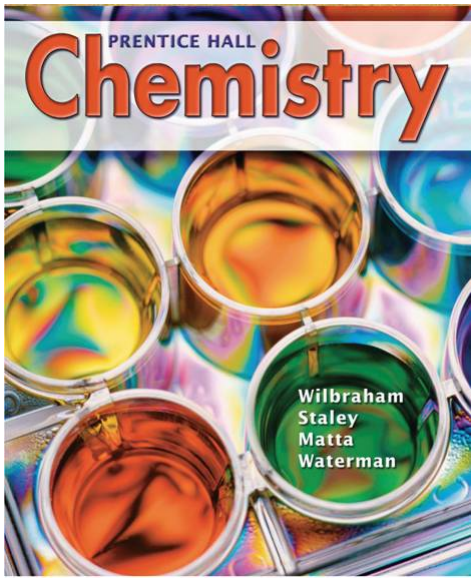


Slide 1 of 21

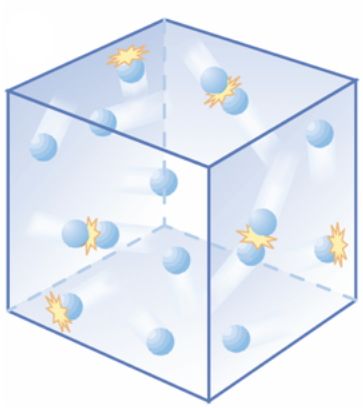
14.1 Properties of Gases > REVIEW CHAPTER 13

The word ***kinetic*** refers to motion.

- **Kinetic energy** is the energy an object has because of its motion
- **Kinetic theory:** all matter consists of tiny particles that are in constant motion.

Slide 2 of 21

Particles in a gas are in rapid, constant motion.



14.1 Properties of Gases > REVIEW CHAPTER 13

Gas pressure results from simultaneous collisions of billions of rapidly moving particles in a gas with an object.

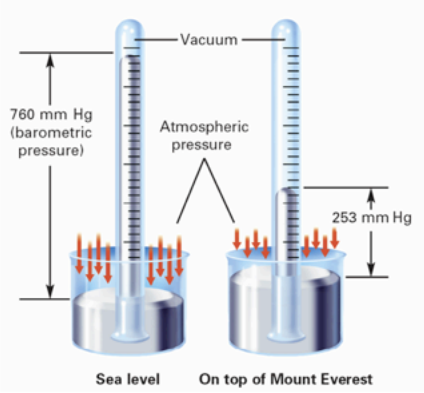
14.1 Properties of Gases > REVIEW CHAPTER 13

Gas pressure results from simultaneous collisions of billions of rapidly moving particles in a gas with an object.

-gas pressure results from simultaneous collisions of rapidly moving particles

14.1 Properties of Gases > REVIEW CHAPTER 13

A **barometer** is a device that is used to measure atmospheric pressure.



14.1 Properties of Gases

Connecting to Your World

In organized soccer, a ball that is properly inflated will rebound faster and travel farther than a ball that is under-inflated. If the pressure is too high, the ball may burst when it is kicked. You will study variables that affect the pressure of a gas.

14.1 Properties of Gases > Compressibility

Compressibility is a measure of how much the volume of matter decreases under pressure.

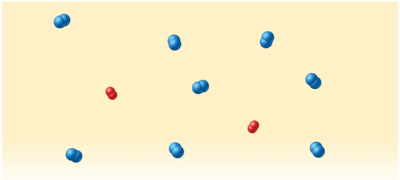
Ex. When a person collides with an inflated airbag, the impact forces the molecules of gas in the bag closer together.

Compressibility

Why are gases easier to compress than solids or liquids?

Gases are easily compressed because of the space between the particles in a gas.

- The distance between particles in a gas is much greater than the distance between particles in a liquid or solid.



- Under pressure, gas particles are forced closer together.

Factors Affecting Gas Pressure

What are the three factors that affect gas pressure?

The amount of gas, volume, and temperature are factors that affect gas pressure.

4 variables are generally used to describe a gas. The variables and their common units are

- *P* = pressure in kilopascals (kPa)
- *V* = volume in liters (L)
- *T* = temperature in kelvins (K)*
- *n* = the number of moles**

*K= ^{o}C + 273 **1 mole = 6.02×10^{23} atoms

14.1 Properties of Gases > Factors Affecting Gas Pressure

Amount of Gas

You can use kinetic theory to predict and explain how gases will respond to a change of conditions. If you inflate an air raft, for example, the pressure inside the raft will increase.

Collisions of particles with the inside walls of a container cause pressure.

