

Grade 8- CHEMISTRY

Unit 1: NON-LIVING THINGS

General Objectives:

Students should demonstrate:

1. An understanding of theory that matter is particulate in nature.
2. An understanding that matter can be classified into many states the three most common being solids, liquids and gases.
3. An understanding of the process involved in a change of state of matter.
4. An understanding that changes of state can be represented graphically.

1.1 States of Matter

Students should be able to:

- (a) Define matter as anything that has mass and volume.
- (b) Cite evidence that matter of tiny particles: real-life evidence such as spraying perfume, smell from the bathroom, kitchen, fast food franchise etc.
- (c) Classify substances as solids, liquids or gases.
- (d) Distinguish between the three states of matter in terms of arrangement of particles, energy, compressibility, forces of attraction, volume and shape.
- (e) Describe what happens in change of state: heat energy supplied-particles convert to kinetic-increase vibrations-break bonds in structure.
- (f) Perform experiments to investigate change of state: (heating water, metal nitrate and iodine).
- (g) Use heating and cooling curves to illustrate changes of state of a pure substance.

1.2 Physical and chemical changes

Students should be able to:

- (a) Define physical and chemical changes: (physical-combination which results in a change of states of the same substance(s) but no new compounds are formed. Chemical-combination which results in formation of new substance(s) whether there is a change of state or not).
- (b) Describe features of physical and chemical changes in terms of: (reversibility, products, temporary/permanent) **See CSEC text for table of properties.**
- (c) Give examples of physical and chemical changes: salt in water vs salt, burning paper vs heating iodine, air vs water/ water vs ice.

1.3 Atoms and Elements, Compounds and Mixtures

Students should be able to:

Atoms and elements

- (a) Define an atom as the basic units of matter from everything is made. (revision)
- (b) Define an element as a substance that is made entire from one type of atom (revision)
- (c) Describe with illustrations the structure of the atom, include:
 - Mention of three subatomic particles and their relative masses and charges.
 - 2D representation for drawing purposes and 3D models for display within a periodic table chart.
- (d) Define the terms atomic number and mass number
- (e) Tabulate the first 20 elements of the periodic table along with: name, symbols, protons, neutrons, electrons and number
- (f) Deduce and write electronic configure for the first twenty elements of the periodic table
- (g) Identify elements in everyday materials.

Compounds and Mixtures

- (h) State the relationship among atoms, elements and compounds. (*physical combination of the same type of atoms- elements; chemicals combinations of atoms/elements- compounds*)
- (i) State the relationship among elements, compounds and mixtures. (*chemicals combinations of atoms/elements- compounds; physical combination of different elements or compounds-mixture*)
- (j) Define mixtures as the combination of two or more substances not chemically combined
- (k) Classify mixtures as homogeneous and heterogenous
- (l) State the different types of heterogenous mixtures: solution, suspension and colloid
- (m) Distinguish among solutions, suspension and colloids based on the following properties:
 - Particle size
 - Ability to settle on standing
 - Transmission of light

1.4 Acids Bases and Salts

Students should be able to:

- (a) Define an acid as a substance that has a pH less than 7 or a substance which turns blue litmus red
- (b) Define a base as a substance that has a pH greater than 7 or a substance which turns red litmus blue.

- (c) State the physical properties of acids and bases
- (d) Give examples of household chemical which are classified as acidic or basicity of a substance
- (e) Define the term pH scale as a numeric scale used to indicate the degree of acidity or basicity of a substance
- (f) Illustrate the pH scale using a line diagram
- (g) Perform simple tests using indicators to determine of pH of the various household chemicals mentioned above.
- (h) Examine the chemical reaction of acids and bases (*neutralization*) to give neutral compounds (*salts*)
- (i) Discuss the importance of neutralization with the aid of role plays, scenarios and problem solving within the following:
- Teeth cleaning
 - Bite treatment
 - Soil treatment
 - Indigestion
 - Bathroom cleaning
 - Kettle limescale treatment
 - Oven cleaning
 - Baking
 - Washing (use of washing soda)

1.5 Metals and Non-metals

Students should be able to:

- (a) Define metals as elements that consists of 1-3 electrons within the valence shell of the atom.
- (b) Define nonmetals as elements that consists of 4-8 electrons within the valence shell of the atom.
- (c) Classify the first 20 elements of the periodic table of metals and non-metals.
- (d) State the physical properties of metals and nonmetals (*include conditions necessary for corrosion*)
- (e) Relate the properties of metals to their uses
- (f) Give examples of metallic and non-metallic elements used in biological systems and everyday life. Example should include the following elements:
- Iron
 - Copper
 - Magnesium

- Calcium
- Aluminum
- Titanium
- Nickel
- Chromium
- Hydrogen
- Oxygen
- Carbon
- Phosphate
- Sulphur
- Iodine
- Helium
- Neon
- Chlorine

(g) perform practical activities to determine physical properties of a named metal. (check *density, malleability, ductility, expansion*)

(h) Define the term alloy as a solution of two or more metals that are physically combined.

(i) State examples of alloys and their uses. Examples include:

- Solder
- Bronze
- Stainless steel
- Brass
- Sterling silver
- White gold

(j) Define plastics as synthetic materials made from a variety of non-metals.

(k) State and define the two different kinds of plastics

(l) Give examples and uses of each type of plastic

(m) Outline the advantages and disadvantages of using plastics