

<CHEM 101> 6/9/2015

Matter: Anything that occupies space and mass.

Mass: Measure of the quantity of matter.

Weight: Interaction of mass with gravity creates weight, which can be measured on a scale or balance.

Matter: chemical composition

Pure Substance: has the same composition throughout.

It cannot be separated into components by physical means.

Elements: Cannot be broken down into simpler substances even by a chemical reaction.

Periodic Table → classify elements

each column - groups of elements } share similar characteristics / properties  
families of elements }

category {  
  metal : luster (shines) / conduct electricity  
  non metal

Compounds: called a chemical compound. Substance composed of two or more elements combined in definite proportions.

A compound has properties different from those of its component elements.

Atom: Smallest unit of an element that has the chemical properties of that element.

States of Matter	Physical State:	Symbol
	Solid	(s)
	liquid	(l)
	gas	(g)
	<u>aqueous</u> (aq)	
	dissolved in water	

Qualitative: non numbers

smell, color, shape, texture, shininess, physical state, etc.

Quantitative: numbers/measurements

mass, weight, temperature, length, volume, etc

Physical Property: characteristics that we can observe or measure without changing the composition of a substance.

→ odor, taste, hardness, mass, volume, density, magnetism, conductivity, temperature change

• Mass  $1 \text{ lb} = 453.6 \text{ g}$

• Volume  $1 \text{ cm}^3 = 1 \text{ mL}$   
 $1 \text{ oz} = 29.57 \text{ mL}$

• Density =  $\frac{\text{mass (g)}}{\text{volume (mL)}}$

Temperature: measure of how hot or cold something is relative to some standard.

Boiling point: the temperature at which the liquid form of substance changes to the gaseous form.

Melting point: the temperature at which the substance changes from a solid to a liquid.

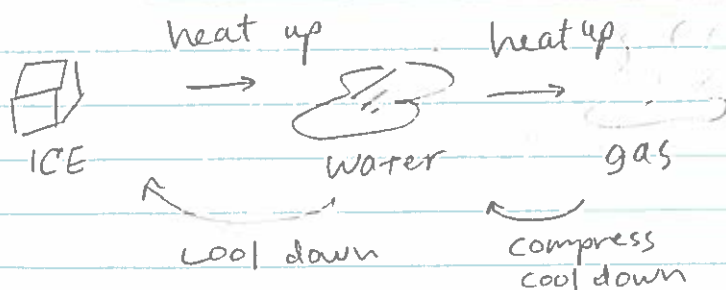
$$T_K = T_{°C} + 273.15$$

$$T_{°F} = 1.8(T_{°C}) + 32$$

$$T_{°C} = \frac{T_{°F} - 32}{1.8}$$

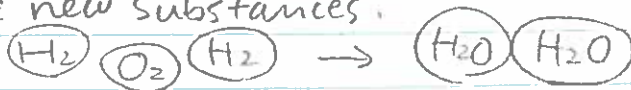
### Physical Changes

A process that changes the physical properties of a substance without changing its chemical composition.



### Chemical changes

A process in which one or more substances are converted into one or more new substances.



Chemical Property of a substance is defined by what it is composed of and what chemical changes it can undergo.