



Republic of the Philippines  
DEPARTMENT OF EDUCATION



## **K to 12 BASIC EDUCATION CURRICULUM**

**TECHNOLOGY AND LIVELIHOOD EDUCATION**

# **TEACHER'S GUIDE**

**Exploratory Course on**

**CONSUMER ELECTRONICS SERVICING**

K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION  
**INDUSTRIAL ARTS – CONSUMER ELECTRONICS SERVICING**  
**(Exploratory)**

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**Teacher’s Guide for TLE Exploratory Course on CONSUMER ELECTRONICS SERVICING**

**Introduction**

This Teacher’s Guide is intended for you, the TLE teacher, who teaches any of the more than 24 TLE exploratory courses in the Grades 7 and 8 of the K to 12 curriculum. To ensure that you teach the TLE exploratory courses the way they were intended to be taught, you must see the big picture of the K to 12 curriculum and the teaching of TLE. Some background information is necessary.

**Background Information**

**1. The Overall Goal of the K to 12 Curriculum**

The K to 12 Curriculum has as its overarching goal *the holistic development of every Filipino learner with 21<sup>st</sup> century skills who is adequately prepared for work, entrepreneurship, middle level skills development and higher education*. The over arching goal of the K to 12 curriculum, tells you that the teaching of TLE plays a very important role in the realization of the overall goal of the curriculum. Whether or not the K to 12 graduate is skilled and ready for work, entrepreneurship and middle skills development depend to a great extent on how effectively you taught TLE.

**2. The Conceptual Framework of the Teaching of TLE**

Below is a schematic diagram of Technology and Livelihood Education (TLE) framework in general secondary schools. This should guide you in the teaching of the TLE exploratory courses.

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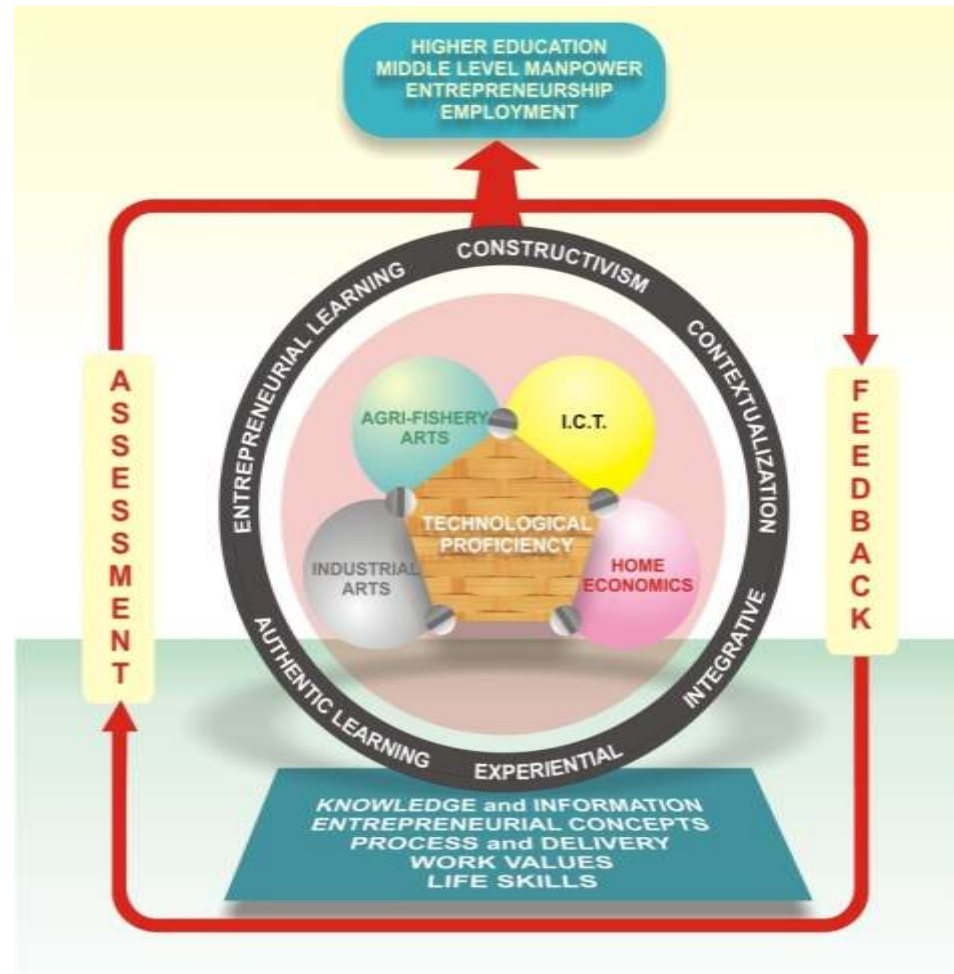


