ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

# Development and Validation of Learning Module in Teaching Science 10

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Date Submitted:
**February 24, 2026**

Date Accepted:
**March 29, 2026**

Date Published:
**April 07, 2026**

DOI:
**10.5281/zenodo.19465622**

## ABSTRACT

This study was conducted to validate the developed learning module in teaching Science 10. This study made use of the research and development type of research validating the learning module – a set of checklists was used for the Science experts. There were [20] twenty science experts; [5] five Earth Science experts, [5] Physics experts, [5] Biology experts, and [5] Chemistry experts who validated the learning module in teaching Science 10. The Science experts validated the learning module in terms of objectiveness, content, learning activities, suitability, clarity and usefulness. The Earth Science and Physics experts rated the learning module in Earth Science and Physics as Very Highly Valid. On the other hand, the Biology and Chemistry experts rated Biology and Chemistry learning module as Highly Valid. The science experts stated that learning module helps the students to attain the 21st-century skills needed for the students to become globally competitive, which are the following: (1) communication, (2) creativity, (3) critical thinking, and (4) collaboration. Furthermore, science experts also stated that the learning modules improve the students' scientific literacy skills where the learning module shares knowledge and activities. Therefore, it is recommended that teachers are encouraged to use Learning Modules resources as additional resources in teaching Science. Also, the learning module may be used in a study comparing the performance of the Grade 10 students.

**Keywords**: *Module development, module validation, Science 10, K-12 curriculum, instructional material, Earth Science, COVID-19 education*

## INTRODUCTION

*"The importance in life is to always seek for learning, enjoy the various difficulties, and endure ambiguity because at the end of the day there will be no exact answers."* – Martina Homer**.** This quotation has something to do with the current situation that we are experiencing, amidst of COVID-19 pandemic, which gave a significant challenge to everyone, we need to continue the educative process. Learning should never stop. That is why the Department of Education implemented the use of the Department of Education (DepEd) commons which consists of learning modules that yield the continuity of education. This learning module is anchored in the DepEd Order 18 series of 2020, which mainly talks about the Policy Guidelines for the Provision of Learning Resources in the Basic Education Continuity Plan. This policy guideline has a target to put the standards and specifications in the qualification of learning materials in the pursuance of the Basic Education – Learning Continuity Plan. The learning material is an addition learning resource for students where procedures, directions, and other details are provided to aid the educative process.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

However, the quality and system of education in our country were thoroughly examined in the year 2019. Based on the local or international evaluation results on students' academic performance Filipino students got a poor performance. Moreover, Secretary Briones stated that the performance of learners in the National Achievement Test (NAT) for students who are in 6th, 10th, and 12th grade level "moves from deficient level" precisely in Mathematics, Science, and English subjects. Despite this result, the Department of Education still hopes for a positive outcome on Philippine education, and it will serve as a warning to all educational organizations to work collaboratively and help each other to achieve a goal which is to give quality and excellent education. By this, the Filipino students will become globally competitive.

As such, the educational organization created a memorandum – DM-CI-2020-000 also known as the Clarification on the use of the Most Essential Learning Competencies (MELCs) which aims to enhance the different learning competencies across subject areas to enhance the academic performance of the learners. There is a recommendation which is "there must be a need for supplementary materials such as modules to cater all the competencies of those academes with more than one shift" ("National Achievement Test, p 28). Therefore, the Education of National Science gives requirement to all science teachers to make use of various science learning materials, advance technological resource accessible to the students, and efficient teaching of the content of the lesson. With this, the development of science learning materials and resources must be aligned in the students' capabilities, skills, knowledge, background, and interest. In providing excellent and quality education, one should emphasize the role of instructional learning resources in the effective teaching-learning process.

Also, the use of modules encourages independent study. One of the benefits of using modules for instruction is the acquisition of better self-study or learning skills among students. Students engage themselves in learning the concepts presented in the module. They develop a sense of responsibility in accomplishing the tasks provided in the module. With little or no assistance from others, the learners progress on their own. They are learning how to learn; they are empowered (Nardo, M.T.B, 2017). Other advantages of modular instruction include more choice and self-pacing for students, more variety and flexibility for teachers and staff, and increased adaptability of instructional materials.

In the Junior High School spiral curriculum, Science is a major subject offered in Grade 10 to be taken by the students in the first to fourth quarters. The subject deals with the four main branches of Science: Earth Science, Physics, Biology, and Chemistry. The different lessons and concepts were gathered together with the lessons in their former science subject. There is a lot of time to study the relationships and to give an in-depth understanding of the lessons (K to 12 Junior High School Curriculum – Earth Science 10, 2016). The researcher has been a secondary science teacher in a private institution for almost four years. In his four years of teaching, he has taught physics, chemistry, and earth science in junior high school and senior high school. He has been given different tasks, including being an adviser of student organization the Sci-Math Club, and a Science coordinator. It was observed that some teachers were teaching science subjects experienced a lack of learning materials aligned to K to 12 learning competencies. The development and validation of learning resources that will provide inquiry is a need to change the K to 12 Curriculum because inquiry is one of the fundamental characteristics of teaching science lessons for the past years.

In connection to this, the Department of Education (DepEd) released a DepEd Order (DO) 42 series of 2016, which talks about the different guidelines in the preparation of daily lessons in connection to the K to 12 programs. With the enactment of Republic Act (RA) No. 10533 or the Enhanced Basic Education Act of 2013, the Department of Education (DepEd) provided different guidelines in preparing daily lessons in connection to the K to 12 programs. Planning of the lesson and topic is very vital in providing a quality educative process in the schools. It is also the same in developing a learning module that is now a trend in the Philippine educational system due to the COVID-19 pandemic. Furthermore, these policies target to give help for educators in managing and organizing their lessons and classes efficiently and effectively. By that, an achievement in the academic performance of the students will be ensured.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

It also professes the responsibility of the K to 12 educators to make the learning easy for the students. The preparation of lesson through the Daily Lesson Log and learning modules give educators the following chances to think: how the learners should be learned, what learners should learn, and how to give an efficient educative process. Also, the goal is to deliver excellent lessons that recognize the uniqueness of the students in the classroom. They are passionate to see the success of their students, permit to use different teaching strategies that include the use of information and communications technologies, and the role of the teacher to facilitate every learner in evaluating their academic performance across the subjects.

With regards to the problems of limited number of learning resources, educators are now facing another demand: to design and develop appropriate learning resources that will help the students heighten their learning. This probably may solve the problem on the limited number of learning resources. The development and validation of the learning module in Grade 10 Science aims to give an efficient and effective educative process in understanding the lesson in earth science, physics, biology, and chemistry and to provide real-life experience through validated learning module, despite the scarcity of learning resources in both public and private education. This learning module development will serve as an innovation that will serve as a hope to answer the current needs of the educational system in the country.

This study aimed to develop and validate a Science 10 learning module aligned with the Most Essential Learning Competencies (MELCs) in Earth Science, Physics, Biology, and Chemistry. It also assessed the module's validity in terms of objectiveness, content, learning activities, suitability, clarity, and usefulness, and examined its implications for science education.

## LITERATURE REVIEW

Science is a system of knowledge covering the general laws, especially as tested and got from the scientific method process. Ajesoji & Olatunbosun (2008) stated that science is a field of study that has made it possible for a person to understand the behavior and structure around us. Science teachers are very vital in transforming different scientific-educational goals into reality so that the science education can give an efficient and effective preparation for the students to become globally competitive in their lives. For them to accomplish it, an excellent, expert science educator who can take into reality the needs of teaching lessons in Science concerning technological and scientific skills in students must be a need.

However, using various instructional learning resources such as learning modules can contribute to the effectiveness of teaching science subjects. Teachers are now challenged by the heavy task of teaching young learners to be updated with the technological world. Compared to other counties, the Philippines have a very low level of excellent education, specifically in educating science lessons. Based on the World Economic Forum (2018) report, the Philippines categorized as number 76$^{th}$ out of 137 countries when it comes to excellent and quality science and mathematics education. Nowadays, the standing of education in science is very much affected by numerous problems especially on the scarcity of learning resources and teaching tools aligned to the Most Essential Learning Competencies. Educators experienced difficulties delivering their lessons on some theories and concepts in science due to inadequate alignment, relevance, replication and problem and project-based learning materials.

Furthermore, the inadequateness of facilities in science education is considered as one of the reasons why there is a low-performance education in Science as perceived by the poor evaluation rating of learners in different assessments and evaluations. In addition, instructional learning resources and teaching tools which are patterned to the aimed learning competencies are insufficient (Jalmasco, 2014). This undesirable condition that is experienced by the educational organization here in the Philippines gives way to the Department of Education to heighten the various learning competencies across the curriculum that is necessary for the accomplishment and achievement of 21$^{st}$-century skills such as communication, creativity, and others. That is why there is a need that the educational systems in the Philippines must develop and implement supplementary learning resources in a modular form to heighten the different learning

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

competencies across the curriculum of those in the educational institutions and will lead to a better academic performance of students.

On the other hand, during the governance of the former President Benigno Aquino III in 2013, the Department of Education gives rise to the enactment of the K to 12 programs, also known as the Republic Act 10533. The Republic Act 10533 or the K to 12 programs of the Department of Education (DepEd) targets to prepare junior and senior high school students for higher education, labor, business, or the reality of life. This is an additional two years education from the previous level of education, where the 10th grade learners still need to study for at least two years to be ready for the challenges given by society. (Department of Education, 2016). In connection to this, there must be a need for an inquiry-based program to enrich because it gives emphasis of reform in the curriculum – K to 12 across science levels. This will happen if there is a development of learning resources and teaching tools that emphasizes inquiry-based activities. This inquiry-based activity has become a foundation in science education over the past few years. It gives the learners the chance to expose laboratory experiment activities, real-life tasks, asking questions that can provide higher-order thinking skills and develop reasoning and logical skills (Meyer et al., 2013; Trumbull et al., 2005). In addition, to implement an effective inquiry-based strategy in science education, there must be a use of instructional learning resources in the teaching-learning process. These learning resources comprised of an independent lesson of delivery prepare for achieving well-defined learning competencies (Macarandang, 2009). Promotion of learning on their own and practicable in various places and times are the two unique characteristics of self-instructional learning resources. As a self-paced learning resource and teaching tool, it allows a student to work on his/her own rather than to work collaboratively with other students. The availability of the self-instructional learning resources also allows learners to comprehend the lesson in their own time.

