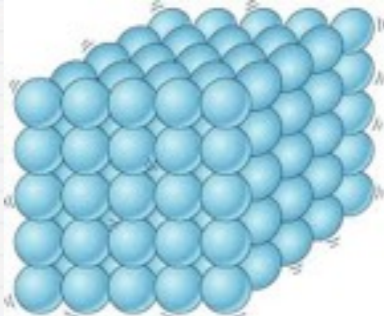
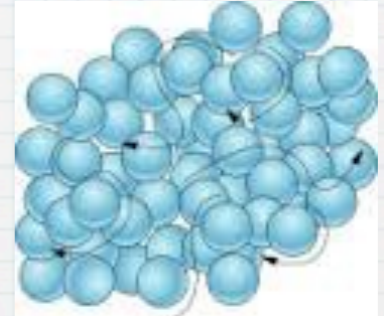
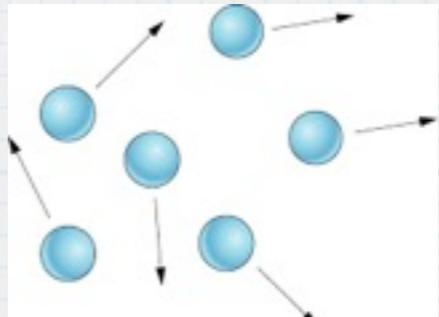


Gases

An Introduction to Properties of Gases and
Atmospheric Chemistry

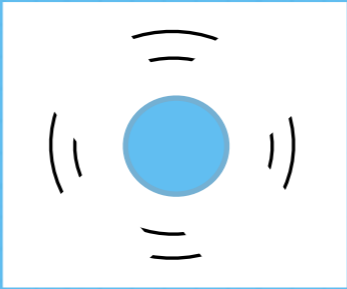
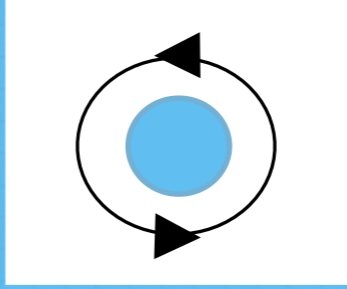
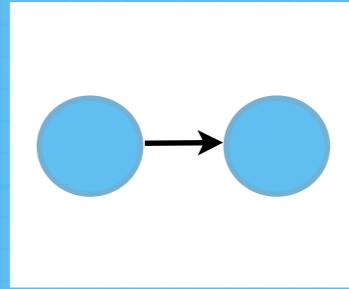
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State	Properties	Particles	
Solid			
Liquid			
Gas			

State	Properties	Particles	
Solid	Constant Shape Constant Volume Almost Incompressible	Organized in a regular pattern with fixed position	
Liquid	Variable Shape Constant Volume Almost Incompressible	Less organized, particles able to slide past one another	
Gas	Variable Shape Variable Volume Compressible	Particles bounce off each other and walls of their container	

Kinetic Energy

- * **Kinetic Energy:** energy that a body possess by virtue of being in motion
- * Particles in a substance have three type of motion, and therefore three types of kinetic energy

	Vibrational	Rotational	Translational
			
Solid	Free	Very Restricted	Very Restricted
Liquid	Free	Somewhat Restricted	Somewhat Restricted
Gas	Free	Free	Free

Properties of Gases

- * **Gases are compressible:** The volume of gases decreases when pressure is exerted.
- * Gases **expand** as **temperature** is increased
- * Gases have **very low viscosity**
- * Gases have **lower densities**
- * Gases are **miscible**

Kinetic Molecular Theory of Gases

- * **Kinetic Molecular Theory of Gases:** explains gas behaviors in terms of random motion of particles with negligible volume and negligible attractive forces
- * **Ideal Gas:** a hypothetical gas made up of particles that have mass but no volume and no attractive forces between them.

