



Changing Matter

Physical & Chemical Changes



What different ways can we differentiate between my sisters?



✚ Properties

- How we identify something.



Matter has properties

- ✚ Two basic types of properties that we can associate with matter.
 - Physical properties
 - Chemical properties



Physical Properties

- ✚ Anything that can be observed without changing the identity of the substance. (Tends to be measurable.)
 - melting point
 - boiling point
 - electrical conductivity
 - color
 - density
 - thermal conductivity
 - ductility
 - malleability



Chemical Properties

✚ The way a substance may change or react to form other substances

- heat of combustion
- reactivity with water
- PH
- Oxidation
- Flammability
- Reactivity to other chemicals



Matter can be changed two ways

+ Physically

- Physical reaction
- Physical change

+ Chemically

- Chemical reaction
- Chemical change



Physical Changes

- ✚ Do **NOT CHANGE THE TYPE OF MATTER**
 - Nothing new or different is formed
 - ◆ Could be a change in:
 - ✚ Mass
 - ✚ Volume
 - ✚ Density
 - ✚ Change in state
 - ✚ Color
 - ✚ Shape

} **Size**



Examples of Physical Changes

- ✚ Boiling
- ✚ Freezing
- ✚ Dissolving
- ✚ Breaking
- ✚ Making a mixture
 - 2 or more types of matter (substances) mixed together
 - Not in specific amounts
 - Can be separated physically



Chemical Changes

- ✚ The composition of the substance changes.
 - The substances present at the beginning of the change are not present at the end; new substances are formed. The change cannot be “undone.”



Picture from

www.chem4kids.com



Chemical Changes

- ✚ Evidence of a chemical reaction
 - Formation of gas
 - Formation of precipitate
 - Change in color
 - Change in energy
 - ◆ **Endothermic** Absorbs heat energy (gets cold)
 - ◆ **Exothermic** Releases heat energy (gets hot)

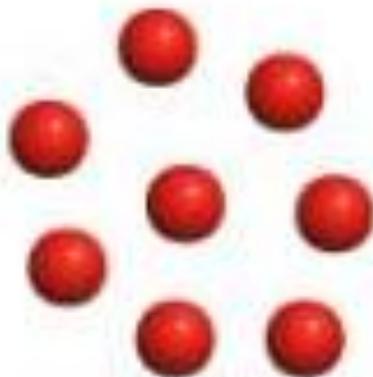


Chemical Changes

- Atoms are re-arranged, **NOT** created or destroyed

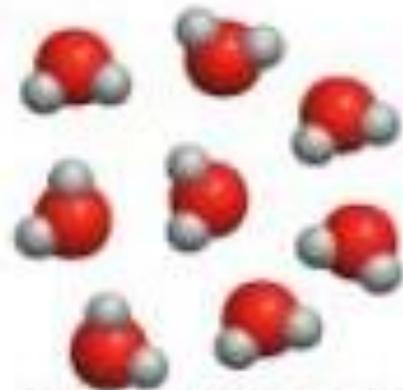


Atoms of
element X



Atoms of
element Y

(a)



Compounds of
elements X and Y

(b)



Law of Conservation of Matter

- Matter is conserved → **type of atoms does not change**
 - Nothing is created or destroyed



Law of Conservation of Mass

- ✚ Mass is conserved → **amount of atoms cannot change**
- ✚ Nothing is created or destroyed