Figure 1.TLE Framework

The diagram shows that Technology and Livelihood Education encompasses the field of Home Economics, Industrial Arts, Agri-Fishery Arts and ICT. The 24 TLE courses can be categorized under any of these fields.

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TLE is geared towards the development of technological proficiency and is anchored on knowledge and information, entrepreneurial concepts, process and delivery, work values and life skills. K to 12 TLE is...

- a. one that is built on adequate mastery of knowledge and information, skills and processes, acquisition of right work values and life skills;
- b. one that equip students with skills for lifelong learning; and
- c. one that is founded on cognitive, behavioral or psychomotor and affective dimensions of human development.

The diagram likewise shows that entrepreneurial concepts also form part of the foundation of quality TLE. It is expected that your TLE students, after using the Learning Module on Entrepreneurship, imbibe the entrepreneurial spirit and consequently set up their own businesses in the areas of Agri-Fishery Arts, Industrial Arts, Home Economics, and Information and Communication Technology.

TLE by its nature is dominantly a skill subject and so you must engage your students in an experiential, contextualized, and authentic teaching-learning process. It is a subject where your students learn best by doing. It is integrative in approach. For instance, it integrates entrepreneurship with all the areas of TLE. It integrates concepts, skills and values.

### **3. The TLE Exploratory Courses**

TLE in Grades 7 and 8 are exploratory in nature. Your school will choose at least 4 from the list of 24 courses for which 23 Learning Modules have been prepared. <sup>1</sup>Your school's choice is determined by the availability of its resources (faculty and facilities) as well as the local needs and resources of the community.

The 24 TLE exploratory courses focus on four basic common competencies: 1) use and maintenance of tools and equipment; 2) mensuration and calculation; 3) occupational health and safety procedures, and 4) preparation and interpretation of technical drawing. Why are these competencies called basic? Because they are competencies that you must acquire in order that you can do higher level competencies. They are also described common because these are true to all TR-based TLE courses.

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<sup>1</sup> There are 24 TLE courses but there are only 23 Learning Modules because there is one Learning Module for Tailoring and Dressmaking.

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### **The Learning Modules and Lessons**

There is a Learning Module for each exploratory course. If there are 24 exploratory courses then you have 24 Learning Modules in your hands. But you will use 4 Modules only for the entire year in Grade 7

Each Learning Module consists of 4 to 5 Lessons<sup>2</sup>. The Lessons are focused on the 4 to 5 basic competencies. To avoid meaningless repetition of the teaching of the 5 common competencies, you have to teach them in the context of the TLE course. For example, you teach “use and maintenance of tools” in beauty care when you are teaching the course on Beauty Care. You teach the same competencies - use and maintenance of tools-in Horticulture but in the context of Horticulture and so your tools will not be entirely the same.

### **New Feature on the Teaching of TLE**

***What’s new in the teaching of TLE in the K to 12 curriculum?*** In the K to 12 curriculum, the TLE courses are taught based on the learning outcomes and performance criteria stated on the Training Regulations(TR)from Technical Education and Skills Development Authority (TESDA). They are TR-based.

***Why is this necessary?*** To prepare the K to 12 graduate for lucrative work, he/she must earn a National Certificate (NC)I, II or even an NC of higher level that is required by industries. This he/she earns after passing an assessment given by TESDA.

***How can you ensure that the K to 12 high school student (Grade 9 to 12) pass TESDA assessment and obtain an NC?*** By seeing to it that you teach the TLE course in accordance with the performance criteria and learning outcomes laid down in the TESDA Training Regulations.

***Do the exploratory courses enable the high school student to earn already an NC?*** Not yet. Completion of the exploratory courses may not yet qualify a high school student to take an assessment for an NC. Instead, it helps him/her earn a Certificate of Competency (COC) at least in Grade 9 that will lead eventually him/her to an NC. In short, the COC paves the way to the earning of an NC.

