* Matter and its Properties
* 1-2 Learning Targets
* Identify characteristic properties
* Classify substances as mixture or pure
* Matter
* Anything that has mass and occupies space
* Mass- is a measure of the amount of matter
* Atoms
* Smallest unit of element that maintains the properties of that element
* Elements
* Pure substance made of only one kind of atom
* Cannot be broken down into simpler substances by chemical means
* Symbols used to represent elements
* Compound
* Substance made of atoms of two or more different elements that are chemically combined
* Has unique properties from the elements that make them
* Molecule
* Smallest unit of a substance that keeps all the physical and chemical properties of that substance
* H2O
* O2
* Cl2
* Properties
* **Extensive properties-** depend on the amount of matter that is present
  + Volume, mass, amount of energy
* **Intensive properties** -do not depend on the amount of matter present
  + Mp, Bp, density, conductivity
* Physical Properties
* Characteristic that can be observed or measured without changing the identity of the substance
* Odor, color, volume, state, density, melting and boiling point
* Physical change
* Change in physical properties
* No change in chemical composition or identity
* State of matter change
* Breaking, grinding, tearing, melting, dissolving
* Change of State
* Physical change of a substance from one state to another
* Requires transfer of energy
* States of matter: solid, liquid, gas
  + State of matter depends on the strength of the force and amount the particles in the matter
* Changes of State
* Water
* Boils 100 ºC, 373 K, 212 ºF
* Melts/ Freezes 0 ºC, 273 K, 32ºF
* Solid
* Rigid, fixed shape and volume
* Ice, diamond
* Liquid
* Definite volume
* Takes shape of container
* Water, gasoline
* Liquid
* Solid
* Gas
* No fixed volume or shape
* Takes volume and shape of container
* air
* Gas
* Phase graph
* Chemical Properties
* Relates to a substance’s ability to undergo changes that transform it into different substances
* Reactivity, flammability, oxidation
* Chemical Changes
* Composition changes by forming one or more new substances with new properties
* Called reactions
  + Reactants react in chemical change to form Products
* Not reversible
* Compounds can be broken down by chemical changes
* Indicators of Chemical change
* Change in color
* Odor
* Production of gas
* Production of light
* Production of heat
* Production of new substance (precipitate)
* Examples of Chemical Change
* Digestion
* Rust
* Baking
* Burning
* Physical or chemical change?
* Energy and Changes in Matter
* Energy involved in physical and chemical change
* Can have several forms (heat, light ect.)
* NEVER created or destroyed
* Mixture
* Combination of two or more pure substances in which each substance retains its own composition and properties
* Can be separated into pure substances by physical means
* No exact chemical formula
* Homogenous mixture
* Uniform properties throughout
* Same as solution
* Brass, air, salt water
* Heterogeneous mixture
* Not uniform throughout
* Granite, sand in water
* Pure Substance
* Fixed composition
  + Every sample of a pure substance has exactly the same characteristic properties
  + Every sample of a given pure substance has exactly the same composition
* Can’t be further broken down by physical means
* Only one kind of matter
* Compound or element
* Compound
* Substance that can be decomposed by chemical means into simpler substances (elements)
* Always contains atoms of different elements
* Broken down in the same ratio by mass
* Water, salt, sugar
* Matter:   
  Can it be separated?
* Yes
* **Mixture**
* **Is the composition uniform?**
* Yes= homogeneous
* No= heterogeneous
* No
* **Pure Substance**
* **Can it be decomposed by ordinary chemical means?**
* Yes= Compounds
* No= Elements
* Lab Chemicals and Purity
* All chemicals have impurities
* Different grades of purity, depends on what used for