

Quiz Review: Pressure, Buoyancy, Temperature

1. Right now we are experiencing ordinary atmospheric air pressure. What causes ordinary air pressure?

The weight of the air above us, pushing down.

2. Describe how air pressure changes as you rise higher above the ground. Also explain why air pressure changes in this way.

Pressure decreases with height, because there is less air above you when you go higher.

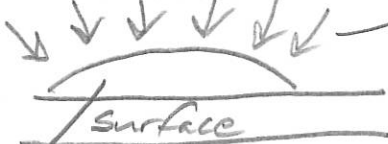
3. At sea level, how much force does average air pressure exert on 1 square inch of surface area?

14.7psi

4. In which direction does a human ear drum stretch as the human moves rapidly from a low elevation to a high elevation? Explain why.

As you rise, the air pressure around you (outside your head) decreases, while the pressure inside your head does not change. The pressure in your head pushes harder than the outside pressure, so your ear drum stretches outward.

5. Use words and a picture to show why a suction cup can stick to a surface.



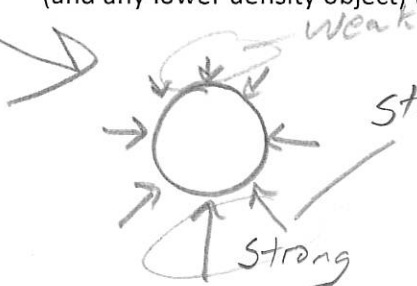
Suction Cup

There is air pressure pushing down from the outside, but there is none pushing up because there is no air beneath the cup.

6. What is buoyancy, and what causes it?

An upward force caused by stronger pressure pushing up on the bottoms of objects and weaker pressure pushing down from the top.

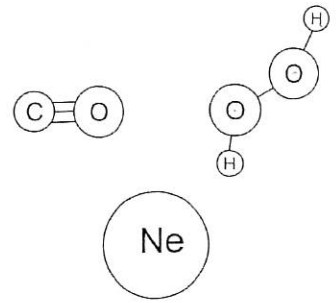
7. Use a diagram to show why air pressure causes bubbles (and any lower density object) to float upward.



Stronger pressure pushing up overpowers weaker pressure pushing down, so the object rises

Assume that the picture on the right shows substances in a gas.

8. How many atoms are in the picture on the right? 7
9. How many elements are in the picture? 4 — C, O, H, Ne
10. How many particles are in the picture? 3



11. List the two most abundant elements in the universe, and tell what percentage of the Universe's mass they comprise.

Hydrogen : 74%

Helium : 24%

12. Suppose you have a balloon filled with gas particles. On a microscopic level, describe what those particles are doing.

Gas particles are flying around, bumping into each other and bumping into the balloon walls.

13. What happens to particles' motion as their temperature increases?

They speed up.

14. What usually happens to a substance's volume when the substance is heated? Explain how this is caused by particle motion on a microscopic level.

Volume increases because hotter particles move faster, so they push away from one another with more force.

15. What usually happens to a substance's volume when the substance is cooled?

Volume decreases

16. Give the name for each of the following changes. Then use a + or - sign to tell whether energy needs to be added or subtracted for the change to occur.

a. Solid → Liquid Melting + b. Gas → Liquid Condensation -

c. Liquid → Gas Evaporation + c. Liquid → Solid Freezing -

17. What happens to a substance's temperature when it is compressed?

Temperature increases

18. Why does compression of a substance cause the temperature of the substance to change in that way?

Squeezing a substance gives its particles a push. Their push speeds them up.

19. What happens to a substance's temperature when pressure is removed and the substance is allowed to expand?

Temperature decreases

20. Why does the expansion of a substance cause the temperature of the substance to change in that way?

In an expanding substance, the particles push outward. In this case, the particles are doing the pushing, so they "get tired" (lose energy and slow down)

21. Provide one reason to explain why the inside of the Earth is hot?

Gravity has caused the Earth to compress itself, especially near the core.

22. When our sun first began to shine, it got a lot bigger. Why?

The sun heated up, and heating caused it to expand.

23. Why is the Universe getting colder?

It is expanding, and expansion causes cooling

24. When our sun runs out of nuclear fuel, it will start to shrink. Why?

It will cool down. Cooling causes shrinking.