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<sup>2</sup> Some Learning Modules combined use and maintenance of tools to make one Lesson, so the number of Lessons amount to 4; others made separate Lessons for use of tools and for maintenance of tools, thus the total is 5 Lessons.

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Student's choice of TLE specialization begins in Grades 9. After having been exposed to an array of TLE courses during the exploratory phase in the first two years, the student will be most benefited, if in Grades 10, 11, or 12 he/she continues with a TLE course in which he/she already has a COC. In that way, he/she will get an NC faster.

#### About the Learning Module

##### 1. Design of the Module

- a. The Module is designed to be a teacher-assisted learning kit or a self-learning kit on competencies that a Grade 7 TLE ought to possess. It explores the course on Consumer Electronics Servicing which helps your student earn a Certificate of Competency in Grade 9 which leads to a National Certificate Level I / II (NCI / II) in Grades 10, 11 or 12.
- b. The Learning Module is made up of 4 to 5 Lessons based on the competencies. Each Lesson contains the following:
  - 1) Learning Outcomes
  - 2) Performance Standards
  - 3) Materials/Resources
  - 4) Definition of Terms
  - 5) What Do You Already Know?
  - 6) What Do You Need to Know?
  - 7) How Much Have You Learned?
  - 8) How Do You Apply What You Learned?
  - 9) How Well Did You Perform?
  - 10) References

There are some TLE Modules which have a section on "How Do You Extend Your Learning?", This section is meant for enrichment. It is usually given as an assignment for not everything can be taught and done in the classroom given a limited time.

- c. The **Self-check** can also serve as the posttest of the lesson.

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2. Parts of the Lesson. -The following explain the parts of each Lesson and describe what your students’ - as well as your tasks are.

Part of the Lesson	Students’ Task	Teacher’s Task
<p><b>1. Learning outcomes</b> are what your TLE student is supposed to know and be able to do after using the module. Since our TLE courses are TR-based, all learning outcomes are lifted from the TESDA TR. In the Curriculum Guide (the matrix which contains Content Standard, Performance Standard, Learning Competencies, Projects/Activities, Assessment, Duration), the identified Learning Outcomes are written in the column of Learning Competencies.</p>	<p>Students acquaint themselves with the learning outcomes and performance standards and make them their personal goals.</p>	<p>You introduce the learning outcomes to your students and make sure that they understand them and make these learning targets their own.</p> <p>Make these your goals for instruction.</p>
<p><b>2. Performance Standards</b> are referred to as “performance criteria” in the TESDA TR. They are more specific descriptions of the student’s behavior that serve as evidence that the expected learning outcomes have been realized with the expected level of proficiency or in accordance with established standards.</p> <p>The learning outcomes and performance standards set the direction of your lessons. These are what you should teach and, in turn, what you should assess. They are identified and are written for you in the Curriculum Guide.</p>	<p>Students clearly understand the performance standards and make them their own learning goals.</p>	<p>You introduce the performance standards to your students and make sure that they understand them and make these performance standards their own.</p> <p>Let these standards give your lesson its specific direction.</p>
<p><b>3. Materials/Resources and References</b> To teach effectively, you need <b>materials</b> and</p>	<p>Get to know the materials. They are part of the Lesson.</p>	<p>Prepare the materials you need in advance. For gadget, tool or equipment, it is always wise</p>