Temperature

- * Temperature: the measure of the average kinetic energy of molecules
- * Can be measure in Celsius, Fahrenheit, Kelvin

Temperature

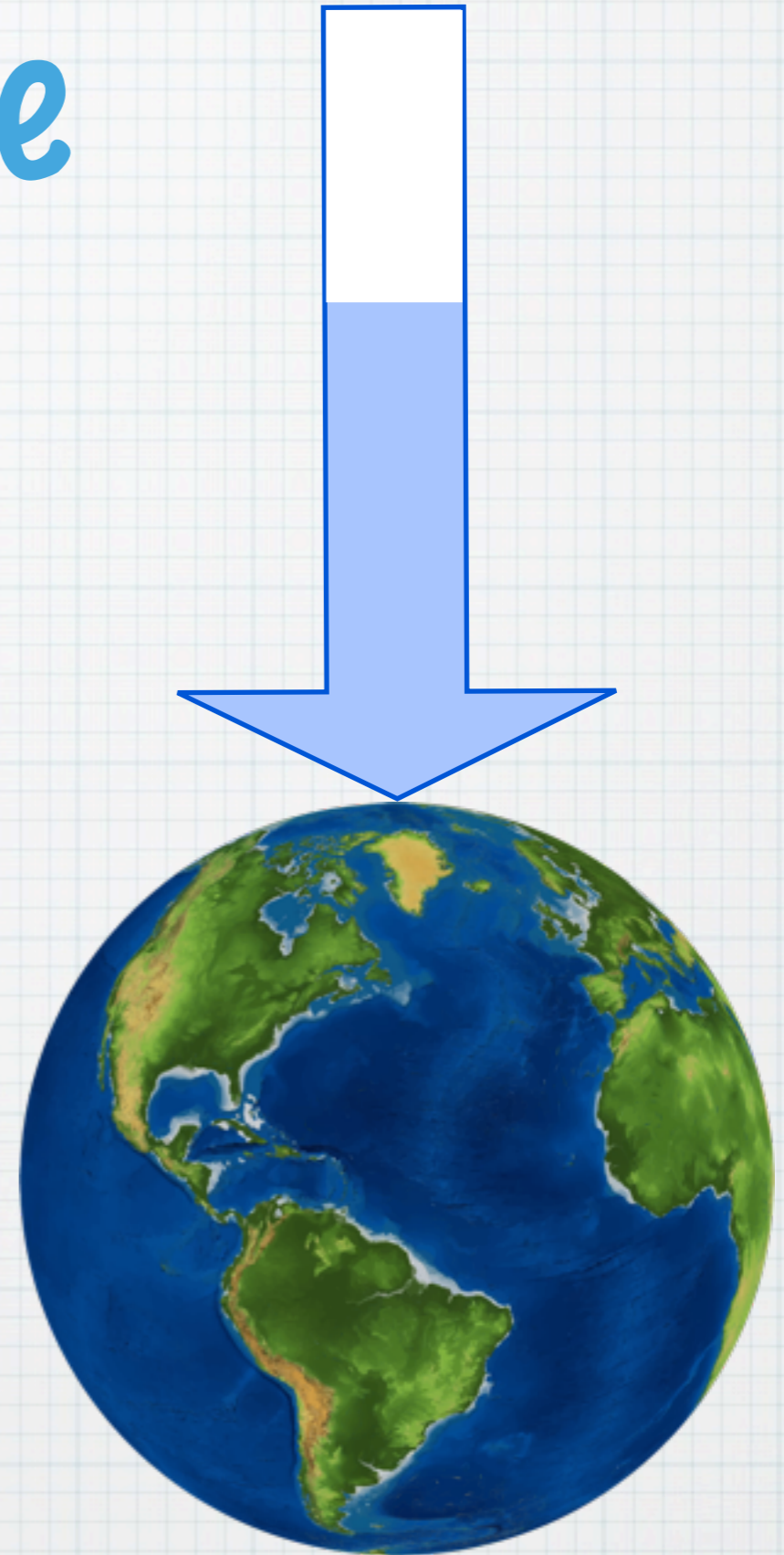
- * In chemistry, we use Kelvin to represent temperature

- * $T_k = T_c + 273$

- * **Absolute zero:** A theoretical temperature of 0K (-273 C). At this point all energy is removed and molecules stop moving.

Pressure

- * **Atmospheric Pressure:** the force exerted on the Earth's surface by a column of air over a given area.



Units of Gas Pressure

- * **Standard Atomic Pressure (SAP):**
atmospheric pressure in dry air at a temperature of 0 C
- * Measured in atmospheres atm
- * **1 atm = 760 mmHg**

Other Units of Pressure

Unit of Pressure	Symbol	Instruments that use this unit
Standard Atmosphere	atm	gas compressors
Milimeteres of Mercury	mmHg	barometers
Pascal	Pa	pressure sensors
Kilopascal	kPa	tire inflation gauges
Pounds per Square Inch	psi	hydraulic gauges