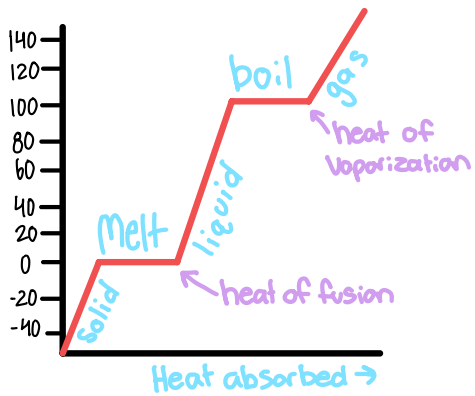
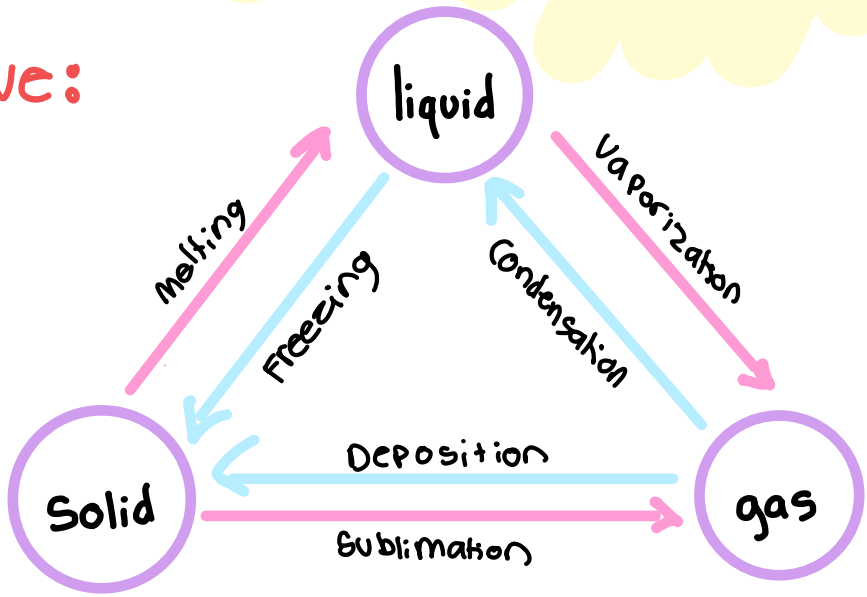
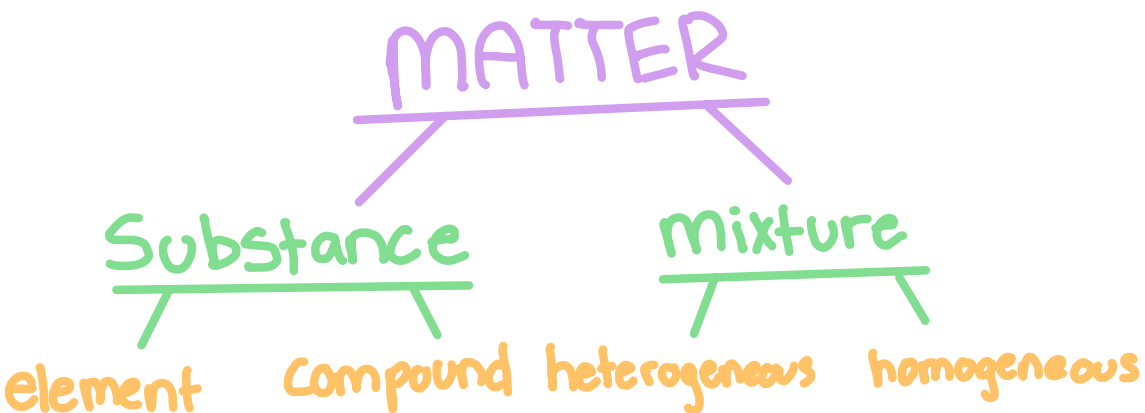
3 Rules of Matter:

1. All matter is made of small particles
2. Those particles are in constant, random motion
3. The motion causes the particles to collide

Ex. of a heating curve:







Evidence of a chemical change:

1. Release of light
2. Change in temperature
3. Odor change
4. Color change
5. Gas/solid appearance

Notes from FIBNs, Minor Packets, and One-Pagers:

Solids vibrate, they don't move freely
Solid: barely any particle motion, some volume, constant shape
Liquid: mid movement, constant volume, changing shape
Gas: lotsa movement
Stars are plasma
Bose-Einstein condensates are used for things like lasers
State change is PHYSICAL because it only changes shape
Temperature: measure of average kinetic energy of particles in an object
Plasma: 4th form of matter, mostly plasma in the universe
Bose-Einstein Condensates: Atoms that are cooled to such a low temp. they form a SUPER-ATOM
Heat of Fusion: The amount of energy needed to turn a solid to a liquid at melting point
Vaporization: the phase/state transition from liquid to gas occurring in evaporation or boiling
Heat of Vaporization: the amount of energy needed to turn a liquid to a gas at boiling point
Evaporation: pressure change at the top of a liquid
Boiling: temperature change throughout the whole liquid
Supersaturated: there is more solute than the solvent can hold
Saturated: the solute and solvent merge and the solute dissolves into the solvent
Unsaturated: when there is too little solute
Solute: the particle dissolving (ex: salt)
Solvent: the substance that makes the solute dissolve (ex: water)
Solution: when the solute and solvent mix together to form a new substance (ex: salt water)
Solubility: how well a substance dissolves into another
Ionic compounds dissolve easily in water because the atoms in the water are quick and efficient because they are polar… the negative water ions watch with the positive ions in the solute and five versa. They then pull apart and dissolve. Heating and stirring can make this process fo faster (because stirring and beating makes the particles move more hastily)
Alloy: metals dissolved in metals
Law of Conservation of Matter: Matter is neither created or destroyed in a chemical change… it only changes forms
Matter: anything that has mass
Homogeneous mixtures are chemically combined, while heterogeneous mixtures are physically combined
A compound is two or more elements combined, while a mixture is two or more substances combined
Compound ex: table salt, water, carbon dioxide
Heterogeneous mixture ex: milk, veggie soup
Element ex: oxygen
Homogeneous mixture ex: lemonade, peanut butter
Mixture: when substances combine
Substance: a particular matter
Element: a substance in it's purest form
Separate: to take apart a mixture
Dissolve: when a solute combines with the solvent
*use water displacement for an irregularly shaped object. To do water displacement, measure how high the water is, then measure how high the water is with the object in it and subtract the two numbers
Physical properties are ones you can clearly see, like color, but chemical properties are the chemical make-up of that substance so you can't see them
Chemical change ex: boiling, evaporating, rusting, rotting
Physical change ex: crumpling, burning, freezing, sawing, crushing
Melting point: temperature at which a solid turns into a liquid
Boiling point: temperature at which a liquid evaporates
Viscosity: how runny a liquid is (honey has high viscosity and water has low viscosity)
Density: how much mass is in an object
Combustibility: how easily something blows up
Reactivity: how much a substance reacts to a change
Oxidation: the removal of hydrogen
Chemical reaction: when one substance reacts to another chemically
Atom: the smallest form of a substance
Group (periodic table): the vertical columns on the periodic table (all elements in the same group have the same number of valence electrons)
Group names: Group1: alkali metals, Group 2: alkaline earth metals, Group 3: rare earth metals Group 3-12: transition metals, Group 17: Halogens, Group 18: Noble gases
Periods (periodic table): the horizontal rows on the periodic table (the elements in the same period have the same number of energy levels
Metals: shiny, silvery solids… good conductors of heat and electricity (left of metalloids)
Nonmetals: gases or dull, brittle solids… bad conductors of heat and electricity (right of metalloids, with the exception of hydrogen)
Metalloids: solids…semi conductors. Physical properties like metals and chemical properties like nonmetals
Bohr Model: simple diagrams that show the atomic structure of an atom
Atomic mass: the bottom number located at the bottom of the element cell
Atomic number: the number at the top of the element cell
How many shells=how many energy levels
*Protons and electrons are equal to the atomic number, and to find the neutrons, subtract the atomic number from the atomic mass
Valence electrons: the electrons farthest from the nucleus that travel the fastest