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<p><b>references.</b> Materials may include equipment, hand tools or consumables. The <b>references</b> are the books, magazines, articles, websites you yourself and your students will read or refer to in order to gain greater understanding of the lesson. They are either in soft copy or hard copy.</p>	<p>By all means, read the references for lesson mastery.</p>	<p>to prepare, check and try them in advance to ensure that they function when you use them. As the saying goes “forewarned is forearmed.”</p> <p>Be resourceful in the preparation of materials. You are strongly encouraged to use appropriate local materials as substitute for listed materials that are not available.</p> <p>For effective teaching, your lesson preparation should include reading the list of references.</p> <p>Do not limit yourself to the list of references. If you discover good reference material/s, add to the list of references.</p> <p>Introduce the references to your students. Motivate them to read these references as they go through the module for mastery of the lesson.</p>
<p><b>4.</b> The <b>definition of terms</b> and <b>acronyms</b> will help you understand the meaning of key words in your lesson. Defining key words as they are used in your lesson will ensure that the key terms in your lesson mean one and the same for everyone in class and so avoid misunderstanding.</p>	<p>Refer to the definition of terms for greater understanding of the lesson.</p>	<p>Remind your students to refer to the definition of terms and acronyms for clearer understanding of the lesson.</p>
<p><b>5.</b> The section “<b>What Do You Already Know</b>” is intended to determine entry knowledge and skills of your students to find out if you have to</p>	<p>Take the test honestly.</p> <p>Check answers against the answer key provided.</p>	<p>Tell your students to accomplish the pretest. Explain that the purpose of the pretest is to find out how much they already know about the</p>

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<p>teach the lesson, teach some parts of the lesson or skip it entirely because your students already know it. This is done by way of a pretest.</p>		<p>lesson in order to determine your next steps. It is, therefore, necessary that they take the test honestly, if they want to learn or want to be helped.</p> <p>Make it clear to them that their scores will not be recorded for grading purposes and will not be taken against them.</p> <p>If you find out that your students already know what you are about to teach, logic dictates that you do not need to teach it anymore. You may as well proceed to the next lesson. If, however, you find out that they do not yet know what you are about to teach, then by all means teach. Or if you discover that your students have some erroneous concepts, then teach and correct their misconceptions. To know what your students already know and do not yet know will guide you in adjusting your instruction.</p>
<p><b>6. “What Do You Need To Know?”- This section contains</b> one or more Information Sheets and for some modules an Operation Sheet. These are important notes for the TLE student to read after which he/she is asked to do a Self-check to determine how much he/she has learned. The self-check functions as a pretest.</p>	<p>Read and understand the Information Sheet/s and /or Operation Sheet.</p> <p>Be prepared For a Self-check which serves as a posttest.</p> <p>Correct answers by referring to the answer key.</p>	<p>Make sure students are engaged in reading the Information Sheet/Observation Sheet and in answering the self-check.</p> <p>Give assistance to your students where needed.</p>
<p><b>7. “How Do You Apply What You Learned?” –</b> In this section, you give your student the</p>	<p>Do the Activity.</p>	<p>Find a way to test real life application of what your students have learned.</p>

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<p>opportunity to transfer what he/she has learned in another activity or in real life situation. Ideally, this should be a performance test, what you usually call practical test. If “the proof of the pudding is in the eating”, then your student must be able to apply what she/he learned in real-life setting or must be able to come up with a product as an evidence of learning.</p>	<p>To determine level of performance, use the scoring rubrics or check answers against the answer key, which ever is applicable.</p> <p>Reflect on assessment results.</p>	<p>Do not hesitate to use ways of determining how your students can apply learned facts and concepts which are more authentic and realistic than that/those given in the Module.</p> <p>Reflect on assessment results. Use assessment results in planning your instruction.</p>
<p><b>8. How Do You Extend Your Learning?</b> – As the word implies, this activity is done outside class hours for enrichment purposes. This can reinforce lesson mastery.</p>	<p>Do the task assigned outside class hours.</p>	<p>Motivate the students to do the task by making clear what the enrichment activity is about – why it is given, how it is done, how it relates to the class lesson .</p>

**Reflection**

It is a good habit to reflect on your teaching for the day – what went well, what did not go well, why this activity went well with this group, why it didn’t work well with the other group. What are your realizations? What are lessons learned? Jot them down in your diary. Commit them to your memory. If you do this consistently, you will find your delivery improve substantially.

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**Curriculum Guide for the Exploratory Course on Consumer Electronics Servicing**

For you to get a complete picture of the complete TLE exploratory course on Consumer Electronics Servicing, you are hereby provided with the Curriculum Guide on Consumer Electronics Servicing.

