GASES

Characteristics of Gases

- Where are they found?
  - Everywhere!
- Can we see them?
  - Most are invisible
- What gases are in the atmosphere?
  - 78% N_2
  - 21% O_2
  - 1% Ar
  - < 1% CO_2

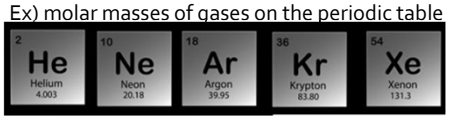
EXPLANATION OF CHARACTERISTICS OF GASES

Characteristics of Gases

1) Have mass & occupy space.
2) Separated by relatively large distances.
3) Are in constant, rapid, random motion.
4) Exert pressure when collide with walls of container.
5) Easy to compress.
6) Gases with lightest mass travel fastest.

1) Have mass and occupy space

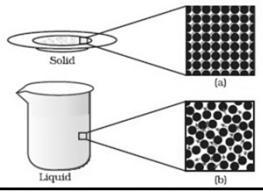
- Matter: "anything that has mass and takes up space"
  - Gases do both of these!
  - Ex) molar masses of gases on the periodic table

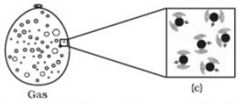


- Make a prediction:
  - The mass of a soccer ball deflated
  - The mass of a soccer ball inflated
  - The same, heavier, lighter??

2) Separated by relatively large distances
3) Constant, rapid, random motion

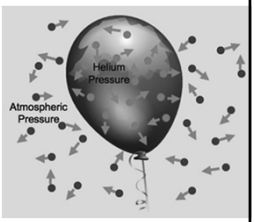
- Gases molecules are spread further apart and move much faster than solids and liquids
- They never stop moving!





4) Exert pressure when collide with walls of container

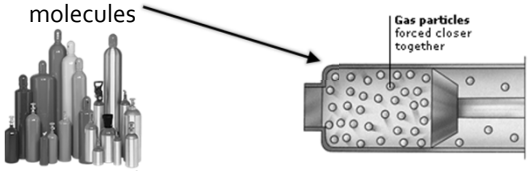
- Ex) a helium filled balloon
  - The helium on the inside of the balloon exerts pressure on the inside walls of the balloon
  - The gas molecules in the atmosphere collide with the outside walls of the balloon



- Ex) more particles = more pressure = balloon inflated more

5) Easy to compress

- Because there is so much space between gas molecules



- Convenient for transporting commercial gases
  - Liquid propane, acetylene, oxygen
  - Can be hazardous

6) Gases with the lightest mass travel fastest

Example) The noble gases

Helium has a small mass. Xenon has a large mass.