

Gases Review

1. STP = Standard Temperature and Pressure: 0°Celsius or 273 K and 1 atm or 101.3 kPa; Be able to convert between °C and K; and between atm and kPa.
2. Gas particles are very far apart, can be compressed and take the volume of whatever container they occupy.
3. As pressure increases gas volume decreases. Volume and pressure are inversely proportional. $P \times V = K$. The product of pressure and volume is a constant for a given gas sample.
4. As temperature increases gas volume increases; as kinetic energy increases, temperature increases; as temperature increases, pressure increases. All these relationships are direct.
5. Combined gas law is on Table T, always use temperature in Kelvins.
6. Kinetic Molecular Theory of Gases: (explains behavior of gases)
 - a. Ideal gases have no volume/ volume is negligible
 - b. Ideal gases have no IMF's
 - c. Particles are very far apart and move in continuous, rapid, random straight line motion.
 - d. Collisions between particles and container are elastic.
7. Real gases deviate from ideal gases because they have volume and they have IMF's. H_2 and He behave most like the ideal because of their small size and weak IMF's.
8. Real gases behave most like the ideal under conditions of low pressure and high temperatures

P L I G H T ---- pressure low - ideal gas - high temperatures.

9. Equal volumes of gases, at the same conditions of temperature and pressure, have equal numbers of molecules. This is Avogadro's Hypothesis. Any three of these conditions make the fourth one to be true. Samples don't have to have the same masses not the same number of atoms.
10. Vapor pressure is the pressure created by the molecules of a liquid as it evaporates. Vapor pressure increases with temperature.
11. The weaker the IMF's the higher the vapor pressure at any given Temp. Table H.
12. Boiling point is the temperature at which vapor pressure = atmospheric pressure; normal boiling point occurs at standard pressure.
13. Heat of vaporization is the energy needed to change a given sample of a liquid to a gas, or to condense a gas into a liquid, when the sample is at the boiling point.
14. Gases are most soluble in water at low temps and high pressures

Graphs: Vapor Pressure vs. Temperature; Pressure vs. Volume; Temperature(K) vs. Volume

