is the relationship known as Pascal's principle?

3. What does a force pump do?

4. Describe the heart in terms of force pumps.

5. Suppose you push down on a small piston that is connected to a confined fluid, and another piston with the same area is connected by a U-shaped tube to the confined fluid. How much fluid pressure will the second piston experience compared to the first?

6. Suppose you push down on a small piston that is connected to a confined fluid, and a piston twenty times larger is connected by U-shaped tube to the confined fluid. How much fluid pressure will the larger piston experience compared to the small piston?

7. In a hydraulic system, how is the force applied on a small surface multiplied?

8. Is the following sentence true or false? A car's brake system multiplies the force of the driver's tap on the brake pedal.

9. The tube feet of a sea star take advantage of what principle to move around?

10. When a sea star contacts different muscles, it changes the _____ in the fluid of its tube foot.

11. The _____ a sea star exerts on the fluid in its system causes the tube foot to either push down or pull up on its sucker.

Section 6-3: Floating and Sinking

1. Water exerts a(n) _____ force that acts on a submerged object.

2. Circle the letter of each sentence that is true about a buoyant force.
    a. It acts against the force of gravity.
    b. It acts in an upward direction.
    c. It makes an object feel heavier.
    d. It makes an object feel lighter.

3. How much fluid does a submerged object displace?

4. What does Archimedes' principle state?

5. Is the following sentence true or false? IF the weight of a submerged object is less than the buoyant force, the object will sink.

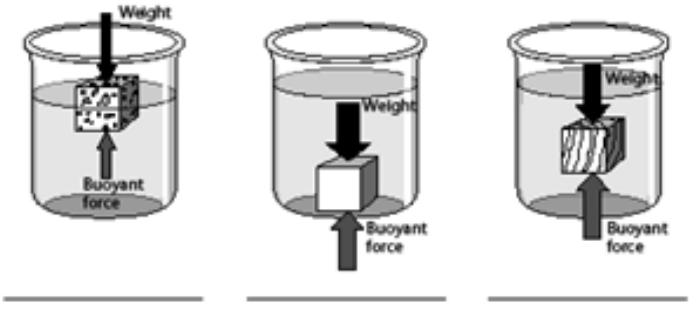
6. What happens when the weight of a submerged object is exactly equal to the buoyant force?

7. The _____ of a substance, no matter what state or shape, is its mass per unit volume.

8. What formula do you use to find density?

9. What is the density of water?

10. The illustrations below show three objects in water. All three objects are equal in volume. The captions for these illustrations are listed below. Write the letter of the correct caption under each illustration.
    a. Object is more dense than water.
    b. Object is less dense than water.
    c. Object has a density that is equal to water's density.



_____ _____ _____

11. Is the following sentence true or false? An object that is more dense than fluid in which it is immersed floats to the surface.

12. An object that is _____ dense than the fluid in which it is immersed sinks.

13. Figure 16 on page 193 shows the densities of several substances. Us the figure to rank the following substances, from 1 for the least dense to 3 for the most dense.
    a. ____ corn syrup b. ____ wood c. ____ plastic

14. Why does a helium balloon rise in air while an ordinary balloon filled with air does not?

15. When submarine pumps water out of its floatation tanks, its density decreases and it floats. Why does its density decrease?

16. Usually, the hull of a ship contains a large volume of air. Why?

17. The amount of fluid displaced by a submerged object depends on its _____.

18. A ship stays afloat as long as the _____ force is greater than its weight.

Section 6-4: Applying Bernoulli's Principle

1. Is the following sentence true or false? The faster a fluid moves, the more pressure the fluid exerts.

2. What does Bernoulli's principle state?

3. Is the following sentence true or false? A faster-moving fluid exerts less pressure than a slower-moving fluid.

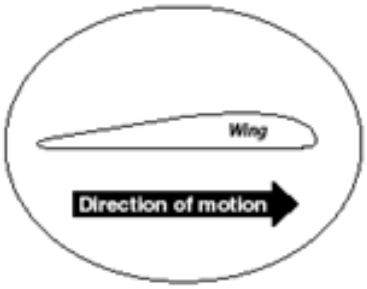
4. Explain why a sheet of tissue paper rises when you blow air above the tissue paper.

5. Is the following sentence true or false? Objects can be designed so that their shapes cause air to move at different speeds above and below them.

6. If the air moves faster above an object, does pressure push the object upward or downward?

7. If the air moves faster below an object, does pressure push the object upward or downward?

8. On the illustration of a wing below, draw arrows that show the path of air above and below the wing.



9. Air that moves over the top of an airplane wing must travel farther than air that moves along the bottom of the wing. AS a result, the air moving over the tow exerts less _____ than the air moving along the bottom.

10. What is lift?

11. In what way is an airplane wing shaped like a bird's wing?

12. Why is a spoiler on a racing car curved on the lower side?

13. How do differences in air pressure cause smoke to rise up a chimney?

14. When you squeeze the rubber bulb of a perfume atomizer, how do you change the air pressure at the top of the tube?

15. Is the following sentence true or false? An atomizer works because moving air at the top of the tube increases the air pressure inside the flask.