Content Standard	Performance Standard	Learning Competencies	Project/ Activities	Assessment	Duration
<b>LESSON 1: USE OF HANDTOOLS</b>					
<i>Demonstrate understanding of/on:</i> <ul style="list-style-type: none"> <li>Identifying appropriate hand tools</li> <li>Selecting appropriate hand tools</li> </ul>	<ol style="list-style-type: none"> <li>Appropriate hand tools are identified.</li> <li>Hand tools are selected according to the task requirements.</li> </ol>	LO1.Plan and prepare for tasks to be undertaken.	<ol style="list-style-type: none"> <li>Drawing the different tools used in electronic drafting and giving their functions (matrix form).</li> <li>Drawing a project plan of a soldering activity.</li> <li>Practicing soldering using copper wires with specified sizes in diameter and length.</li> </ol>	<ul style="list-style-type: none"> <li>Written test</li> <li>Performance test</li> </ul>	6 hours
<ul style="list-style-type: none"> <li>Operation of hand tools</li> <li>Function of hand tools</li> <li>Common faults of hand tools</li> <li>Safety requirements for handling tools</li> </ul>	<ol style="list-style-type: none"> <li>Appropriate hand tools are checked for proper operation and safety.</li> <li>Unsafe or faulty tools are identified.</li> <li>All tools for repair according to standard company procedures are marked.</li> </ol>	LO2. Prepare hand tools.		<ul style="list-style-type: none"> <li>Performance test</li> </ul>	
<ul style="list-style-type: none"> <li>Function of tools</li> <li>Safety requirements of tools</li> <li>Proper use of tools</li> </ul>	<ol style="list-style-type: none"> <li>Tools are used according to tasks undertaken.</li> <li>All safety procedures in using tools are observed at all times.</li> </ol>	LO3. Use appropriate hand tools and test equipment.		<ul style="list-style-type: none"> <li>Performance test</li> </ul>	

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Content Standard	Performance Standard	Learning Competencies	Project/ Activities	Assessment	Duration
	3. Malfunctions, unplanned or unusual events are reported to the supervisor.				
<b>LESSON 2: PERFORMING MENSURATION AND CALCULATION</b>					
<p><i>Demonstrate understanding of/on:</i></p> <ul style="list-style-type: none"> <li>• Types of components and objects to be identified</li> <li>• Correct specifications relevant sources</li> <li>• Measuring toolsselecting the job requirements</li> <li>• Work instruction</li> <li>• Communication skills</li> </ul>	<ol style="list-style-type: none"> <li>1. Object or component to be measured is identified.</li> <li>2. Correct specifications are obtained from relevant source.</li> <li>3. Appropriate measuring instrument is selected in line with job requirement.</li> </ol>	LO1.Select measuring instrument.	<ol style="list-style-type: none"> <li>1. Draw the resistor color coding chart.</li> <li>2. Identify different resistors based on their color coded value.</li> </ol>	<ul style="list-style-type: none"> <li>• Written test</li> <li>• Performance test</li> </ul>	6 hours
<ul style="list-style-type: none"> <li>• Appropriate measuring instruments to be used</li> <li>• Using accurate measurements for the tasks given.</li> <li>• Using the four fundamental mathematical operations</li> <li>• Introducing proper procedure in calculating fractions, percentages, and mixed numbers</li> <li>• Interpreting work</li> </ul>	<ol style="list-style-type: none"> <li>1. Appropriate measuring instruments are selected to achieve required outcome.</li> <li>2. Accurate measurements are obtained for job specifications.</li> <li>3. Calculations needed to complete work tasks are performed using the four fundamental operations (addition, subtractions, multiplication and division)</li> <li>4. Calculation involving fractions, percentages, and mixed numbers are used to complete</li> </ol>	LO2. Carry out measurement and calculation.	<ol style="list-style-type: none"> <li>1. Measuring resistors value and compare to their color-coded value.</li> <li>2. Computing for the tolerance values of resistors.</li> <li>3. Solving problems involving Ohm’s Law and Power Law.</li> </ol>	<ul style="list-style-type: none"> <li>• Performace test</li> <li>• Written test</li> <li>• Written test</li> </ul>	

