Behavior of Gases

- Adding gas ________________ the pressure
- Ex. ____ more gas = ____ greater pressure
- ______ ratio as long as T and P are _______
- Decrease amount of gas _________ pressure
- Gases move from areas of ____ P to ____ P
- Changing container size changes pressure
- _____ container size = P increases ______
- __ container size ___ = P decreases to _____

Properties of Gases

- Gases are composed of ________________ particles in ____________________ motion.
- Gases flow readily and occupy the _________ ___________ of their ______________.
- __________ – a gas that is a liquid at room temperature and pressure (___________ and ______________, but ______________ and _________________).
- Many ______________ molecular compounds are either ______ or easily vaporizable _________.

Behavior of Gases

The principal assumptions of kinetic-molecular theory are:

- A gas is made up of molecules that are in ________________________________.
- Molecules of a gas are _________; a gas is mostly ________________.
- There are _____________ between molecules except _______________________.
- Individual molecules may ______ or ________ energy as a result of ___________; however, the *total energy* ____________________.

Measuring gases

- ____________________
- Used to measure atmospheric pressure.
- One _____________: pressure exerted by a column of mercury exactly 760 mm high.
- One millimeter of mercury is called a ____.

1 atm = _______ mm Hg
= _______ Torr
= _______ kPa (kilo Pascals)

Measuring Gases

- ______ = Standard Temperature & Pressure
- P = _____ kPa (______ kPa previously used)
- T = _________K or _____°C
- Gases may be measure in multiple ways
  - by mass (____________)
  - by volume (_____________)
  - by amount (________________________)
  - by pressure (see previous slide)

Gas Laws

- Dalton's Law of Partial Pressures
- P_{total} = ____________________________
- This means that the ________________ in a container is the _________ of the individual pressures of each gas found inside of the container

Gas Laws

- Boyle's Law (constant temperature)
- Equation:
- Temp – Pressure changes (constant V)
- Equation:
- Charles Law (constant Pressure)
- Equation:

Gas Laws

- Combined Gas Law
- Equation:
- Ideal Gas Law (use # moles of gas, n)
- Equation:
- PV/nT = R or PV = nRT
- Values of R (gas constant)
  R = __________L·atm / mol·K (pressure in atm)
  R = __________ L·torr / mol ·K (pressure in torr)
  R = __________ kPa·L / mol·K (pressure in kPa)

Diffusion & Graham's Law

- Diffusion – gases move from ________________
- Graham studied ____________ (gas escaping from a small opening in a container)
- Rate of effusion (or diffusion) is ______________ proportional to the ______________________
- ____________ (KE of diff. gases is equal at = T)
- (m = _____, v = _______ and KE = ____________)

$$\frac{Rate_A}{Rate_B} = \frac{\sqrt{MolarMass_B}}{\sqrt{MolarMass_A}}$$

Real vs. Ideal Gases

- Idea gas law assumptions
  1. _______________________________
  2. _______________________________
- Departures from the gas laws
  PV / nRT = 1 (ideal gas)
  real gases PV / nRT ____ or PV / nRT ____
  Due to real gases having _______ and being _____________ to each other