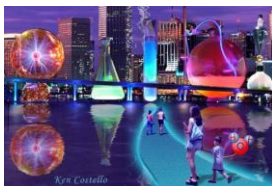
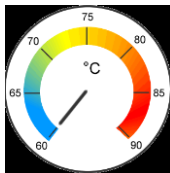


Physical Science

Chapter 14 An Introduction to Matter

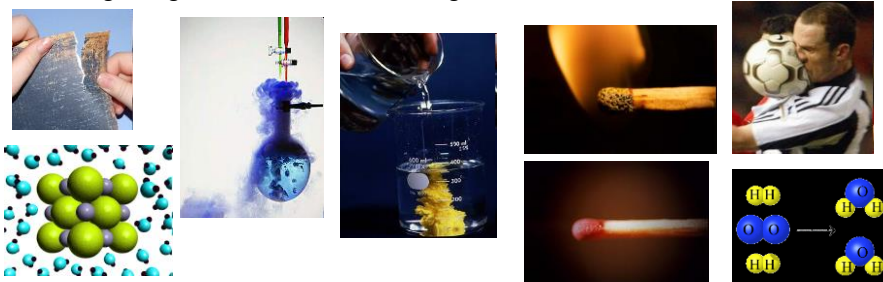
Describing Matter:

- **Matter** - is anything that has mass and occupies space
- **Properties of Matter** - How is it described: Hot, cold, hard, soft, rough, smooth, shiny, dull, solid, liquid, gas, etc.
- **Characteristic Properties** - Those properties of a given substance that do not change and therefore can be used to help identify the substance.
Boiling Point, Melting Point, Freezing point

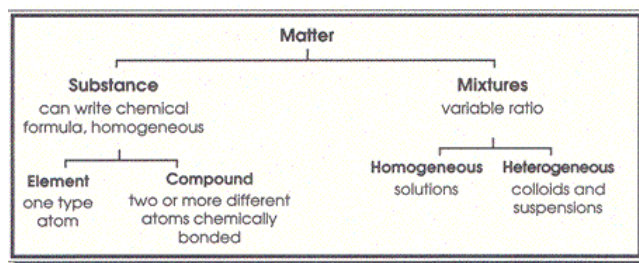


Changes in Matter

- **Physical Change** -A change that alters the form of a substance but not the chemical makeup of the substance, a change of state
 - Words like: *crush, smash, tear, evaporate, slice, breakdown, dissolve, absorb, swell, burst*
- **Chemical Change** - One or more substances combine or decompose to form a chemically different substance
 - Words like: *react, burns, forms, decomposed, rusting, sours, rotting, digesting, cooked, molecular change*



Types of Matter

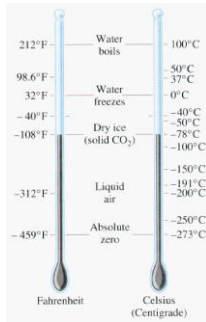
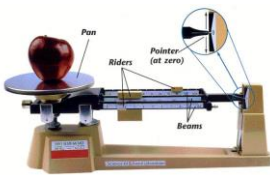


- **Pure Substances** – Those substances made up of one kind of matter. It has definite characteristic properties
 - **Elements:** Contain only one type of atom, H, He, Na, Mg, C, N, O,
 - **Compounds:** A pure substance formed by the chemical combination of two or more elements - CO_2 , H_2O , $\text{C}_6\text{H}_{12}\text{O}_6$, NaCl
- **Mixed Substances (Mixtures)**– two or more substances that are mixed together but not chemically combined.
 - **Homogeneous** Mixture: a very well mixed mixture -solution of sugar water
 - **Heterogeneous** Mixture: not evenly mixed - handful of dirt, Rocky Road Ice Cream,

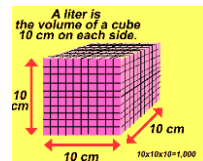
Measuring Matter

- SI – **International System of Units** = the metric system
 - **Length** – the one dimensional measurement of distance – SI unit is **Meter**, Kilometer
 - **Mass** – the amount of matter in a substance – SI unit: **gram** or kilogram
 - **Weight** – the force of gravity acting on an object – SI unit: **Newton**
 - **Volume** – how much space an object occupies – SI unit: liter, milliliter, cm³
 - **Solid Volume** = **Length x Width x Height = cm³, meter³**
 - **Liquid Volume** = **liter, milliliter**
 - **1ml = 1cm³**
 - **Density** – the amount of mass an object has in a given volume – SI unit: g/ml, g/cm³
 - **Density= Mass / Volume**
 - **Temperature** – the average kinetic energy of an object.
 - **°C** = Centigrade or degrees Celsius, **°K** = degrees Kelvin
 - **0 °C = 273 °K**
 - **Time**: unit of measure: **second**, minute

Measuring Matter

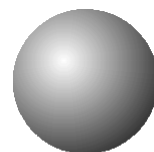
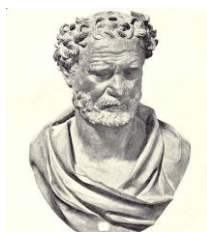


$$D = \frac{M}{V}$$



Particles of Matter

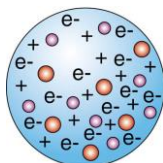
- **Atoms** – The smallest particle of an Element that retains the chemical properties of that element
- **Democritus** – 400 BC, a Greek philosopher that coined the term “**atomos**” which means “**uncuttable, indivisible**”



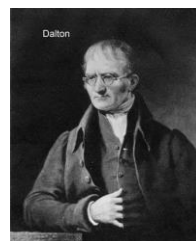
Democritus
(400 B.C.)

John Dalton -1802 - The Atomic Theory

- **Ding-a-Ling!! Ding-a-Ling!!**
- Atoms can not be broken into smaller pieces – atoms are like a solid marble (Not entirely accurate)
- In an element all atoms are exactly alike (Not entirely accurate)
- Atoms of two or more elements can combine to form compounds (this is true)
- Atoms of each element have a unique mass (Not entirely accurate)
- Compounds are always composed of whole number proportions of elements ie CO_2 – Carbon dioxide, H_2O – Water, $\text{C}_6\text{H}_{12}\text{O}_6$ – Glucose, NaCl – Table Salt (this one is true also)



The basic particle of an Element is the Atom – H, He, Fe, etc
The basic particle of a Compound is the Molecule – a group of atoms that are chemically bonded and act as a single unit until the bonds are broken: CO_2 , H_2O , $\text{C}_6\text{H}_{12}\text{O}_6$, NaCl



I give up!!

No mas!!

NO mas !!