- *Simple Distillation*
  - *Separates mixtures based on boiling point*
  - Separating salt from water
- *Fractional Distillation*
  - *Separation of a mixture into it's different parts based on boiling points*
  - Getting different types of gas/fuel from crude oil
- *Centrifugation*
  - *Spinning the sample to cause the denser materials to go to the bottom*
  - Separating plasma in blood

Properties of Matter

- *Law of Conservation of Matter:* In chemical reactions the total mass of the products must equal the total mass of the reactants.
- Physical Properties
  - Color
  - Odor
  - Luster (to be shiny or glossy)
  - Malleability (ability of the substance to be beaten into thin sheets)
  - Hardness (how easily the substance can be scratched)
  - Conductivity (to allow flow of energy or electricity)
  - Solubility (ability to dissolve a solvent)
  - Melting Point
  - Boiling Point
  - Etc

States of Matter and Phase Changes

- There are 5 States of Matter
  - Solid
  - Liquid
  - Gas
  - Plasma
  - B.E.C. (Bose-Einstein Condensate)
- Phases Changes
  - Solid → Liquid = Melting
  - Solid → Gas = Sublimation

- Liquid → Gas = Vaporization
- Liquid → Solid = Freezing
- Gas → Liquid = Condensation
- Gas → Solid = Deposition
- Gas → Plasma = Ionization
- Plasma → Gas = Deionization

- *Endothermic* - requires the absorption of heat
- *Exothermic* - requires the release of heat

Phase change	**Endothermic or Exothermic**
Melting	Endothermic
Vaporization	Endothermic
Sublimation	Endothermic
Deposition	Exothermic
Condensation	Exothermic
Freezing	Exothermic

Integrative Levels of Organization

Levels of Organization

Level of Organization	**Description**	**Examples**
Atom	Components of molecules	Hydrogen
Element	A substance that can't be broken down any further into another substance	Sulfur, Oxygen, Hydrogen
Compound	Two or more elements combined	Water, Methane
Macromolecules	A molecule that contains a lot of atoms	Protein, DNA
Organelles	Structures in a cell	Mitochondria (powerhouse of the cell), nucleus

Deposition	
Condensation	
Freezing	

Integrative Levels of Organization Practice

Fill in the Levels of Organization

Item	***Organization***
Water	
Sulfur	
Phosphates	
Euglena	
Hair	
Eye	
Bee Stinger	
DNA	
Pistil of a flower	
Methane	
Blood	
Hartland	
Nucleus	
Deer	
Sperm	
Gold	
Coral Reef	
Marianas trench	

Microscope Practice

Complete the table and answer the practice questions. Be sure to show all of your work.

	Total Magnification	**Diameter in Microns**	**Diameter in mm**

Scanning lens			
Low Power			
High Power			

- Approximately 500 of a certain type of bacteria can fit across your low-power field of vision. What is the approximate size of 1 bacterium?

2. Approximately 7 of a certain type of protist can fit across your high-power field of vision. What is the approximate size of 1 protist?

3. If a microscope has a low-power magnification of 100X, a high-power magnification of 600X, and a low-power field diameter of 1800 micrometers, what is the high-power field diameter in micrometers?

4. If 20 objects fit across a low-power field of view whose field diameter is 3000 micrometers, what is the approximate size of each object?

_____

5. If an organism took up 1/5 of your field of vision while using the 40x objective lens, the organism would be how small? Show your work.

6. A ribosome in a typical animal cell takes up 1/1000 of the cytoplasmic space (the space inside the cell). If the animal cell is viewed under high power, it appears to take up 1/20th of your field of vision.

- What is the size of the cell? _____

- What is the size of the ribosome? _____

7. Cryptosporidium is a protozoan parasite that infected millions of Milwaukee residents