

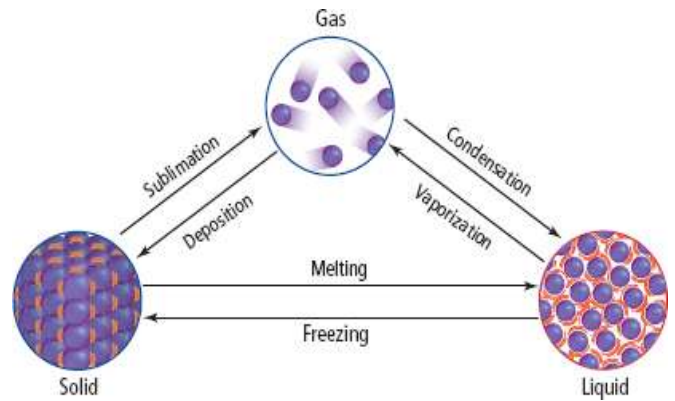
16. ____ What happens to the volume of a gas during compression?
 A) The volume increases. B) The volume decreases.
 C) The volume remains constant. D) It is impossible to tell because all gases are different.
17. ____ Compared with the particles in a gas, the particles in a liquid
 A) have more energy. B) move around less. C) are larger. D) are farther apart.
18. ____ Particles within a solid
 A) do not move. B) vibrate energetically.
 C) vibrate weakly about fixed positions. D) exchange positions easily.
19. ____ Compared with the particles in a liquid, the particles in a solid usually are
 A) higher in energy. B) more massive. C) closer together. D) more fluid.
20. ____ Solids have a definite volume because
 A) the particles do not have a tendency to change positions.
 B) the particles are far apart.
 C) they can be easily compressed.
 D) the energy of the particles is high.
21. ____ Which of the following properties do solids share with liquids?
 A) fluidity B) definite volume C) definite shape D) slow rate of diffusion
22. ____ Bernoulli's principle states that as the velocity of a fluid _____, the pressure exerted by the fluid _____.
 A) increases, increases B) increases, decreases
23. ____ Boyle's Law relates what two variables?
 A) Volume and pressure B) Volume and temperature
 C) Temperature and pressure D) Pressure and moles of gas
24. ____ Increasing temperature
 A) increases viscosity. B) decreases viscosity. C) does not affect viscosity. D) eliminates viscosity.
25. ____ Which of the following equations correctly relates the two variables?
 A) $P_1/V_1 = P_2/V_2$ B) $V_1/T_1 = V_2/T_2$ C) $(P_1)(T_1) = (P_2)(T_2)$ D) $(P_1)(n_1) = (P_2)(n_2)$
26. ____ According to the kinetic-molecular theory, particles of matter
 A) are in constant motion. B) have different colors. C) have different shapes. D) are always fluid.

Short Answer:

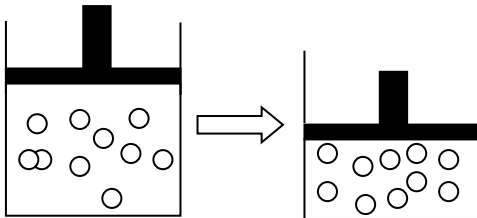
27. Boyle's Law relates which two variables?
 a. Is this relationship direct or an inverse relationship?
 b. Which variable is assumed to be constant?
28. Charles' Law relates which two variables?
 a. Is this relationship direct or an inverse relationship?
 b. Which two variables are assumed to be constant?
29. Gay Lussac's Law relates which two variables?
 a. Is this relationship direct or an inverse relationship?
 b. Which two variables are assumed to be constant?

30. The Combined Gas Law relates which variables?
31. What is standard temperature and pressure (STP)?
32. What units must be used to express the temperature in the equation for the ideal gas law?

