Density

* Density = mass ÷ volume
* Higher density sinks
* Water displacement – find the volume of an object by placing in water to see how much the water level rises

Chemical Changes

* There is always a formation of a new substance

1. Production of a gas (bubbles)
2. Change in temperature/release of energy (heat, light, sound)
3. Production of a precipitate (liquid reaction turns to solid)
4. Color change (new color)

Elements and Compounds

* Elements are a pure substance that cannot be broken down into anything else
* The smallest particle of any matter is an atom
* Elements are represented by Chemical Symbols (ex: Silicon=Si)
* An Element is one single element, compounds are two or more elements (example: H5 is an element, Fe2O5 is a compound). Remember: count the capital letters
* Oxygen is the most abundant Elements in the Lithosphere (ground), Hydrosphere (water), and Biosphere (living matter)
* Nitrogen is the most abundant Element in the Atmosphere (air)

Biosphere:

Oxygen(O) 65%  
Carbon(C ) 18%  
Hydrogen(H)10%  
Nitrogen (N) 3%

Lithosphere:

Oxygen (O) 47%  
Silicon (Si) 28%  
Aluminum (Al) 8%  
Iron (Fe) 5%  
Calcium(Ca) 3.6%

Atmosphere:

Nitrogen (N) 78%  
Oxygen (O) 21%

Hydrosphere:

Oxygen (O) 86%  
Hydrogen(H) 11%

1. **H3PO4    +     3 KOH    --->  K3PO4     +  3 H2O How many elements? 4 (H,P,O,K)**
2. **K2CO3    +     HCl   ---->    H2O     +    CO2    +    KCl How many elements? 5 (K,C,O,H,Cl)**
3. **H2SO4    +      Ba(OH)2    --->  BaSO4     +   H2O How many elements? 4 (H,S,O,Ba)**

Metals, Non-Metals, Metalloids

|  |  |  |  |
| --- | --- | --- | --- |
| Property | Metals | Non-Metals | Metalloid |
| Luster | High metallic luster (shiny) | Non-metallic luster (dull) | Can be shiny or dull |
| Malleability | Very malleable, can be bent | Brittle if it is a solid. | Can be malleable or brittle. |
| Conductivity | Good conductors | Poor Conductors | Semi-conductors |
| Other Properties | Usually solid at room temperature | Can be solid, liquid, or gas at room temperature | Solid at room temperature |

* Metalloids share properties of both metals and non-metals
* Periodic Table: Metals (left), Non-Metals (Right), Metalloids (Middle Right on the “staircase”)