

Matter, Energy, and Plate Tectonics

1. Mass vs. weight
 - a. When are they different?
 - b. When are they the same?
2. Density
 - a. Definition?
 - b. Formula?
 - c. Calculations using density formula
3. Matter
 - a. Pure substances vs. mixtures
 - b. Elements vs. compounds
 - c. Metals vs. nonmetals
 - d. Ionic vs. molecular
 - e. Heterogeneous mixtures vs. solutions
4. Law of conservation of matter
 - a. Conservation of Mass lab
 - b. When is it obeyed?
 - c. When are there exceptions?
5. Phase changes
 - a. Melting
 - b. Freezing
 - c. Vaporization
 - d. Condensation
 - e. Sublimation
 - f. Deposition
6. Chemical vs. physical changes and properties
 - a. Distinguish one from the other.
 - b. All phase changes are physical changes.
 - c. Formula of Water lab
7. Energy profile: Energy vs. reaction progress
 - a. Activation energy
 - b. Exothermic vs. endothermic reactions
 - c. Catalysts: What they do and how they work
8. Phase diagrams: Pressure vs. temperature
 - a. Water vs. other pure substances
 - b. Melting point/freezing point
 - c. Boiling point: definition and examples
 - d. Triple point
 - e. Sublimation
9. Heating curves: Temperature vs. heat
 - a. Temperature during phase change
 - b. Changes of State lab
 - c. Definitions of heat, temperature, etc.
 - d. Heat capacities
10. Nuclear reactions
 - a. $E = mc^2$
 - b. Fission and fusion
11. Energy
 - a. Radiant energy, potential energy, thermal energy, kinetic energy, etc.
 - b. Conservation and degradation
 - c. Laws of thermodynamics
 - d. Absolute temperature (K)
12. Plate tectonics
 - a. Layers of the earth: Compositional vs. physical (mechanical)
 - b. Elastic vs. plastic behavior of rocks
 - c. Rock cycle
 - d. Mantle convection
 - e. Global evidence and surface features of plate tectonics
 - f. Types of plate boundaries
 - g. Relative plate motions
 - h. History of plate motion
 - i. Hot spots
 - j. Plate Tectonics lab