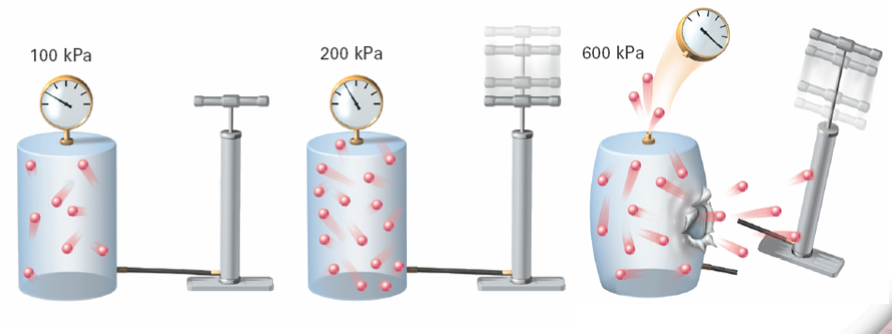
Increasing the number of particles ***increases*** the number of collisions, which ***increases*** **pressure**

↑ amount, ↑ pressure

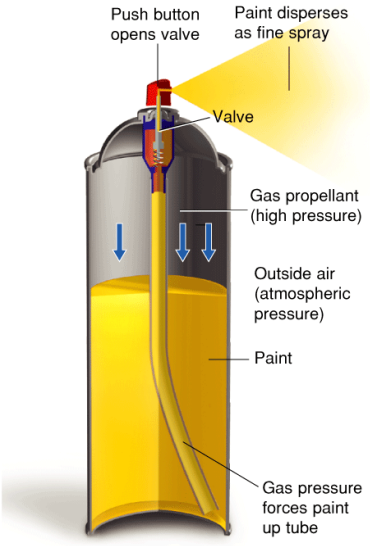
therefore

↓ amount, ↓ pressure

If the gas pressure increases until it exceeds the strength of an enclosed, rigid container, the container will burst.



Aerosol Spray Paint



Volume

Decreasing the volume *will cause more collisions* and therefore ***increase pressure***

The more a gas is compressed, the greater the pressure the gas exerts

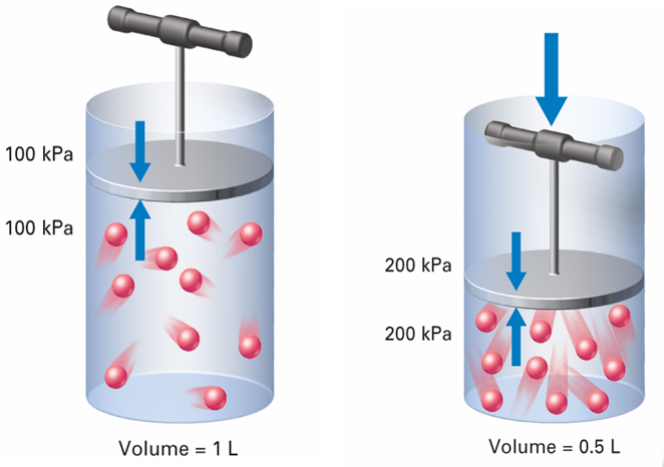
Volume

↓ volume, ↑ pressure

therefore

↑ volume, ↓ pressure

When the volume of the container is ***halved***, the pressure the gas exerts is ***doubled***.



Temperature

Increase in the temperature of a gas causes an ***increase*** in its pressure.

As a gas is heated, the average kinetic energy of the particles increases.

Faster-moving particles hit the walls of a container with more energy and cause higher pressure.

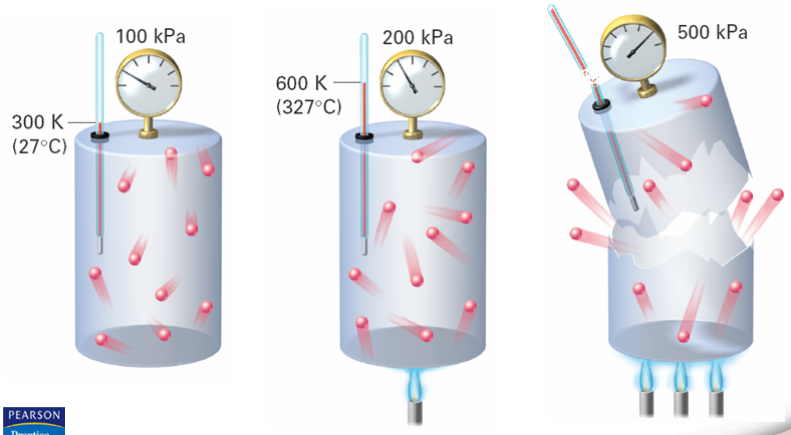
Temperature

↑temperature, ↑pressure

therefore

↓ temperature,↓ pressure

When the Kelvin temperature of the enclosed gas doubles, the pressure of the enclosed gas doubles.



14.1 Section Practice

1. Compared to liquids and solids, gases are easily compressed because the particles in a gas

   a. attract each other.

   b. are spaced relatively far apart.

   c. are very small.

   d. repel each other.

14.1 Section Practice

2. Gas pressure is affected by

   a. temperature, volume, and the amount of the gas.

   b. temperature, volume, and the molar mass of the gas.

   c. phase diagram, volume, and the size of the container.

   d. temperature, phase diagram, and the mass of the gas container.

14.1 Section Practice

3. For gases, the SI units for volume (*V*), pressure (*P*), and temperature (*T*) are, respectively,

a. liters, kilopascals, and °C.

b. liters, kilopascals, and kelvins.

c. cm^3, kilopascals, and kelvins.

d. liters, atmospheres, and °C.

END OF SHOW