33. In what **directions** must energy be added to cause the indicated phase changes? (*Hint: Add arrows to show how energy must be added in order for each of the phase changes to take place.*)



34. Describe the Kinetic Theory.
35. Describe thermal expansion. Which gas law is related to the concept of thermal expansion?
36. What does Archimedes' principle state?
37. Why does the air pressure inside the tire of a car increase when the car is driven?
38. The dots in the containers represent particles of air. Use what you know about pressure, temperature, volume, and the kinetic theory of matter to write a hypothesis to explain what is happening in the containers.



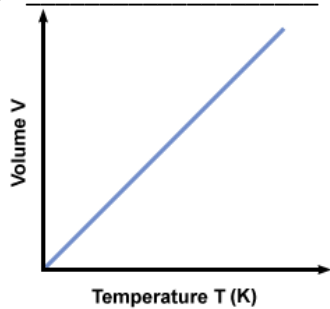
Completion: Each of the following examples gives a change in volume, temperature, amount, or pressure of a gas sample. Indicate whether the other variable mentioned would increase or decrease. \uparrow = increases \downarrow = decreases

39. Additional gas is added to a soccer ball. The pressure ___.
40. An inflated balloon is placed in a refrigerator. The volume ___.
41. A piston in an engine compresses the gas into a smaller volume. The pressure ___.
42. Compressed air in scuba tanks cools off as a diver swims at deeper levels. The pressure in the tanks ___.
43. A person sits on an air mattress. The pressure ___.
44. An unopened bag of potato chips is left in a hot car. The volume ___.
45. Dry ice (solid CO_2) is sealed in a plastic bag. As the temperature increases, the amount of gas present in the bag ___.

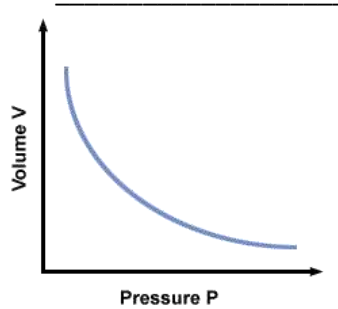
Graph Analysis:

Each of the three graphs represents one of the gas laws. Label each graph accordingly.

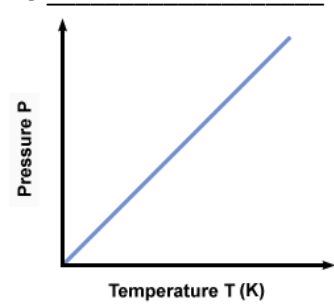
46.



47.



48.



Practice Problems:

49. A 100 cm^3 object weighing 0.49 N (50 g) is placed in water. What is the buoyant force of the water (1 cm^3 of water weighs 0.0098 N) on the object? Will the object sink or float?
50. A hydraulic lift is used to lift a heavy machine that is pushing down on a 3.2 m^2 piston A1 with a force F_1 of 1200 N . What force F_2 needs to be exerted on a 0.0068 m^2 piston A2 to lift the machine?
51. A hydraulic lift is used to lift a heavy machine that is pushing down on a 6.8 m^2 piston A1 with a force F_1 of 900 N . What force F_2 needs to be exerted on a 0.0075 m^2 piston A2 to lift the machine?
52. A balloon has a volume of 8.0 L at a pressure of 101 kPa . What will be the new volume when the pressure drops to 43.0 kPa ?
53. A sample of gas occupies a volume of 2.00 liters at a temperature of 100 K . What volume will the gas occupy at 300 K assuming the pressure remains constant?
54. The air in a dry, sealed 2 L soda bottle has a pressure of 0.998 atm at sea level at a temperature of 34.0°C . What will be its pressure if it is brought to a higher altitude where the temperature is only 23.0°C ?
55. If a gas sample has a pressure of 30.7 kPa at 0.00°C , by how much does the temperature have to decrease to lower the pressure to 28.4 kPa ?
56. An object weighs 25 Newtons. When submerged in a fluid it displaces 20 N of water. What is the buoyant force pushing up on this object? Will the object sink or float? Explain