Name: _____ Date: _____

THIRD TERM E-LEARNING NOTE

SUBJECT: CHEMISTRY **CLASS: SSS 2**

SCHEME OF WORK

WEEK TOPIC

1. Water
   - Sources, Types, Uses and Structure of Water.
   - Laboratory Preparation of Water.
   - Test for Water
   - Causes/ Removal of Hardness of Water.
   - Purification of Water for Municipal Supply.
2. Solubility and Solutions
   - Definition of Terms.
   - Calculations based on Solubility.
   - Solubility Curves.
   - Uses of Solubility.
3. Mass/Volume Relationship
   - Mole and Molar Quantities
   - Relative Atomic Mass and Relative Molecular Mass.
   - Calculations involving Mass and Volume.
4. Acid/ Base Reactions
   - Preparation of Standard Solutions.
   - Indicators
   - Calculations based on Acid-Base Titration.
5. Hydrocarbons
   - Unique Nature of Carbon.
   - Characteristics Features of Organic Compounds
   - Classification of Hydrocarbons.
   - Definition of Terms used in Organic Chemistry
6. Saturated Hydrocarbon (Alkanes)
   - Nomenclature
   - Preparation, Properties and Uses
7. Unsaturated Hydrocarbon (Alkenes)
   - Nomenclature
   - Preparation, Properties and Uses
8. Unsaturated Hydrocarbon (Alkynes)
   - Nomenclature
   - Preparation, Properties and Uses

   Aromatic Hydrocarbons
   - Benzene Structure
   - Preparation, Properties and Uses
9. Alkanols
   - Types and Classes
   - Industrial Production by Fermentation
   - Properties and Uses

REFERENCE MATERIALS

- New School Chemistry for Senior Secondary Schools by O. Y. Ababio

Name: _____ Date: _____

- New System Chemistry for Senior Secondary Schools by T. Y. Toon et al
- S.S.C.E Past Questions and Answers on Chemistry
- U.T.M.E Past Questions and Answers on Chemistry

WEEK ONE
TOPIC: WATER
CONTENT

- Sources, Types, Uses and Structure of Water.
- Laboratory Preparation of Water.
- Test for Water
- Causes/ Removal of Hardness of Water.
- Purification of Water for Municipal Supply.

WATER
Water is regarded as the universal solvent. It is a good solvent for many substances.

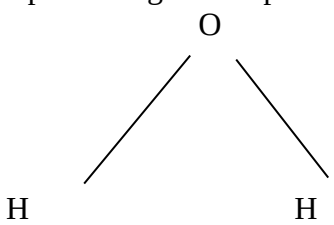
SOURCES OF WATER
The following are the sources of water:
1. Natural water:Rainwater, Well water, Spring water and Sea water
2. Treated water*:* Distilled water, Pipe – borne water and chlorinated water.

TYPES OF WATER
Water is of two types namely: soft water and hard water. Soft water forms lather with soap easily while hard water does not form lather readily with soap since it contains some dissolved salt in it.

STRUCTURE OF WATER
In a molecule of water, H_2O, the central atom is Oxygen. Oxygen has the following electronic configuration: $1s^2\ 2s^2\ 2p^4$.

The valence shell of oxygen has two lone pairs of electrons ($2s^2 2p^2$) and two unpaired electrons ($2p_y^1 2p_z^1$). Each unpaired electron forms a covalent bond with an electron from a hydrogen atom. The water molecule has two lone pairs and two bond pairs of electrons in the valence shell of its central atom, thereby satisfying the octet rule for stability.

Ideally, the four electron pairs should be directed towards corners of a tetrahedron. However, when lone pairs of electrons is located near another lone pair, the repulsion between them is so great that they squeeze the other two bond pairs of electrons closer together. As a result, the bond angle in water is compressed to approximately 105^o, such that the structure of the water molecule is V-shaped or angular shape.



LABORATORY PREPARATION OF WATER
To prepare water in laboratory, dry hydrogen gas is ignited in air. It burns with a faint blue flame to give steam, which will condense on contact with any cold surface to form water.

Name: _____ Date: _____

PHYSICAL PROPERTIES OF WATER

1. Water boils at 100^{o}C and freezes at 0^{o}C
2. It has a maximum density of 1gcm^{-3} at 4^{o}C
3. It is neutral to litmus.

CHEMICAL PROPERTIES

1. Water reacts with electropositive metals to form alkali and liberate hydrogen gas. E.g

   $Na_{(s)} + H_2O_{(aq)} \longrightarrow NaOH_{(aq)} + H_{2(g)}$

   Mg & Zn react with steam

   Cu, Au, Ag, Hg do not react with water to form alkaline solution
2. Non-metal like chlorine reacts with water to form acid solution.

   $H_20_{(aq)} + Cl_{2(g)} \longrightarrow HCl_{(aq)} + HOCl_{(aq)}$

TEST FOR WATER

When few drops of water are added to

1. White anhydrous copper (II) tetraoxosulphate (VI), it turns blue.
2. Blue cobalt (II) chloride, it turns pink.

NOTE: These two tests are not specific for water. They only indicate the presence of water. Any aqueous solution or substance containing water will give a positive test for water.

EVALUATION

1. Describe the structure of water.
2. How will you identify a give solution to be water?

HARDNESS OF WATER

Hard water is the water that does not…