Moreover, the concept of self-directed learning with learning module is commendable by Shaikh (2013), who stated that self-directed learning must exist across different subject levels. Self-paced students are given challenging tasks, practice how they will learn the lesson, develop an in-depth understanding of the learning module, and give extra effort and patience which leads them to have a quality and excellent education (Perry, Phillips, & Hutchinson, 2006). Hence, in a world marked by sudden changes, the educational system needs to target two goals for the students to prepare for their lives in this kind of world. These two objectives are giving the timely subject matter and preparing the students with self-directed learning skills that will favor them in their lifetime (Dynan, Cate, & Rhee, 2008).

Besides, different teaching strategies and approaches have been incorporated in the teaching-learning process to emphasize on self-directed learning skills with the help of using learning modules. Let say for example, Smedley (2007) gives different teaching approaches and strategies that may use to assist the readiness of self-directed learning skills: giving immediate feedback, giving opportunities to involve the learners in their learning processes, employing self-reflection and self-assessment, and creating goal-oriented values and skills. These approaches and strategies are fundamental in helping educators emphasize and facilitate learners to continue their studies in this technological world.

With all the related literature cited above, it is indispensable to have a better teaching and learning process because it is vital to heighten student's success. The start of the K to 12 educational programs of the Department of Education in the Philippines gives rise to a demanding and challenging educational system. With this, science educators must give quality and well-developed learning modules to enrich students' learning. It has been demanded the call to teach among those teachers who are not graduates of Education course. The challenge is to give their best and perform well inside and outside the classroom, even if teaching is really not their original calling.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

### *A. Foreign*

According to the study of Lee and Kwon (2008) about the "Earth Science Module: A Development and Application", it was found out that the goals of the National Earth Science Curriculum were aligned to the designed Earth Science learning module. Also, this Earth Science learning module helps students enhance their scientific literacy, particularly in Earth Science. It is vital in understanding the concepts such as weather, planets, water, and rocks when it comes to comprehending the characteristics, structure, and components of Earth System. The learning module in Earth Science is a valuable instructional learning resource that can enhance students' academic performance in Earth science. The study of Kwon and Lee is very relevant to the present study of developing and validating learning modules in teaching Science 10. On the other hand, they have different objectives wherein Kwon and Lee help the learners enhance their understanding and skills in Earth Science and become literate in the lessons and applications in Earth Science. In contrast, the present study will help the learners enhance their understanding and skills in Science 10, specifically Earth Science, Physics, Biology and Chemistry.

Furthermore, a research study that aims to create and design a module in the area of Physics based on the technology and learning habits employed by the educator in the Junior High School evaluated the acceptability of the module. The study was tested on two educators and fourteen respondents. The outcome of the interviews with the educator and learners shows a perfect response in Physics. The appropriate technology is matched with the learning styles and habits of the learners. In the evaluation stage, two group of respondents were used to gather information for this research. Alias (2012) found out that the model used in this study gives knowledge to directions from the students' point of view rather that from the content of the subject matter. That suits developing learning modules in Physics based on their learning habits and appropriate media and technology in Junior High School in other countries. The results of this study also give perspective to provide an educative process of learning module in Physics. The study of Alias was different from the present study that the Physics subject was focused on the module. In addition, the module was developed using the learners' learning style and appropriate technology in the educational setting. On the other hand, the present study will focus on developing and validating the learning module in teaching Science 10 using the researchers' developed and designed learning module.

Moreover, a study in Padang, West Sumatera, Indonesia, titled "Discovery Learning Module based on Scientific Approach." This research focused on developing a learning module about Acid-Base solutions based on a scientific approach discovery. Azhar et al. (2018) made use of three main stages. The first stage is the preliminary research, the second is the model stage, and the last stage is the evaluation. The respondents of this research were the 10th and 11th-grade learners. Chemistry teachers were used as an expert to validate the learning module. The effectiveness of the learning module has been validated by using experimental design through a comparison of the students' success. The study of Azhar et al. found that the developed learning module based on scientific approach discovery significantly enhanced the students' learning of Acid-based and Electrolyte and Non-Electrolyte solutions. The result of the used statistical treatment in data analysis indicates that the learning module in chemistry was valid in content, presentation, and construction. In addition, the learning module in chemistry based on scientific and discovery learning in acid-based solutions for the 10th and 11th-grade learners were revealed to be effective and valid. The study of Azhar et al. has both similarities and differences in the present study. The difference is that the study of Azhar et al. used Plomp Model in developing discovery learning modules and focused on Chemistry subjects. However, the present study will employ the ADDIE Model's stages in developing learning modules in teaching Science 10. Also, the similarity of this study to the present study is that they have both the same objective, and this is to provide a quality learning module that will help the learners enhance their skills in science.

On the other hand, a research study aimed to design an "E-Module on Some Topics in Thermodynamics." The electronic module in Cipasung, Singapore, West Java, Indonesia tested the feasibility and validity test to enhance learners' scientific literacy for 11th-grade learners. Serevina et al.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

(2018) stated that the electronic module was made and developed through the five stages based on problem-based learning. The five stages are the following: organization of set of problems, giving of learning activities, investigation, development of result, and assessment of information. An expert validated the developed electronic module in terms of heat and temperature, and it was found out that the electronic module in Physics was recognized as very good. Based on the results on the assessment of learners' academic performance in science with this electronic module, it resulted in a category known as moderate.

In contrast to the study regarding the use of "Educational Modules as a Strategy for 7th-grade learners in Science Subject" in Salt, Jordan, this study of Alelaimat (2012) aims to present the educational modules strategy about the academic achievement of Grade 7 students. The respondents of this study are a combination of male and female students with one hundred seventy-four. These students in the city of Mafraq are further subdivided into two parts: the Experimental and Control. The study found out that the students in the experimental group were excellent than the control group students in both types of academic performance. At the same time, the study results found that there is a missing difference between male and female students in long-term assessment. With this, Alelaimat has a recommendation on using in-depth modern approaches to teach learners the Science skills and concepts such as module strategy, to give training and workshop for educators on implementing modules strategy. Furthermore, having readily available textbooks, worktext, and other references helps this kind of teaching.

For a very long time, the development and validation of modules in diverse disciplines have remained a subject of hellacious deliberation. Therefore, going deep into the details of each field is essential. The researcher has found some studies which directly or indirectly related to his research study.

Martin (2018) administered a study in Senior High School in Lucena and Metro Lucena titled "Content Validation of Earth Science Module." The developed modules were validated by the group of teachers who were considered experts in their fields. Both the educator and student find the Earth science module acceptable in terms of objectives, structures, learning activities, and form of evaluation. They decipher it as an additional form and very appropriate instructional tools to make the educative process more meaningful. Students and teachers may use the developed module in Earth Science to acquire more information beneficial to both of them. The teaching and learning process will become excellent. The study used the descriptive method of research to collect data about the content validity of the developed module in Earth Science. The present study will also use a descriptive method of research and the content, objectiveness, learning activities, suitability, clarity, and usefulness as his variables to validate the learning module in teaching Science 10. This is what makes the present study similar to the study of Martin.

In contrast to the research about "Physics Module for 10th Grade Learners: Development and Validation", teachers from Tibagan High School and selected Physics Experts from Philippine Normal University were the respondents used to validate the learning module in Physics. It was further tried out on ninety-six learners of Tibagan High School. The study of Naval (2014) revealed that the learning modules were revealed to be acceptable 10th-grade learners who are taking up Physics subject. On the other hand, there was no significant difference between the acceptability of the module and the evaluation of the respondents. Also, in terms of acquiring knowledge, the developed set of learning modules was concrete and practical. The present study is much similar to the study of Naval in that the present study will also be needed of science experts to validate the learning module. However, their difference is that the present study will focus on Science 10 subject while the study of Naval focused on the least-mastered learning competencies in Physics subject. This research inspired the present researcher. He also wanted to validate a learning module in Science 10 and be implemented in the school where he is teaching.

However, a research study was conducted about the "Workbook of Physical Science for 11th and 12th Grade Levels" in a government-owned university in Central Luzon. Adequacy, coherence, appropriateness, and usefulness were the variables used in Rogayan and Dollete's (2019) study to validate the developed workbook. However, the present study used objectiveness, content, learning activities, suitability, clarity, and usefulness as his variables to validate the learning module in teaching Science 10.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

This is what makes the present study differs from that of Rogayan and Dollete. Furthermore, Rogayan and Dollete found out that the developed workbook in Physical Science was very much acceptable by the experts who validated the workbook. The workbook was acceptable in terms of the variables used in the study, such as adequacy, coherence, appropriateness, and usefulness. In addition, the enrolled students in a Physical Science course were also served as the validator. That is why they also rated the workbook acceptability. The validated learning material is recommended as additional instructional learning resources in the Physical Science course in the Senior High School curriculum. Furthermore, Selga's (2013) study aimed to develop and validate instructional material, particularly a worktext in Science, Technology, and Society. The goal is to assess the adequacy, availability of the learning material, the lessons needed in the program, and the level of validity of the learning activities in terms of content, format, and readability. The study revealed a missing in terms of adequacy and availability of the learning material in Science, Technology, and Society; therefore, there is a desire to create a contextualized learning material in the said subject area. This is also the aim of the present study, which is to validate a learning module in teaching Science 10 because the researcher thinks there is a lack of instructional materials in science subjects. The study of Selga found out that the developed worktext is practical to use in the educative process. This means that it gives to the achievement of learning competencies of the subject, is well-developed and well-organized of the information of the lesson, and it is appropriate to the ability and comprehension of the learners. The study implies that instructional learning resources must have a concrete and proper allocation. If to be created, the teachers should be made appropriately and correctly to their target users. Instructional learning resources should be effectively used with high quality and quantity to achieve an effective and efficient educative process.

In the evaluation of learning materials, teachers play a vital role. A teacher who facilitates and guides students must ensure that instructional learning resources achieve the practical, educative process. In connection to this, the study of Tan & Coral (2019) focused on the evaluation of Grade 7 Biology Modules produced by the Department of Education as perceived by teachers whose major is science in the sixteen public schools and Biology Expert. The learning module in Biology 7 is validated based on specific standards. Seventeen experts specialize in biology with a doctoral degree and one to fifteen years of teaching Biology subjects. Both experts assessed the learning modules' satisfaction in the seven standards. However, the experts suggested an improvement in some areas of the learning modules. Moreover, the study's findings come to a recommendation which is to enhance the learning modules in another subject of Grade 7 that already existed.

**Conceptual Framework**

The concept in Science would be possibly taught to learners if there is an integration of real-life and practical applications of the lessons (Hofstein and Naaman, 2007). The main goal of this Study is to validate the developed student-centered and to learn competency-based learning module in teaching Science 10 that might be used as one learning resource in the lecture online or face-to-face in the Junior High School Curriculum. The Study about the validation of learning modules in teaching Science used the IPOO-Model. According to the IPOO-model built on a cognitive basis, school learning is an information processing procedure with four components: input, process, output, and organizing (Mező, 2014). Every component is built based on special abilities, motivations, and methods.

