

Chapter 3 – States of Matter

3-2

Behavior of Gases

Describing Gas Behavior

- Different from solids & liquids
- Volume changes because of pressure and temperature

Temperature

- Measure of how fast particles are moving
- Faster movement = more energy = higher temperature
- Heat expands gas (makes it spread)

Volume

- The amount of space an object takes up
- Depends on the container – gas fills ANY container
- Can be compressed (squished) or spread out

Pressure

- Amount of force on a given surface
- More particles in the same amount of space
- Ex: basketball vs. beachball

Boyle's Law

- Fixed amount of gas at a constant temperature
- Volume & pressure are inverse
 - \uparrow volume means \downarrow pressure (Ex: smell of popcorn in a movie theatre)
 - \downarrow volume means \uparrow pressure (Ex: air in a basketball)

Charles's Law

- Fixed amount of gas at a constant pressure
 - \uparrow temperature means \uparrow volume
 - \downarrow temperature means \downarrow volume

Boyle's Law



Lifting the piston lets the particles of gas spread far apart. The volume of the gas increases as the pressure decreases.



Releasing the piston allows the particles of gas to return to their original volume and pressure.



Pushing the piston forces the gas particles close together. The volume of the gas decreases as the pressure increases.

Charles's Law



Decreasing the temperature of the gas causes the particles to move more slowly. The gas particles hit the piston less often and with less force. So, the volume of the gas decreases.



Increasing the temperature of the gas causes the particles to move more quickly. The gas particles hit the piston more often and with greater force. So, the volume of the gas increases.