

FIRST TERM E-LEARNING NOTE

SUBJECT: CHEMISTRY

CLASS: SSS2

SCHEME OF WORK

WEEK TOPIC

1. The Periodic Table
 - Historical Development of the Periodic Table/Periodic Law
 - Features of the Periodic Table.
 - Periodic Classification into Blocks and Families.
 - Families of Elements.
2. The Periodic Trend
 - The Periodic Properties of Elements: Atomic size, Ionic size, Ionization Energy, Electron Affinity, Electronegativity down the group and across the period.
 - Diagonal Relationship in the Properties of Elements in the Periodic Table.
3. Types of Reaction/Redox Reactions
 - Definition of Oxidation and Reduction.
 - Relationship between Oxidation Number and IUPAC Naming.
4. Oxidizing and Reducing Agents
 - Identification of Oxidizing and Reducing Agents
 - Balancing of Redox Equations in Acidic and Alkaline Medium.
5. Ionic Theory: Distinguish between:
 - Electrovalent and Covalent Compounds.
 - Electrolytes and Non-electrolytes.
 - Weak and Strong Electrolytes.
 - Conductors and Non-conductors.
6. Electrolysis
 - Meaning of Electrolysis
 - Definition of Terms
 - Preferential Discharge of Ions during Electrolysis.
7. Electrolysis of Specified Electrolytes
 - Acidified water
 - Brine solution
 - Copper (II) tetraoxosulphate (VI) solution.
 - Uses of Electrolysis
8. Faraday's Laws of Electrolysis
 - Faraday First and Second laws of electrolysis.
 - Verification of Faraday's Laws of Electrolysis.
 - Calculations based on Faraday's Laws.
9. Electrochemical Cells
 - Electrolytic and Electrochemical Cells with their differences.
 - Standard Electrode Potential.
 - Drawing and Writing of Cell Diagrams.
 - Calculation of e.m.f of a Cell.
10. Application of Electrochemical Cells
 - Distinction between Primary and Secondary Cells
 - Types of Electrochemical Cells.

REFERENCE MATERIALS

- New School Chemistry for Senior Secondary Schools by O.Y Ababio
- 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: THE PERIODIC TABLE

CONTENT

- Historical Development of the Periodic Table/Periodic Law.
- Features of the Periodic Table.
- Periodic Classification into Blocks and Families.
- Families of Elements.

THE PERIODIC TABLE

The periodic table is the table which shows the arrangement of elements in the order of increasing atomic number.

HISTORICAL DEVELOPMENT OF THE PERIODIC TABLE

In Chemistry, classification of elements began with Lavoisier in 1787, whose classification was essentially into metals and non-metals. Other scientists like Doberainer, Newland and Lothar Meyer also attempted to classify elements based on their properties. In 1869, a Russian scientist, Dmitri Mendeleev prepared the first periodic table where he arranged elements based on the atomic masses of the elements.

Mendeleev development of the periodic table was based on the periodic law. His periodic law stated that the properties of the element varied periodically with their relative atomic masses. He arranged the elements in increasing order of relative atomic mass. With this, elements having similar properties kept recurring at regular intervals or periods forming families of related elements.

With the discovery of the electronic structure of the atoms, it became clear that elements do vary regularly not with their relative atomic mass, but with their atomic number. Hence, in the modern periodic table, classification is based on atomic number, rather than relative atomic mass. Therefore, the **modern periodic law** states that the properties of elements are periodic function of their atomic number.

FEATURES OF THE PERIODIC TABLE

The modern form of the periodic table is divided into eight vertical columns known as GROUPS and seven horizontal rows known as PERIODS.

GROUPS:

The vertical columns of elements or groups are numbered from I to VIII (or 0). Elements in the same group have the same number of electrons in the valence shell. Hydrogen can be placed in group I or VII because it can donate its one electron like group I elements or accept electron like group VII elements. But for convenience and because of its simple valence electron, it is placed in group I. In group VIII, which is also group 0, Helium has two electrons while the other elements have eight valence electrons. Besides the eight groups, there are also, the transition groups of elements. These lay between group II and III in the periodic table.

PERIODS:

The horizontal rows of elements or periods are numbered from 1 to 7. Elements in the same period have the same number of electron shells. Among the elements in the period six and seven are the elements of Lanthanides and Actinides series known as inner transition metals.

PERIODIC CLASSIFICATION INTO BLOCKS AND FAMILIES

The elements in the periodic table may be divided into blocks according to the orbital their valence electrons are found which is responsible for the positions of the elements. The s-block elements have s-electrons in the outermost energy level, while the p-block has both s and p-electrons. The transition elements contain d-electrons in addition to its s and p-electrons, while the lanthanides and actinides contain f-electrons in addition to the s, p and d electrons.

Element	Atomic Number	Electronic configuration.
H	1	1s¹
He	2	1s²
Li	3	1s² 2s¹

Be	4	$1s^2 2s^2$
B	5	$1s^2 2s^2 2p^1$
C	6	$1s^2 2s^2 2p^2$
N	7	$1s^2 2s^2 2p^3$
O	8	$1s^2 2s^2 2p^4$
F	9	$1s^2 2s^2 2p^5$
Ne	10	$1s^2 2s^2 2p^6$
Na	11	$1s^2 2s^2 2p^6 3s^1$
Mg	12	$1s^2 2s^2 2p^6 3s^2$
Al	13	$1s^2 2s^2 2p^6 3s^2 3p^1$
Si	14	$1s^2 2s^2 2p^6 3s^2 3p^2$
P	15	$1s^2 2s^2 2p^6 3s^2 3p^3$
S	16	$1s^2 2s^2 2p^6 3s^2 3p^4$
Cl17		$1s^2 2s^2 2p^6 3s^2 3p^5$
Ar18		$1s^2 2s^2 2p^6 3s^2 3p^6$
K	19	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$
Ca20		$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$

EVALUATION

1. State the periodic law.
2. Explain the basis on which elements are arranged in the periodic table.

FAMILIES OF ELEMENTS

Elements in the same group may be said to belong to a family since they show similar properties because their atoms have the same number of valence electrons. At the same time, certain properties of the element in the same group show a gradual change with increase in atomic number. Such gradual change of property within a group is known as GROUP TREND.

GROUP I

The group I elements include: Lithium (Li), Sodium(Na), Potassium(K), Rubidium(Rb), Caesium (Cs), and Francium (Fr). They are...