Figure 1 shows the input-process-output-outcome model (IPOO Model). The developed learning modules in teaching Science were made as part of the input (I). The process (P) included the validation of the developed learning module by the science experts. This Study's output (O) was the validated learning module in teaching Science 10 and its implication to Science Education. Lastly, the outcome (O) of this Study was the implication to Science Education.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

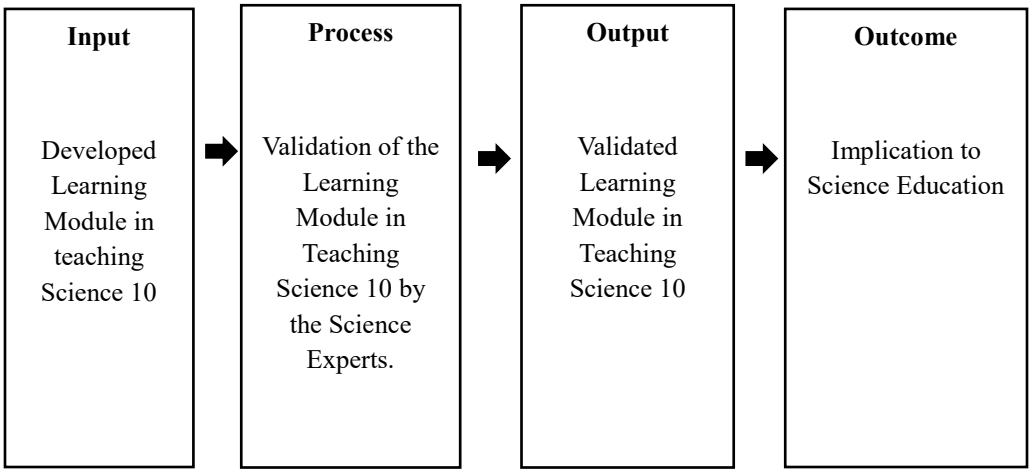



Figure 1. *Paradigm of the Study*

The learning module in teaching Science 10 was developed by the researcher aligned to the prescribed Curriculum Guide given by the Department of Education. The learning module was validated by the twenty [20] science experts in terms of objectiveness, content, learning activities, suitability, clarity, and usefulness. After the validation of the learning module, the researcher made an outcome of the Study, which is the implication of the learning module to science education based on comments and suggestions of the science experts.

## METHODS

### Research Design

This study employed a research and development (R&D) design to develop and validate a Science 10 learning module aligned with the Most Essential Learning Competencies (DepEd Order No. 12, s. 2020). The module was evaluated by science experts based on objectiveness, content, learning activities, suitability, clarity, and usefulness to support effective teaching and learning processes.

### Research Locale

The Study was conducted in Tarlac and Pangasinan. The twenty [20] science experts who validated the learning module in teaching Science 10 were teaching at the different High Schools and Universities in Tarlac and Pangasinan. These schools also used learning modules in digital and printed format initiated by their Schools Division Office.

### Validators of the Learning Module

The study involved 20 science expert validators, including specialists in Earth Science, Physics, Biology, and Chemistry. All were licensed professional teachers with relevant undergraduate and graduate degrees, and had at least five years of teaching experience in their respective fields. These experts were selected to ensure credible and informed validation of the Science 10 learning module.

### Data Gathering Procedure

Permission was secured from 20 science expert validators prior to the study. The developed Science 10 module was distributed along with a validation checklist via an online platform. Validators, consisting of experts in Earth Science, Physics, Biology, and Chemistry, assessed the module based on established

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

criteria. Data were collected after submission of evaluations, followed by an online post-conference to discuss results. The entire validation process was conducted over three weeks under the researcher's supervision.

**Research Instruments**

A researcher-developed Science 10 learning module was validated using a checklist adapted from Rogayan and Dollete (2019) and Marasigan (2019). The module consisted of MELCs, introduction, discussion, enrichment activities, and assessment. It was evaluated by 20 science experts with at least five years of teaching experience and advanced degrees in Science. Validation covered objectiveness, content, learning activities, suitability, clarity, and usefulness, using a 5-point scale ranging from not valid to very highly valid.

**Ethical Consideration**

The researcher asked permission from the science experts prior to the conduct of the Study. The personal information of the experts was kept in private for confidentiality. Results, methods, and procedures were collected and conducted without any manipulation. This is to provide valid and reliable results for the research. The researcher did not pressure or force the experts to participate in the research. Moreover, science experts can participate and contribute to the research of their own will.

**Sampling Technique**

In order to pursue the research, the specific earth science, physics, biology and chemistry experts involved must be identified. These experts were clustered and selected based on their area of specialization, on the degree they earned in their college level and graduate studies and on the number of years in teaching the said specialization. The purposive sampling technique was used since the researcher selected the science experts according to their area of specialization (Palys, 2008).

**Statistical Treatment**

Descriptive statistics, specifically the mean for ungrouped data, were used to analyze the validation ratings of science experts. The grand mean was computed to determine the overall validity of the developed Science 10 learning module in terms of objectiveness, content, learning activities, suitability, clarity, and usefulness.

## RESULTS AND DISCUSSION

**Development of the Learning Module in Teaching Science 10 Based on the Most Essential Learning Competencies (MELCs)**

The researcher developed a learning module in teaching Science 10 that is anchored on the Most Essential Learning Competencies given by the Department of Education, which consisted of four areas of instruction. The learning module in Science 10 consists of four branches of Science which are the following: Earth Science – First Quarter, Physics – Second Quarter, Biology – Third Quarter, and Chemistry – Fourth Quarter. The topics under Earth Science 10 were: Plate Tectonic Theory, Plate Boundaries, Mechanism of Plate Tectonic, and Evidence of the Plate Movement. Under Physics 10 were: Electromagnetic Wave, Electromagnetic Spectrum, Mirrors and Lenses, Optical Instruments, and Simple Motor and Generator. Under Biology 10 were: Reproductive, Nervous and Endocrine Systems, DNA, Evolution, Biodiversity, and Ecosystem. Lastly, Chemistry 10 were: Gas Laws, Biomolecules, and Chemical Reactions. Each learning module consisted of five parts which are the following:

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

(1) *Most Essential Learning Competencies* which gives them clear direction on what skills and knowledge they need to achieve.


SCIENCE & TECHNOLOGY 10

QUARTER: 1 TERM: WEEK 1-3

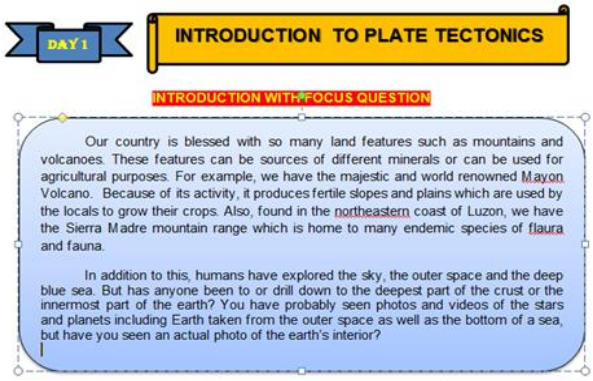
UNIT TOPIC: THE SCIENCE OF PLATE TECTONICS

Most Essential Learning Competency:

In this module, the learners shall be able to:

a. Describe and relate the distribution of active volcanoes, earthquake, epicentres, and major mountain belts to Plate Tectonic Theory.

(2) *Introduction*, which provides a background or summary on what they are going to learn;


DAY 1

INTRODUCTION TO PLATE TECTONICS

INTRODUCTION WITH FOCUS QUESTION

Our country is blessed with so many land features such as mountains and volcanoes. These features can be sources of different minerals or can be used for agricultural purposes. For example, we have the majestic and world renowned Mayon Volcano. Because of its activity, it produces fertile slopes and plains which are used by the locals to grow their crops. Also, found in the northeastern coast of Luzon, we have the Sierra Madre mountain range which is home to many endemic species of flaura and fauna.

In addition to this, humans have explored the sky, the outer space and the deep blue sea. But has anyone been to or drill down to the deepest part of the crust or the innermost part of the earth? You have probably seen photos and videos of the stars and planets including Earth taken from the outer space as well as the bottom of a sea, but have you seen an actual photo of the earth's interior?

https://www.pinterest.ph/pin/40884309089312523/ https://www.britannica.com/place/Mount-Apo

(3) The *discussion* that gives the student a detailed explanation of the lesson with corresponding process questions or guides questions.


Day 2-4

DISCUSSION

You will now begin to read and understand the concepts about reproductive and endocrine systems.

The morphological and physiological structures of the male reproductive system are different from the female reproductive system. The external and internal parts differ in size and shape as well as its functions. Though the parts and functions of the reproductive system are different in some aspects, they are coordinated. The role of the male reproductive system is to produce and transport the sperm cells while the female reproductive system is to produce egg cells and for childbearing. Without the fusion of the gamete from the testis of the male organ with the gamete from the female organ, reproduction will not occur.

