SUBJECT: BASICS OF CHEMISTRY

LESSON OBJECTIVES:

- Explain the difference between organic and inorganic chemistry
- Discuss the different forms of matter: elements, compounds, and mixtures
- Explain the difference between solutions, suspensions, and emulsions
- Explain pH and the pH scale
- Describe oxidation and reduction (redox) reactions.

Inspirational thought for the day: “The greater the difficulty, the more glory in surmounting it. Skillful pilots gain their reputation from storms and tempests.” -- Epictetus

I) MATTER
  A) Elements
    1) Composed of a single part or unit
    2) Cannot be reduced to a simpler substance
    3) There are 90 naturally occurring elements
    4) Identified by a letter symbol. Ex: C: Carbon. O: Oxygen. N: Nitrogen. H: Hydrogen. S: Sulfur
  B) Atoms
  C) Molecules
    1) Elemental molecules
    2) Compound molecule

II) STATES OF MATTER
  A) Solids
  B) Liquid
  C) Gases
  D) Physical and chemical properties
    1) Physical
    2) Chemical
  E) Physical change
  F) Chemical change
  G) Pure substances
  H) Physical mixtures
    1) Ingredients do not change their properties
  I) Solutions, suspensions, and emulsions
    1) Solution
    2) Solute
    3) Solvent
    4) Miscible liquids
    5) Immiscible liquids
    6) Suspension
    7) Emulsion
    8) Surfactants
      (a) Head of the surfactant
      (b) Tail of surfactant
      (c) Surfactant molecule
      (d) Oil in water emulsion
      (e) Water in oil emulsion
  J) Other physical mixtures
    1) Ointments, etc.
    2) Powders

K) Common product ingredients
    1) Alcohols
        (a) Readily evaporating
        (b) Colorless
        (c) Volatile alcohols
        (d) Fatty alcohols
    2) Alkanolamines
    3) Ammonia
        (a) Colorless with a pungent odor
        (b) Compose of nitrogen and hydrogen
        (c) Used to raise the pH
    4) Glycerine
        (a) Sweet, colorless, oily substance
        (b) Used as a solvent and moisturizer
    5) Silicones
    6) Volatile organic compounds
    7) Formaldehyde (formalin)
        (a) Preservative
        (b) Toxic to inhale
        (c) Strong irritant
L) Potential hydrogen and ions
    1) Ion
    2) Ionization
    3) Anion
    4) Cation
M) Water and pH
    1) Hydrogen ion (H+) is acidic
    2) Hydrogen ion (OH-) is alkaline
N) The pH scale
    1) A scale of 0 to 14
    2) 7 indicates a neutral solution
    3) Below 7 indicates an acidic solution
    4) Above 7 indicates an alkaline solution
    5) Logarithm
O) Acids
    1) pH below 7
    2) Turn litmus paper from blue to red
    3) Contract and harden hair
P) Alkalis
    1) Term is interchangeable with base
    2) pH above 7
    3) Turn litmus paper from red to blue
    4) Feel slippery and soapy on the skin
    5) Soften and swell hair
    6) Taste bitter
Q) Acid-alkali neutralization reactions
    1) Pure water
    2) Neutralizing shampoos and normalizing
R) Oxidation reactions
    1) Oxidation
    2) Oxidation-reduction (redox) reactions
    3) Exothermic

4) Combustion

S) Reduction reactions
   1) Oxidized
   2) Reduction
   3) Oxidizing agent

T) Redox