**Welcome to our module on Review of Chemistry Principles**

Over the years, you have studied elementary science topics such as matter and energy. In this module, you are going to have an overview of chemistry and its branches. In addition to that, the relationship of chemistry to other sciences and to industry will be discussed. Moreover, we will re-examine the concept of matter, its properties, classification, states and the changes it undergo. Lastly, we will study the fundamental principles of chemistry and how will it be useful in solving chemistry problems.

**Learning Outcomes:**

At the end of the module, you should be able to:

1. acquire the fundamental principles of chemistry; and
2. apply the different concepts in solving simple chemistry problems.

**In this module, you are recommended to have:**

- Desktop, laptop or mobile phone to view this file and watch a review lesson after this module; and
- Steady internet access.

**You are also expected to:**

- Read the entire module as it may help you to answer several self-assessments, activities or quizzes at the end of this lesson.
- Accomplish the self-assessments on your own. It is designed to gauge your understanding of the lesson and it will not be recorded. If you have any clarifications, you may contact me through our Google Classroom.

**Content:**

1.1 Nature and Scope of Chemistry

Everything around you is associated with chemistry. You will learn a lot about the natural environment, its composition and operations at the most basic level as we go along the lessons. Chemistry can encompass a wide range of topics in science which we can actually relate to our daily lives from cooking, taking medicines and cleaning our countertops to more complex processes such as technological advancements in nanotechnology, transportation and space age which trigger innovation, provide occupations and improve people's wellbeing.

Acquiring the necessary chemical concepts will help you better undestand the world you live in.

## 1.2 Definition of Chemistry

Chemistry is the science of the composition, structure, properties and transformation of matter and the different laws and principles governing the changes it undergoes. It also tackles the energy transfomation accompanying these changes.

## 1.3 Branches of Chemistry

In general, the field of chemistry has been classified onto three main branches:

1. Organic chemistry is the study of compounds of carbon.
2. Inorganic chemistry is the study of all the other elements and their compounds.
3. Physical chemistry is the study of the principles of chemistry.

As more knowledge has been acquired in specialized areas, new areas of study have developed:

1. Biochemistry is the study of the chemical compounds, reactions, and other processes in living systems.
2. Analytical chemistry is the study of techniques for identifying substances and measuring their amounts.
3. Theoretical chemistry is the study of molecular structure and properties in terms of mathematical models.
4. Computational chemistry is the computation of molecular properties.
5. Chemical engineering is the study and design of industrial chemical processes.
6. Medicinal chemistry is the application of chemical principles to the development of pharmaceuticals/
7. Biologial chemistry is the application of chemical principles to biological structures and processes.

Different interdisciplinary branches of knowledge emerged with chemistry as its foundation:

1. Molecular biology is the study of the chemical and physical basis of biological function and diversity.

2. Material science is the study of the chemical structure and composition of materials.
3. Nanotechnology is the study of matter at the nanometer level, where structures consisting of small number of atoms can be manipulated.

1.4 Relationship of Chemistry to other Sciences and to industry

Chemistry is the servant of other sciences because it provides explanation and interpretation to various kinds of matter that are studied in detail in other sciences. Understanding chemistry principles is important for an in-depth knowledge of other sciences such as geoogy, botany, agriculture, medicine and engineering.

In Geology, chemistry is necessary in order to study chemical composition of our planet as well as of other worlds. It may also be used to understand the chemical processes and reactions in the formation of rocks, soils etc.

In Botany, certain chemical compounds produced by plants are called phytochemicals which have protective or disease preventive properties.

In agriculture, the use of fertilizers and pesticides protected crops and enhanced food provision. Moreover, food preservatives were used for longer shelf lives and food additives enhanced flavors.

In medicine, analysis and synthesis of chemical compounds lead to the creation of new drugs which may treat diseases

In engineering, chemical engineers design or optimize processes in the chemical industry. While civil engineers might focus on environmental protection or remediation. Electrical engineers must know how chips operate on an atomic scale for them to enhance or develop certain devces. Other interesting engineering developments through chemistry are high strength concrete, used in the Petronas Towers, and bioconcrete which are of great potential for further research.