ISSN: 3116-3475
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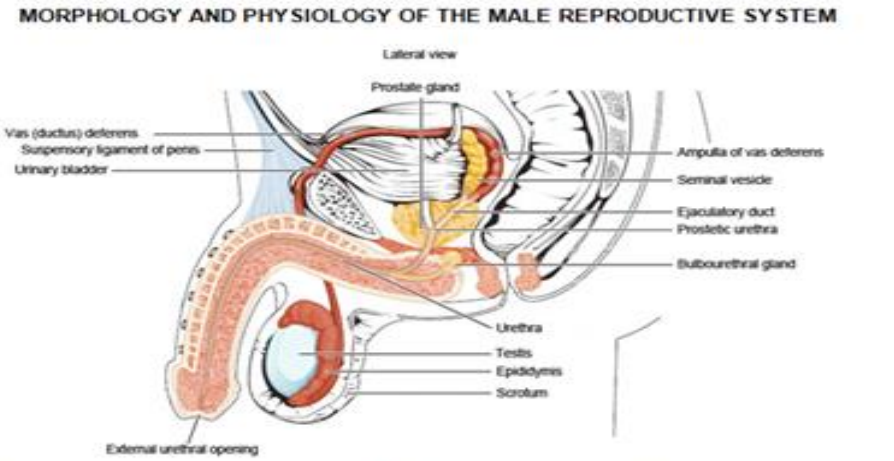
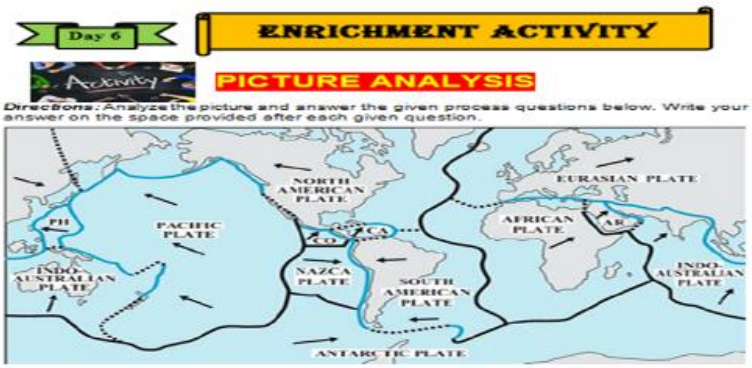
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)



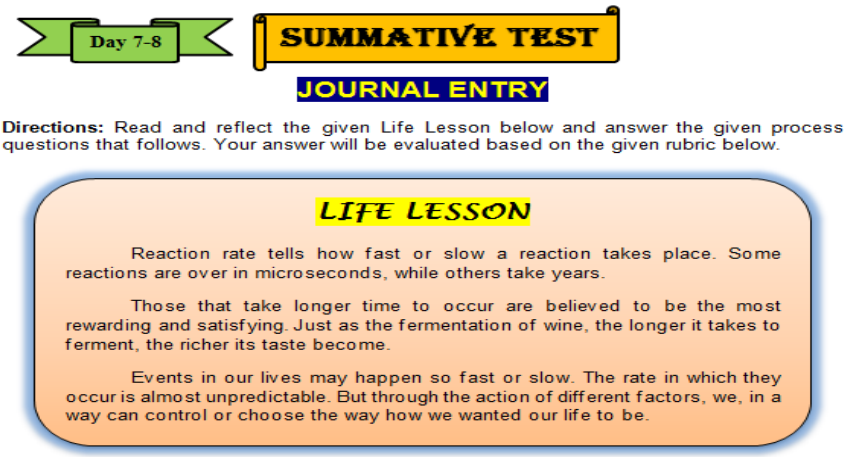

https://www.cambridge.org/core/books/abs/textbook-of-clinical-embryology/physiology-of-the-male-reproductive-system/AFF9273D9F0989498188591CD3BF2655

(4) *Enrichment Activity* which challenges the students to apply what they have learned from the lessons;



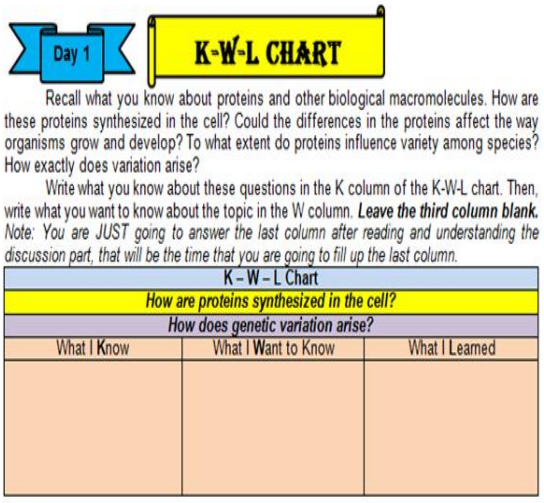

https://www.researchgate.net/figure/Schematic-map-of-the-surface-of-the-Earth-showing-the-12-main-lithospheric-plates_fig1_245541905

(5) *Summative Assessment* provides an evaluation on student learning at the end of the learning module.



ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

Aside from the regular parts, the learning module also includes diagnostic tests, formative assessments in various activities, life lessons, performance tasks, and references.



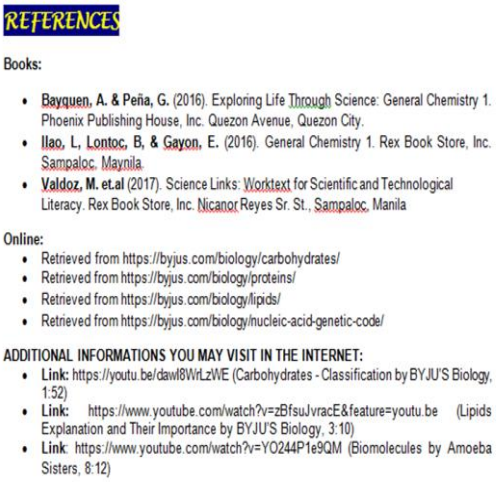
Day 1

K-W-L CHART

Recall what you know about proteins and other biological macromolecules. How are these proteins synthesized in the cell? Could the differences in the proteins affect the way organisms grow and develop? To what extent do proteins influence variety among species? How exactly does variation arise?

Write what you know about these questions in the K column of the K-W-L chart. Then, write what you want to know about the topic in the W column. ***Leave the third column blank.*** *Note: You are JUST going to answer the last column after reading and understanding the discussion part, that will be the time that you are going to fill up the last column.*

| K – W – L Chart | | |
|---|---|---|
| *How are proteins synthesized in the cell?* | | |
| *How does genetic variation arise?* | | |
| What I Know | What I Want to Know | What I Learned |
| | | |



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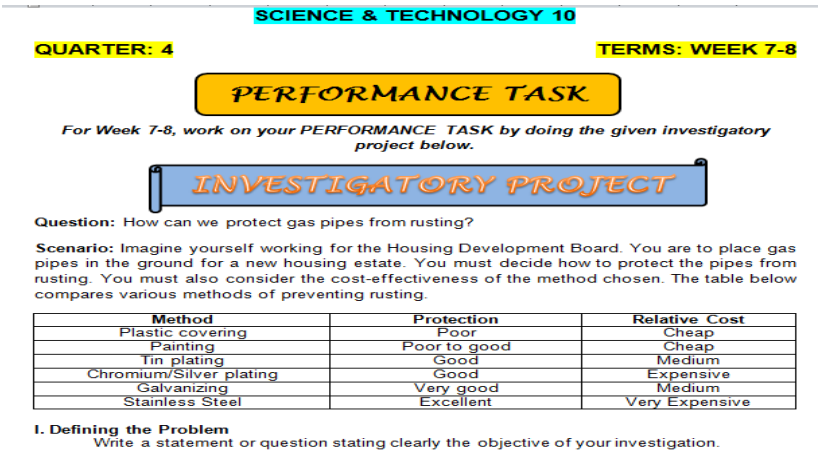
- Ilao, L, Lontoc, B, & Gayon, E. (2016). General Chemistry 1. Rex Book Store, Inc. Sampaloc. Maynila
- Valdoz, M. et.al (2017). Science Links: Worktext for Scientific and Technological Literacy. Rex Book Store, Inc. Nicanor Reyes Sr. St., Sampaloc, Manila

Online:

- Retrieved from https://byjus.com/biology/carbohydrates/
- Retrieved from https://byjus.com/biology/proteins/
- Retrieved from https://byjus.com/biology/lipids/
- Retrieved from https://byjus.com/biology/nucleic-acid-genetic-code/


ADDITIONAL INFORMATIONS YOU MAY VISIT IN THE INTERNET:

- **Link:** https://youtu.be/dawl8WrLzWE (Carbohydrates - Classification by BYJU'S Biology, 1:52)
- **Link:** https://www.youtube.com/watch?v=zBfsuJvracE&feature=youtu.be (Lipids Explanation and Their Importance by BYJU'S Biology, 3:10)
- **Link**: https://www.youtube.com/watch?v=YO244P1e9QM (Biomolecules by Amoeba Sisters, 8:12)



SCIENCE & TECHNOLOGY 10

QUARTER: 4 TERMS: WEEK 7-8

PERFORMANCE TASK

*For Week 7-8, work on your PERFORMANCE TASK by doing the given investigatory project below.*

INVESTIGATORY PROJECT

**Question:** How can we protect gas pipes from rusting?

**Scenario:** Imagine yourself working for the Housing Development Board. You are to place gas pipes in the ground for a new housing estate. You must decide how to protect the pipes from rusting. You must also consider the cost-effectiveness of the method chosen. The table below compares various methods of preventing rusting.

| Method | Protection | Relative Cost |
|---|---|---|
| Plastic covering | Poor | Cheap |
| Painting | Poor to good | Cheap |
| Tin plating | Good | Medium |
| Chromium/Silver plating | Good | Expensive |
| Galvanizing | Very good | Medium |
| Stainless Steel | Excellent | Very Expensive |

**I. Defining the Problem**
Write a statement or question stating clearly the objective of your investigation.

The learning module for each quarter is suitable for eight weeks; for the eight weeks learning module per quarter, two weeks are allotted for the students to make their performance tasks aligned to the performance standards as prescribed in the Curriculum Guide. The developed learning module in teaching Science 10 ensures the integration of knowledge, values, and 21st-century skills. For this reason, the students will become globally competitive.

**Validation of the Learning Module in Teaching Science 10 as Validated by the Science Experts**

The Earth Science, Physics, Biology, and Chemistry experts were asked to validate the learning module in teaching Science 10 because they know the objectiveness, content, learning activities, suitability, clarity, and usefulness in the learning module in teaching Science 10.

***Objectiveness***

The learning module in teaching Science 10 was developed considering the Most Essential Learning Competencies. This was done to ensure that the learning module in teaching Science 10 is aligned to the content standard and performance standard present in the Curriculum Guide by the Department of Education.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

Table 1. *Validation of the Learning Module in Earth Science in terms of Objectiveness*

| Statements | Mean | Verbal Description |
|---|---|---|
| Earth Science | | |
| 1. The learning module meets clearly defined needs. | 4.60 | Very Highly Valid |
| 2. The purpose of the learning module has been made clear to all likely users. | 4.40 | Highly Valid |
| 3. The learning module introduction gives a clear account of its goal. | 4.60 | Very Highly Valid |
| 4. The entry behaviour of potential users has been carefully described in terms of a comprehensive list of knowledge and skills. | 4.40 | Highly Valid |
| 5. The aims relate to the purpose of the learning module. | 4.60 | Very Highly Valid |
| 6. All the general objectives relate to the purpose of the learning module. | 4.40 | Highly Valid |
| 7. Each set of specific objectives leads to the achievement of its relevant general objectives. | 4.60 | Very Highly Valid |
| Overall Mean Score | 4.51 | Very Highly Valid |

Table 1 shows the result of the learning module in Earth Science in terms of objectiveness. The table further revealed that the overall mean score of the learning module in Earth Science in terms of objectiveness is 4.51 with a verbal description of Very Highly Valid. This implies that the validated learning module in Earth Science aligned to the purpose of the module.

In addition, the Earth Science experts stated that the learning module's objectiveness takes into consideration the needs of the learners and includes creative and critical thinking that supports the attainment of the Most Essential Learning Competencies. With this, the learning module in Earth Science meets clearly the needs of the students in terms of content and performance standards aligned to the Most Essential Learning Competencies.

Table 2. *Validation of the Learning Module in Physics in terms of Objectiveness*

| Statements | Mean | Verbal Description |
|---|---|---|
| Physics | | |
| 1. The learning module meets clearly defined needs. | 4.60 | Very Highly Valid |
| 2. The purpose of the learning module has been made clear to all likely users. | 4.40 | Highly Valid |
| 3. The learning module introduction gives a clear account of its goal. | 4.60 | Very Highly Valid |
| 4. The entry behaviour of potential users has been carefully described in terms of a comprehensive list of knowledge and skills. | 4.20 | Highly Valid |
| 5. The aims relate to the purpose of the learning module. | 4.60 | Very Highly Valid |
| 6. All the general objectives relate to the purpose of the learning module. | 4.40 | Highly Valid |
| 7. Each set of specific objectives leads to the achievement of its relevant general objectives. | 4.60 | Very Highly Valid |
| Overall Mean Score | 4.49 | Highly Valid |

The given data in Table 2 shows the result of objectiveness of the learning module in Physics. Based on the gathered data by the researcher, he found out that the learning module in Physics in terms of objectiveness got an overall mean of 4.49 with a verbal description of Highly Valid. This means that the

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

validated learning module in Physics leads to the achievement of its relevant learning competencies. In addition, the background on the behaviour of the students has been carefully described and examined when it comes to the comprehensive list of their knowledge and skills. According to the validators who validated the learning module in Physics, each set of specific objectives leads to the attainment of its relevant general objectives, thus, the learning module in Physics is anchored to the Most Essential Learning Competencies (MELCs).

It can be shown in Table 3 the result of the learning module in Biology in terms of objectiveness. The table further revealed that the objectiveness of the learning module in Biology got an overall mean of 4.63. This implies that the objectiveness in Biology is Very Highly Valid, which means that the purpose of the learning module in Biology has been made clear and suitable to all target users. In connection to this, the general aims or goals are related to the purpose of the developed learning module in Biology. Also, the Biology experts also commend that the objectives are intelligently constructed for Grade 10 students. Therefore, the introduction in the learning module gives a clear account of its goal.

Table 3. *Validation of the Learning Module in Biology in terms of Objectiveness*

| Statements | Mean | Verbal Description |
|---|---|---|
| Biology | | |
| 1. The learning module meets clearly defined needs. | 4.60 | Very Highly Valid |
| 2. The purpose of the learning module has been made clear to all likely users. | 4.80 | Very Highly Valid |
| 3. The learning module introduction gives a clear account of its goal. | 4.60 | Very Highly Valid |
| 4. The entry behavior of potential users has been carefully described in terms of a comprehensive list of knowledge and skills. | 4.40 | Highly Valid |
| 5. The aims relate to the purpose of the learning module. | 4.80 | Very Highly Valid |
| 6. All the general objectives relate to the purpose of the learning module. | 4.60 | Very Highly Valid |
| 7. Each set of specific objectives leads to the achievement of its relevant general objectives. | 4.60 | Very Highly Valid |
| Overall Mean Score | 4.63 | Very Highly Valid |

Table 4. *Validation of the Learning Module in Chemistry in terms of Objectiveness*

| Statements | Mean | Verbal Description |
|---|---|---|
| Chemistry | | |
| 1. The learning module meets clearly defined needs. | 4.60 | Very Highly Valid |
| 2. The purpose of the learning module has been made clear to all likely users. | 4.60 | Very Highly Valid |
| 3. The learning module introduction gives a clear account of its goal. | 4.00 | Highly Valid |
| 4. The entry behavior of potential users has been carefully described in terms of a comprehensive list of knowledge and skills. | 4.40 | Highly Valid |
| 5. The aims relate to the purpose of the learning module. | 4.40 | Highly Valid |
| 6. All the general objectives relate to the purpose of the learning module. | 4.40 | Highly Valid |
| 7. Each set of specific objectives leads to the achievement of its relevant general objectives. | 4.20 | Highly Valid |
| Overall Mean Score | 4.37 | Highly Valid |

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

Table 4 shows that the overall mean score of the learning module given by the Chemistry experts under objectiveness is 4.37 with a verbal description of Highly Valid. This means that the learning module in Chemistry has clearly stated the objectives. The learning module objectives in Chemistry are constructed in order to become specific, measurable, and written from the students' point of view.

Furthermore, it breaks down skills and knowledge into very specific, discrete skills, course objectives point more to overarching student understanding and higher-level thinking skills. With this, the learning objectives in learning module in Chemistry explain all of the tasks and processes involved in learning a concept or topic. Also, the learners will be able to attain the prescribed content and performance standards set by the Department of Education.

***Content***

The learning module has been carefully prepared and presented to help students learn Science 10 lessons. The process questions and activities are designed to stimulate interest among students.

The learning module has regular parts:

(1) Most Essential Learning Competencies;
(2) Introduction;
(3) Discussion;
(4) Enrichment Activity and;
(5) Assessment

Table 5. *Validation of the Learning Module in Earth Science in terms of Content*

| Statements | Mean | Verbal Description |
|---|---|---|
| Earth Science | | |
| 1. All the contents are directly relevant to the objectives. | 4.60 | Very Highly Valid |
| 2. The content has been arranged in a logical sequence of learning. | 4.60 | Very Highly Valid |
| 3. Each lesson of the learning module is in a clearly defined category of the content of the material as a whole. | 4.40 | Highly Valid |
| 4. The material forms a series of logical steps in the learning sequences. | 4.40 | Highly Valid |
| 5. The material provides relevant information for better understanding. | 4.60 | Very Highly Valid |
| 6. The material is based on JHS learning competencies. | 4.80 | Very Highly Valid |
| 7. The material contains relevant activities. | 4.60 | Very Highly Valid |
| 8. The material encourages creative and critical thinking | 4.80 | Very Highly Valid |
| Overall Mean Score | 4.60 | Very Highly Valid |

It can be shown in table 5 the result of the learning module in Earth Science in terms of content. The table further revealed that the content in the Earth Science module got an overall mean of 4.60 with a verbal description of Very Highly Valid. This means that all information in the learning module in Earth Science particularly the lessons in Plate Tectonic Theory, Plate Boundaries, Mechanism of Plate Tectonic, and Evidences of Plate Movements were appropriate to the learning competencies and all the contents are directly relevant to the objectives. Hence, it will provide content that promotes a better understanding of the lesson that will lead to an effective and efficient teaching-learning process and students' academic success.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

Table 6. *Validation of the Learning Module in Physics in terms of Content*

| Statements | Mean | Verbal Description |
|---|---|---|
| Physics | | |
| 1. All the contents are directly relevant to the objectives. | 4.60 | Very Highly Valid |
| 2. The content has been arranged in a logical sequence of learning. | 4.60 | Very Highly Valid |
| 3. Each lesson of the learning module is in a clearly defined category of the content of the material as a whole. | 4.20 | Highly Valid |
| 4. The material forms a series of logical steps in the learning sequences. | 4.60 | Very Highly Valid |
| 5. The material provides relevant information for better understanding. | 4.20 | Highly Valid |
| 6. The material is based on JHS learning competencies. | 5.00 | Very Highly Valid |
| 7. The material contains relevant activities. | 4.60 | Very Highly Valid |
| 8. The material encourages creative and critical thinking | 4.40 | Highly Valid |
| Overall Mean Score | 4.53 | Very Highly Valid |

Table 6 shows the result of the learning module in Physics in terms of content. The table further revealed that the content of the learning module in Physics got an overall mean of 4.53. This implies that the content in Physics is Very Highly Valid, which means that the content was really arranged in a logical sequence of learning. Moreover, the learners learned the topics in Physics based from vertical learning progression. This vertical learning progression helps the learners to understand the lesson from easy to difficult. Also, the learning module in Physics matched with the learning styles of the learner that is why the validators stated that learners' mastery of concepts in Physics is evident.

Table 7. *Validation of the Learning Module in Biology in terms of Content*

| Statements | Mean | Verbal Description |
|---|---|---|
| Biology | | |
| 1. All the contents are directly relevant to the objectives. | 4.60 | Very Highly Valid |
| 2. The content has been arranged in a logical sequence of learning. | 4.00 | Highly Valid |
| 3. Each lesson of the learning module is in a clearly defined category of the content of the material as a whole. | 4.20 | Highly Valid |
| 4. The material forms a series of logical steps in the learning sequences. | 4.00 | Highly Valid |
| 5. The material provides relevant information for better understanding. | 4.40 | Highly Valid |
| 6. The material is based on JHS learning competencies. | 4.60 | Very Highly Valid |
| 7. The material contains relevant activities. | 4.60 | Very Highly Valid |
| 8. The material encourages creative and critical thinking | 4.80 | Very Highly Valid |
| Overall Mean Score | 4.40 | Highly Valid |

Table 7 shows that the overall mean score of the learning module given by the Biology experts under content is 4.40 with a verbal description of Highly Valid. This means that the learning module can still be improved to be Very Highly Valid by refining the content for better presentation and discussion and motivation for the students to synthesize and review past lessons. On the other hand, the lesson on the learning module in Biology is constructed based on the given Most Essential Learning Competencies. Therefore, all the lessons presented on this learning module are anchored to the content and performance standards set by the Department of Education. The given data in Table 8 shows the result of the content of

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

the learning module in Chemistry. Based on the gathered data by the researcher, he found out that the learning module in Chemistry in terms of content got an overall mean of 4.53 with a verbal description of Very Highly Valid. This means that the content of the validated learning module in Chemistry is based on Junior High School learning competencies. In addition, the Chemistry experts found the learning module to have content that is adequate to the requirement of the learning competencies, follows logical sequence and gradation of concepts, provides relevant information for better understanding, and enhances logical reasoning, and creative thinking skills the students.

Table 8. *Validation of the Learning Module in Chemistry in terms of Content*

| Statements | Mean | Verbal Description |
|---|---|---|
| Chemistry | | |
| 1. All the contents are directly relevant to the objectives. | 4.60 | Very Highly Valid |
| 2. The content has been arranged in a logical sequence of learning. | 4.60 | Very Highly Valid |
| 3. Each lesson of the learning module is in a clearly defined category of the content of the material as a whole. | 4.80 | Very Highly Valid |
| 4. The material forms a series of logical steps in the learning sequences. | 4.60 | Very Highly Valid |
| 5. The material provides relevant information for better understanding. | 4.20 | Highly Valid |
| 6. The material is based on JHS learning competencies. | 4.40 | Highly Valid |
| 7. The material contains relevant activities. | 4.40 | Highly Valid |
| 8. The material encourages creative and critical thinking | 4.60 | Very Highly Valid |
| Overall Mean Score | 4.53 | Very Highly Valid |

***Learning Activities***

The researcher designed the learning activities or enrichment activities so that the students will enhance their scientific skills and scientific knowledge. In addition, the learning activities are aligned with the 21st-century skills needed for the students to become globally competitive. These include Research-Based Activity, Video Analysis with Process Questions, Picture Analysis, Frayer Model Organizer, Table Completion, Drawing Activity, Experiment Time, Analogy Organizer, Journal Writing, K-W-L Chart, I-R-F Chart, Self-Check Monitoring, ThinkPad, Concept Mapping, Venn diagram, Problem Solving, Checklist-Anticipatory Guide, and Simple Investigatory Project.

Table 9. *Validation of the Learning Module in Earth Science in terms of Learning Activities*

| Statements | Mean | Verbal Description |
|---|---|---|
| Earth Science | | |
| 1. All activities are appropriate for their content and objectives. | 4.20 | Highly Valid |
| 2. All learning activities promote active participation and response. | 4.40 | Highly Valid |
| 3. All learning activities develop creativity and resourcefulness. | 4.40 | Highly Valid |
| 4. All learning activities conform to the concepts. | 4.60 | Very Highly Valid |
| 5. All learning activities satisfy the stated objectives | 4.60 | Very Highly Valid |
| Overall Mean Score | 4.44 | Highly Valid |

Table 9 shows that the overall mean score of the learning module given by the Earth Science experts under learning activities is 4.44 with a verbal description of Highly Valid. This means that the learning activities presented in the learning module conform to the lesson concepts in Earth Science. The learning

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

activities in the learning module in Earth Science include the following: Put on the Map, Venn diagram, Table Completion, Picture Analysis, Research-Based Activity, I-R-F Chart, and Frayer Model Organizer. Also, all the learning activities given in the learning module in Earth Science are appropriate for the content standard and most essential learning competencies. Therefore, the skills, knowledge and values needed to achieve by the students from the learning module in Earth Science are attainable.

Table 10. *Validation of the Learning Module in Physics in terms of Learning Activities*

| Statements | Mean | Verbal Description |
|---|---|---|
| Physics | | |
| 1. All activities are appropriate for their content and objectives. | 4.80 | Very Highly Valid |
| 2. All learning activities promote active participation and response. | 4.60 | Very Highly Valid |
| 3. All learning activities develop creativity and resourcefulness. | 4.20 | Highly Valid |
| 4. All learning activities conform to the concepts. | 4.60 | Very Highly Valid |
| 5. All learning activities satisfy the stated objectives | 4.40 | Highly Valid |
| Overall Mean Score | 4.52 | Very Highly Valid |

It can be shown in Table 10 the result of the learning module in Physics in terms of learning activities. The table further revealed that the activities in the learning module in Physics got an overall mean of 4.52 with a verbal description of Very Highly Valid. This means that the learning module in Physics provides various relevant evaluation measures by giving various activities and satisfying the stated objectives and all learning activities develop creativity and resourcefulness. In connection to this, the learning activities in the learning module in Physics promote 21$^{st}$-century skills. The learning activities in the learning module in Physics are the following: Video Analysis, Frayer Model Map, Picture Analysis, Drawing Activity, Song Analysis, Case Analysis, Own Ideas on the Lesson, Misconception Check, Demonstrate Me – Simple Laboratory Experiment, Venn diagram, Inquiry Lab, Analogy Organizer, and Research-Based Activity.

Table 11. *Validation of the Learning Module in Biology in terms of Learning Activities*

| Statements | Mean | Verbal Description |
|---|---|---|
| Biology | | |
| 1. All activities are appropriate for their content and objectives. | 4.40 | Highly Valid |
| 2. All learning activities promote active participation and response. | 4.20 | Highly Valid |
| 3. All learning activities develop creativity and resourcefulness. | 4.00 | Highly Valid |
| 4. All learning activities conform to the concepts. | 4.60 | Very Highly Valid |
| 5. All learning activities satisfy the stated objectives | 4.60 | Very Highly Valid |
| Overall Mean Score | 4.36 | Highly Valid |

The table 11 shows the result of the learning module in Biology in terms of learning activities. The table further revealed that the learning activities of the learning module in Biology got an overall mean of 4.36. This implies that the content in Biology is Highly Valid which means that the learning activities promote active participation and response and all the learning activities conform to the concepts given in the learning module in Biology. The different learning activities given in the learning module in Biology are the following: K-W-L Chart, Journal Writing, Inquiry Lab, Self-Checklist Monitoring, Drawing Activity, Think Pad, Concept Mapping, Frayer Model Organizer, and Venn diagram. Moreover, Biology

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

experts stated that there must be additional activities that give real-life task so that the learning activities in Biology will become Very Highly Valid.

The given data in Table 12 shows the result of learning activities of the learning module in Chemistry. Based on the gathered data by the researcher, he found out that the learning module in Chemistry in terms of learning activities got an overall mean of 4.52 with a verbal description of Very Highly Valid. This implies to the comments given by the Chemistry experts that the learning activities are anchored to the learning objectives, and it promotes simplicity, yet it conveys creativity and develops resourcefulness. This finding of the study also aligned with the study of Windschitl (2009), who clarifies the alignment of learning activities in the learning competencies. Windschitl stated that the learning activities present in the learning module, patterned in the most essential learning competencies, are not about adapting directions to what educators already know and understand. Instead, it is about considering their concepts and knowledge on the best educative process. Furthermore, the learning activities presented in the learning module in Chemistry are the following: K-W-L Chart, Problem Solving, Essay Writing – Critical Thinking, Picture Analysis, and Checklist – Anticipatory Guide.

Table 12. *Validation of the Learning Module in Chemistry in terms of Learning Activities*

| Statements | Mean | Verbal Description |
|---|---|---|
| Chemistry | | |
| 1. All activities are appropriate for their content and objectives. | 4.60 | Very Highly Valid |
| 2. All learning activities promote active participation and response. | 4.20 | Highly Valid |
| 3. All learning activities develop creativity and resourcefulness. | 4.60 | Very Highly Valid |
| 4. All learning activities conform to the concepts. | 4.60 | Very Highly Valid |
| 5. All learning activities satisfy the stated objectives | 4.60 | Very Highly Valid |
| Overall Mean Score | 4.52 | Very Highly Valid |

***Suitability***

The learning module was developed considering the needs of the students, length of time for the students to learn the topics presented in the learning module and multiple intelligences by Howard Gardner. The assessments are given in the learning module in teaching Science 10 aligned with the most essential learning competencies, content standards, and performance standards. Summative Assessment is in multiple choices, essay writing, reading articles and case studies, answering a given process question, and performance task with appropriate rubric.

Table 13. *Validation of the Learning Module in Earth Science in terms of Suitability*

| Statements | Mean | Verbal Description |
|---|---|---|
| Earth Science | | |
| 1. The form and wording of each item in the assessment is appropriate for the objective it is intended to assess. | 4.80 | Very Highly Valid |
| 2. Results of the assessment have been clearly interpreted in terms of the achievement of the objectives. | 4.40 | Highly Valid |
| 3. The length of time needed to complete the learning module appears optimal for the type of the intended users. | 4.20 | Highly Valid |
| 4. The assessment includes at least one item for each specific objective. | 4.60 | Very Highly Valid |
| Overall Mean Score | 4.50 | Very Highly Valid |

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

Table 13 shows the result of the learning module in Earth Science in terms of suitability. The table further revealed that the suitability of the learning module in Earth Science got an overall mean of 4.50. This implies that the suitability in Earth Science is Very Highly Valid, which means that the time frame needed to finish the learning module appears to be appropriate for the type of the intended students. The learning modules in every branch of science are given for eight weeks per quarter. Every set of modules given by the students have a time allotment of two weeks. The students will read and understand the lessons, and answers all the process questions, learning activities and summative assessment for two weeks. Furthermore, the Earth Science experts revealed that the learning module in Earth Science is suitable to the needs of the learners. Thus, it is based on their readiness to learn new concepts and ideas.

Table 14. *Validation of the Learning Module in Physics in terms of Suitability*

| Statements | Mean | Verbal Description |
|---|---|---|
| Physics | | |
| 1. The form and wording of each item in the assessment is appropriate for the objective it is intended to assess. | 4.60 | Very Highly Valid |
| 2. Results of the assessment have been clearly interpreted in terms of the achievement of the objectives. | 4.40 | Highly Valid |
| 3. The length of time needed to complete the learning module appears optimal for the type of the intended users. | 4.80 | Very Highly Valid |
| 4. The assessment includes at least one item for each specific objective. | 4.60 | Very Highly Valid |
| Overall Mean Score | 4.60 | Very Highly Valid |

The given data in Table 14 shows the result of the suitability of the learning module in Physics. Based on the gathered data by the researcher, he found out that the learning module in Physics in terms of suitability got an overall mean of 4.60 with a verbal description of Very Highly Valid. This implies to the comments given by the Physics experts that the assessments were impressive and well-constructed. The assessments given in the learning module in Physics include the following: Table Completion, Essay Writing, Electromagnetic Diary, Multiple Choice and Research-Based Activity. These assessments are aligned to the Most Essential Learning Competencies given by the Department of Education. Moreover, the researcher ensured that the assessment is reliable, valid, feasible, and has an educational impact wherein the assessment results in learning the concepts in the learning module in Physics is important and is authentic and worthwhile.

Table 15. *Validation of the Learning Module in Biology in terms of Suitability*

| Statements | Mean | Verbal Description |
|---|---|---|
| Biology | | |
| 1. The form and wording of each item in the assessment is appropriate for the objective it is intended to assess. | 4.20 | Highly Valid |
| 2. Results of the assessment have been clearly interpreted in terms of the achievement of the objectives. | 4.40 | Highly Valid |
| 3. The length of time needed to complete the learning module appears optimal for the type of the intended users. | 4.00 | Highly Valid |
| 4. The assessment includes at least one item for each specific objective. | 4.40 | Highly Valid |
| Overall Mean Score | 4.25 | Highly Valid |

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

It can be shown in Table 15 the result of the learning module in Biology in terms of suitability. The table further revealed that the suitability of the learning module in Biology got an overall mean of 4.25 with a verbal description of Highly Valid. This means that the learning module in Biology includes at least one item for each specific objective. Hence, the time allotment needed to finish the learning module appears to be optimal for the type of the intended users. However, the words and phrases must be suitable to the target users as commented by the Biology experts for the learning module to be Very Highly Valid this is because the suitability of this learning module is the primary factor why the learning module in Biology is just a Highly Valid. In addition, the assessments in this learning module are the following: Multiple Choice, Table Completion, Essay Writing, Comprehensive Report Writing, Situational Analysis and Performance Task – Making a Brochure. These summative and formative assessments are based on the content and performance standards that were align in the Most Essential Learning Competencies set by the Department of Education.

Table 16. *Validation of the Learning Module in Chemistry in terms of Suitability*

| Statements | Mean | Verbal Description |
|---|---|---|
| Chemistry | | |
| 1. The form and wording of each item in the assessment is appropriate for the objective it is intended to assess. | 4.40 | Highly Valid |
| 2. Results of the assessment have been clearly interpreted in terms of the achievement of the objectives. | 4.60 | Very Highly Valid |
| 3. The length of time needed to complete the learning module appears optimal for the type of the intended users. | 4.20 | Highly Valid |
| 4. The assessment includes at least one item for each specific objective. | 4.60 | Very Highly Valid |
| Overall Mean Score | 4.45 | Highly Valid |

Table 16 shows the result of the learning module in Chemistry in terms of suitability. The table further revealed that the suitability of the learning module in Chemistry got an overall mean of 4.45. This implies that the suitability of the learning module in Chemistry is Highly Valid. As commented by the Chemistry experts, the form and wording of each item in the assessment whether it is formative or summative and also in the lessons must be appropriate and suitable for the learning competencies it is intended to assess. Furthermore, the assessments in the learning module in Chemistry are the following: Problem Solving, Table Completion, Essay Writing, Journal Writing, and Investigatory Project as the Performance Task for Chemistry. These summative and formative assessments are based on the content and performance standards that were align in the Most Essential Learning Competencies set by the Department of Education.

***Clarity***

Simplicity was the key word to describe the presentation of concepts for easy understanding of the students. The lessons were properly sequenced and well-organized because the researcher follows the time allotment to achieve the objective of the lessons. Moreover, the used of images/illustrations in the learning module make it easier for the learners to digest the information.

Table 17. *Validation of the Learning Module in Earth Science in terms of Clarity*

| Statements | Mean | Verbal Description |
|---|---|---|
| Earth Science | | |
| 1. All instructions are clear and easy to follow. | 4.60 | Very Highly Valid |
| 2. The material provides independent activities. | 4.60 | Very Highly Valid |
| 3. The graphical and pictorial images are evident. | 4.60 | Very Highly Valid |

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

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|---|---|---|
| 4. The layout of the pages is well organized making the whole learning module appears interesting and easy to study. | 4.40 | Highly Valid |
| 5. The idea or thoughts in the illustrations/photos clearly convey | 4.60 | Very Highly Valid |
| 6. The learning module concludes with a comprehensive summary of all main points. | 4.40 | Highly Valid |
| Overall Mean Score | 4.53 | Very Highly Valid |

It can be shown in Table 17 the result of the learning module in Earth Science in terms of clarity. The table further revealed that the clarity of the learning module in Earth Science got an overall mean of 4.53 with a verbal description of Very Highly Valid. This means that the directions in the learning module in Earth Science are clear and easy to follow. Furthermore, the Earth Science experts found that the learning module in teaching Science 10 presents properly sequenced and well-organized lessons. It follows horizontal and vertical learning progressions as it is aligned and patterned to the Curriculum Map made by the researcher.

Table 18. *Validation of the Learning Module in Physics in terms of Clarity*

| Statements | Mean | Verbal Description |
|---|---|---|
| Physics | | |
| 1. All instructions are clear and easy to follow. | 4.60 | Very Highly Valid |
| 2. The material provides independent activities. | 4.80 | Very Highly Valid |
| 3. The graphical and pictorial images are evident. | 4.60 | Very Highly Valid |
| 4. The layout of the pages is well organized making the whole learning module appears interesting and easy to study. | 4.00 | Highly Valid |
| 5. The idea or thoughts in the illustrations/photos clearly convey | 4.40 | Highly Valid |
| 6. The learning module concludes with a comprehensive summary of all main points. | 4.00 | Highly Valid |
| Overall Mean Score | 4.40 | Highly Valid |

Table 18 shows the result of the learning module in Physics in terms of clarity. The table further revealed that the clarity of the learning module in Physics got an overall mean of 4.40. This implies that the learning module in Physics is Highly Valid when it comes to clarity, which means that it comprises a comprehensive summary of all the main ideas. In addition, Physics experts found that the illustrations in each lesson are clear, precise, and straightforward. Illustrations can attract attention, aid retention, and enhance understanding, or create context. For example, showing a photo of a spoon inside a water container does more to attract attention than explain the content. Moreover, according to the validators, the instructions and lessons in Physics are well presented and easy to understand. It follows a logical sequence of learning so that the students may have a better understanding of the lessons.

*Table 19. Validation of the Learning Module in Biology in terms of Clarity*

| Statements | Mean | Verbal Description |
|---|---|---|
| Biology | | |
| 1. All instructions are clear and easy to follow. | 4.20 | Highly Valid |
| 2. The material provides independent activities. | 4.20 | Highly Valid |
| 3. The graphical and pictorial images are evident. | 4.00 | Highly Valid |
| 4. The layout of the pages is well organized making the whole learning module appears interesting and easy to study. | 4.20 | Highly Valid |

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

| | | |
|---|---|---|
| 5. The idea or thoughts in the illustrations/photos clearly convey | 4.00 | Highly Valid |
| 6. The learning module concludes with a comprehensive summary of all main points. | 4.00 | Highly Valid |
| Overall Mean Score | 4.10 | Highly Valid |

The given data in Table 19 shows the result of clarity of the learning module in Biology. Based on the gathered data by the researcher, he found out that the learning module in Biology in terms of clarity got an overall mean of 4.10 with a verbal description of Highly Valid. This implies to the comments given by the Biology experts that some formats in the learning module in Biology were dull. The experts suggested adding some graphics and illustrations in every section so that the learning module will be Very Highly Valid when it comes to clarity. This will help the students retain the concepts in their minds and have a better understanding a representation of the concepts in Biology. In addition, the research believed that teaching with images can also help develop students' visual literacy skills, which contributes to their overall critical thinking skills and lifelong learning.

Table 20. *Validation of the Learning Module in Chemistry in terms of Clarity*

| Statements | Mean | Verbal Description |
|---|---|---|
| Chemistry | | |
| 1. All instructions are clear and easy to follow. | 4.60 | Very Highly Valid |
| 2. The material provides independent activities. | 4.00 | Highly Valid |
| 3. The graphical and pictorial images are evident. | 4.00 | Highly Valid |
| 4. The layout of the pages is well organized making the whole learning module appears interesting and easy to study. | 4.40 | Highly Valid |
| 5. The idea or thoughts in the illustrations/photos clearly convey | 4.40 | Highly Valid |
| 6. The learning module concludes with a comprehensive summary of all main points. | 4.20 | Highly Valid |
| Overall Mean Score | 4.27 | Highly Valid |

Table 20 shows the result of the learning module in Chemistry in terms of clarity. The table further revealed that the clarity of the learning module in Chemistry got an overall mean of 4.27. This implies that the clarity of the learning module in Chemistry is Highly Valid, which means that the graphical and pictorial images are evident and enhance students' learning, as commented by the Chemistry experts.

Moreover, images/graphics/illustrations can be an effective way of presenting abstract concepts most especially in teaching Chemistry concepts. The researcher firmly believed that the use of images in the learning module of any subject has led to increased student understanding of the concepts.

***Usefulness***

The researcher designed a learning module that can be applied in a real-life situation and can be used by other teachers for educational purposes. Furthermore, the learning module can be used easily by educators and learners.

Table 21. *Validation of the Learning Module in Earth Science in terms of Usefulness*

| Statements | Mean | Verbal Description |
|---|---|---|
| Earth Science | | |
| 1. The material provides real-life task applicable to the student's actual work. | 4.40 | Highly Valid |
| 2. The material adapts to any size of training groups. | 4.40 | Highly Valid |

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

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|---|---|---|
| 3. The material can be used at any particular learning time frame. | 4.60 | Very Highly Valid |
| 4. The material is easy to use and is transportable to the place of training. | 4.60 | Very Highly Valid |
| 5. The material creates opportunity for the students to learn and study with independency. | 4.60 | Very Highly Valid |
| Overall Mean Score | 4.52 | Very Highly Valid |

Table 21 shows the result of the learning module in Earth Science in terms of usefulness. The table further revealed that the overall mean score of the learning module in Earth Science in terms of usefulness is 4.52 with a verbal description of Very Highly Valid. This implies that the validated learning module in Earth Science provides real-life tasks applicable to the student's actual work. In addition, the Earth Science experts state that the lessons in the learning module allow learners to learn and study independently.

Table 22 shows the result of the learning module in Physics in terms of usefulness. The table further revealed that the usefulness of the learning module in Physics got an overall mean of 4.52. This implies that the learning module in Physics is Very Highly Valid when it comes to usefulness which means that the learning module can be used at any particular learning time frame of the students. Furthermore, the Physics experts commented that the learning module is helpful to teachers because other teachers can use it for training/seminars. It provokes interest and appreciation of students towards science 10, thus making them active learners.

Table 22. *Validation of the Learning Module in Physics in terms of Usefulness*

| Statements | Mean | Verbal Description |
|---|---|---|
| Physics | | |
| 1. The material provides real-life task applicable to the student's actual work. | 4.40 | Highly Valid |
| 2. The material adapts to any size of training groups. | 4.60 | Very Highly Valid |
| 3. The material can be used at any particular learning time frame. | 4.40 | Highly Valid |
| 4. The material is easy to use and is transportable to the place of training. | 4.60 | Very Highly Valid |
| 5. The material creates opportunity for the students to learn and study with independency. | 4.60 | Very Highly Valid |
| Overall Mean Score | 4.52 | Very Highly Valid |

Table 23. *Validation of the Learning Module in Biology in terms of Usefulness*

| Statements | Mean | Verbal Description |
|---|---|---|
| Biology | | |
| 1. The material provides real-life task applicable to the student's actual work. | 4.00 | Highly Valid |
| 2. The material adapts to any size of training groups. | 4.60 | Very Highly Valid |
| 3. The material can be used at any particular learning time frame. | 4.20 | Highly Valid |
| 4. The material is easy to use and is transportable to the place of training. | 4.60 | Very Highly Valid |
| 5. The material creates opportunity for the students to learn and study with independency. | 4.40 | Highly Valid |
| Overall Mean Score | 4.36 | Highly Valid |

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

The given data in Table 23 shows the result of the usefulness of the learning module in Biology. Based on the gathered data by the researcher, he found out that the learning module in Biology in terms of usefulness got an overall mean of 4.36 with a verbal description of Highly Valid. This implies to the comments of the biology experts that the researcher must provide additional real-life activities that apply to the students' actual work for the learning module in Biology to be Very Highly Valid when it comes to usefulness.

Table 24 shows the result of the learning module in Chemistry in terms of usefulness. The table further revealed that the usefulness of the learning module in Chemistry got an overall mean of 4.56. This implies that the use of the learning module in Chemistry is Very Highly Valid, which means that the learning module in Chemistry gives real-life application to the learners' actual work as commented by the Chemistry experts. Learning opportunities are far greater when children have the chance to experience something first hand. Not only does it allow children the opportunity to use all their senses when they are exploring a new object or experience, but it also increases motivation, can improve behaviour as the child is more engaged, helps to develop communication and language skills as experiences give children something to talk about, and consequently, further develops their understanding of the world.

Table 24. *Validation of the Learning Module in Chemistry in terms of Usefulness*

| Statements | Mean | Verbal Description |
|---|---|---|
| Chemistry | | |
| 1. The material provides real-life task applicable to the student's actual work. | 4.20 | Highly Valid |
| 2. The material adapts to any size of training groups. | 4.40 | Highly Valid |
| 3. The material can be used at any particular learning time frame. | 4.80 | Very Highly Valid |
| 4. The material is easy to use and is transportable to the place of training. | 4.60 | Very Highly Valid |
| 5. The material creates opportunity for the students to learn and study with independency. | 4.80 | Very Highly Valid |
| Overall Mean Score | 4.56 | Very Highly Valid |

Table 25. *Overall Validation of the Learning Module in Teaching Science 10*

| Statement | Overall Mean | Verbal Description |
|---|---|---|
| *Earth Science* | | |
| Objectiveness | 4.51 | Very Highly Valid |
| Content | 4.60 | Very Highly Valid |
| Learning Activities | 4.44 | Highly Valid |
| Suitability | 4.50 | Very Highly Valid |
| Clarity | 4.53 | Very Highly Valid |
| Usefulness | 4.52 | Very Highly Valid |
| Grand Mean | 4.52 | Very Highly Valid |
| *Physics* | | |
| Objectiveness | 4.49 | Very Highly Valid |
| Content | 4.53 | Very Highly Valid |
| Learning Activities | 4.52 | Very Highly Valid |
| Suitability | 4.60 | Very Highly Valid |
| Clarity | 4.40 | Highly Valid |
| Usefulness | 4.52 | Very Highly Valid |
| Grand Mean | 4.51 | Very Highly Valid |
| *Biology* | | |
| Objectiveness | 4.63 | Very Highly Valid |

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

| | | |
|---|---|---|
| Content | 4.40 | Highly Valid |
| Learning Activities | 4.36 | Highly Valid |
| Suitability | 4.25 | Highly Valid |
| Clarity | 4.10 | Highly Valid |
| Usefulness | 4.36 | Highly Valid |
| Grand Mean | 4.35 | Highly Valid |
| *Chemistry* | | |
| Objectiveness | 4.37 | Highly Valid |
| Content | 4.53 | Very Highly Valid |
| Learning Activities | 4.52 | Very Highly Valid |
| Suitability | 4.45 | Highly Valid |
| Clarity | 4.27 | Highly Valid |
| Usefulness | 4.56 | Very Highly Valid |
| Grand Mean | 4.45 | Highly Valid |

Table 25 shows the grand mean given by the Science experts. The computed grand mean given by the Earth Science experts is 4.52 with a verbal description of Very Highly Valid. In addition, the grand mean given by the Physics experts is 4.51 with a verbal description of Very Highly Valid. Furthermore, the grand mean given by the Chemistry experts is 4.45 with a verbal description of Highly Valid. Moreover, the grand mean given by the biology experts is 4.35 with a verbal description of Highly Valid. Based on the results, the learning modules in Biology and chemistry need to be improved in clarity and suitability. As suggested by the Biology and Chemistry experts, add more illustrations and graphics that show the concept of the lessons. The words or phrases used in the assessment part should be based on the capacity of the target users, who are the Grade 10 students. These suggestions from the Biology and Chemistry experts will ensure a very high level of validity of the learning modules in both Chemistry and Biology.

Table 26. *Summary of Results on the Validity of the Learning Module*

| Area of Instruction | Grand Mean | Remarks |
|---|---|---|
| Earth Science | 4.52 | Very Highly Valid |
| Physics | 4.51 | Very Highly Valid |
| Biology | 4.35 | Highly Valid |
| Chemistry | 4.45 | Highly Valid |

Table 26 shows the summary of results on the validity of the learning module in the four learning areas. It further shows that Earth Science and Physics are Very Highly Valid, and Biology and Chemistry are Highly Valid. This implies that the learning module is valid in all areas but needs to improve some parts under Biology and Chemistry particularly on clarity by providing additional illustrations and usefulness by giving additional real-life tasks to become Very Highly Valid. Marasigan (2019) concluded in his study titled “The Validation of the Designed Instructional Material in the Area of Mathematics” that the learning module must be very highly valid to have a better result on academic performance and outputs of the learners.

**Implications of Learning Module to Science Education**

The overall frequency of the COVID-19 pandemic has dramatically affected the educational system in the Philippines. The closure of schools leads the students to miss social interaction, which is very necessary for a better teaching-learning process. In contrast, most schools have started various learning modalities such as modular-based learning, online learning, blended learning, and other forms of learning modalities. These learning modalities are anchored to Department of Education Order Number 12 Series of 2020 or the "Adoption of the Basic Education Learning Continuity Plan for School Year 2020-2021 in the

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

Light of the COVID-19 Public Health Emergency". This order aims to continue learning, the pattern of learning materials with the given learning competencies, organizing multiple learning modalities, proper flow of communication of parents and guardians of the students, and proper training for teachers and school heads. With this principle of Basic Education Learning Continuity Plan, the researcher developed and designed a learning module in teaching Science 10 to explore home learning experiences in times of COVID-19.

The science experts who validated the learning module in teaching Science 10 stated that the learning module in this pandemic is a big help for the students. In connection to what is happening in the world, face-to-face interaction in the school is not possible. That is why and learning module is one of the best alternative ways to give to our students. In addition, the science experts also stated that the learning modules improve the students' scientific literacy skills. The learning module shares knowledge and activities through the following areas: First, asking students to think critically while reading articles and case studies about science lessons. The second is to encourage students to watch documentary film videos and make a synthesis. The third is to ask the students to write an essay or journal about science findings from a research review. The next is to challenge students to answer various process questions, guide questions, and relate their answers to real-life situations. Lastly, to give students research-based and hands-on activities to strengthen and deepen the understanding of the lesson. Moreover, the science experts revealed that the learning module prepares the students for real-life scenarios. This is because the activities, content, and assessments are reflected in the learning module help the students to attain the 21st-century skills, which are the following: communication, creativity, collaboration, and critical thinking skills needed for the students to become globally competitive.

With the positive findings of the science experts mentioned above about the implications of the learning module in Science Education, the researcher concluded that the learning module in teaching Science concepts, particularly in Grade 10 level, really significantly impacts science education. This finding parallels the study of Cramer (2018) entitled "Learning Modules by Strengthening Skills of the Students". Cramer found out that the relationship between module and students' success is significant. Despite having a pandemic, education must never stop. That is why the researcher developed and designed his learning module in teaching Science 10. This affirms the study of Asia (2017) that modules could be a potential tool as additional learning resources to enhance learning in Science.

## Summary of Findings

### *Development of the Learning Module in Teaching Science 10 based on Most Essential Learning Competencies (MELCs)*

The developed and validated learning module was based on the Most Essential Learning Competencies (MELCs). The learning module covered the four areas of instruction in Science, namely: Earth Science, Physics, Biology, and Chemistry, with sub-topics in each and comprehensively discussed. Each learning module has a standard format and five parts. The first part presents the Most Essential Learning Competencies of the lesson. The second part gives a short introduction to the lesson. The third part of the learning module consists of discussing the concepts following an enrichment activity for the fourth part. Lastly, a summative assessment was given on the last part of the learning module to evaluate the students' academic performance if they really achieved the given learning competencies.

### *Validation of the Learning Module in Teaching Science 10 as Validated by the Science Experts*

The Earth Science experts rated the learning module as Very Highly Valid, with a grand mean of 4.52. In addition, the Physics experts rated the learning module as Very Highly Valid with a grand mean of 4.51. Furthermore, the Chemistry experts evaluated the learning module as Highly Valid with a grand mean of 4.45. Lastly, the Biology experts evaluated the learning module as Highly Valid with a grand mean of 4.35

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

## CONCLUSIONS

1. This research study entitled "Development and Validation of Learning Module in Teaching Science 10" aimed to help both teachers and students in the teaching-learning process via blended learning as one of the educational platforms offered by both private and public sectors, which is a combination of online distance learning and modular distance learning. This study positively impacted the continuity of education here in the Philippines amidst the COVID-19 pandemic as it served as an additional learning material in a modular form, especially in teaching Science concepts.

2. Furthermore, the developed and validated learning module was aligned to the Most Essential Learning Competencies (MELCs) given by the Department of Education. It ensures the students learn and achieve the 21st-century skills needed for them to be globally competitive. These 21st-century skills are the following: communication, collaboration, creativity, and critical thinking skills. These 21st-century skills can be seen in the learning module, which also helped the students enhance their scientific literacy by giving them real-life tasks and challenging activities that test their reasoning, logic, and communication skills.

### Limitations of the Study

The validators were assigned based on their area of specialization and length of teaching the subject. The researcher did not use any students as respondents invalidating the learning module in teaching Science 10. The researcher only used the twenty science experts to validate the learning module. In connection to this, the researcher suggests another study that will have the students as respondents. The study will be based on the students' academic performance using the learning module in science 10 as another basis for validation of the said learning module.

### Recommendations

In line with the results and conclusions, the researcher recommends the following:

1. It is recommended that the Science teachers use the validated learning module as instructional materials in teaching Science 10.
2. The learning module used as an aid in the teaching-learning process should be simplified to understand the students easily.
3. The validated learning module in teaching Science 10 may serve as a model in designing learning modules in other subjects in Junior High School.
4. The school principal or school heads should send their teachers in webinars or training about doing modules, or they may invite resource speakers to teach them in doing modules.
5. Includes additional pictures or illustrations for Biology and Chemistry modules to enhance its level of validity.
6. A conduct follow-up study on the effectiveness of the validation of the learning modules to the target users.

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