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Content Standard	Performance Standard	Learning Competencies	Project/ Activities	Assessment	Duration
instruction	workplace tasks. 5. Instruments are read to the limit accuracy of the tool.				
<ul style="list-style-type: none"> <li>Using appropriate instruments tools to avoid damage.</li> <li>Proper procedure in cleaning up the workplace before and after using</li> <li>Identifying the proper storage of the instruments to be kept that met the manufacturer's specifications and standard to avoid damage in mismatching.</li> <li>Reading skills required to interpret work instruction</li> </ul>	<ol style="list-style-type: none"> <li>Measuring instruments are not dropped to avoid damage.</li> <li>Measuring instruments are cleaned before and after using.</li> <li>Proper storage of instruments is undertaken according to the manufacturer's specifications and standard operating procedures.</li> </ol>	LO3. Maintain measuring instrument.	1. Demonstrating proper care and handling tools and instruments in testing electronic components.	<ul style="list-style-type: none"> <li>Written test</li> <li>Performance test</li> </ul>	8 hours
<b>LESSON 3: PREPARING AND INTERPRETING TECHNICAL DRAWING</b>					
<i>Demonstrate understanding of/on:</i> <ul style="list-style-type: none"> <li>Drawing conventions</li> <li>Symbols</li> <li>Dimensioning conventions</li> <li>Mark-p/ notation of drawings</li> </ul>	<ol style="list-style-type: none"> <li>Correct technical drawing is selected according to job requirements.</li> <li>Technical drawings are segregated in accordance with the types and kinds of drawings.</li> </ol>	LO1. Identify different kinds of technical drawings.	1. Drawing the different electronic symbols with their corresponding physical appearance.	<ul style="list-style-type: none"> <li>Performance test</li> </ul>	8 hours

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Content Standard	Performance Standard	Learning Competencies	Project/ Activities	Assessment	Duration
<ul style="list-style-type: none"> <li>• Interpreting work instructions</li> <li>• Interpreting electrical/ electronic signs and symbols</li> </ul>	<ol style="list-style-type: none"> <li>1. Components, assemblies or objects are recognized as required.</li> <li>2. Dimensions of the key features of the objects depicted in the drawing are correctly identified.</li> <li>3. Symbols used in the drawing are identified and interpreted correctly.</li> <li>4. Drawing are checked and validated against job requirements or equipment in accordance with standard operating procedures.</li> </ol>	LO2. Interpret technical drawing.	<ol style="list-style-type: none"> <li>1. Drawing the schematic and pictorial diagrams of the following circuits:               <ol style="list-style-type: none"> <li>a. Blinker</li> <li>b. Power supply</li> </ol> </li> </ol>	<ul style="list-style-type: none"> <li>• Performance test</li> </ul>	
<ul style="list-style-type: none"> <li>• Tools and equipment for drawing</li> </ul>	<ol style="list-style-type: none"> <li>1. Electrical/ electronic schematic diagrams are drawn and correctly identified.</li> <li>2. Correct drawing are identified, equipment are selected and used in accordance with job requirements.</li> </ol>	LO3. Prepare/Make changes on electrical/ electronic schematic diagrams.	<ol style="list-style-type: none"> <li>1. Converting the unregulated power supply to regulated one.</li> </ol>	<ul style="list-style-type: none"> <li>• Written test</li> <li>• Performance test</li> </ul>	

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Content Standard	Performance Standard	Learning Competencies	Project/ Activities	Assessment	Duration
<b>LESSON 4: OBSERVING OCCUPATIONAL HEALTH AND SAFETY</b>					
<p><i>Demonstrate understanding of/on:</i></p> <ul style="list-style-type: none"> <li>• Health hazards in the work area</li> <li>• Occupational risks</li> <li>• Personal protective equipment</li> <li>Safety nets in the work area</li> </ul>	<ol style="list-style-type: none"> <li>1. Health hazards and occupational risks are identified.</li> <li>2. Safety nets are formulated and installed.</li> <li>3. Protective equipment are identified.</li> </ol> <p>Occupational health and safety practices are observed.</p>	<p>LO1. Identify health hazards and occupational risks.</p>	<ol style="list-style-type: none"> <li>1. Identifying health hazards and occupational risks found in your shop room.</li> <li>2. Determining the presence of PPE in your laboratory Area.</li> </ol>	<ul style="list-style-type: none"> <li>• Performance test</li> <li>• Written test</li> <li>• Interview</li> </ul>	<p>6 hours</p>
<ul style="list-style-type: none"> <li>• Measures advancing occupational health.</li> <li>• Safety practices in electronics laboratory.</li> </ul>	<ol style="list-style-type: none"> <li>1. Measures advancing occupational health are observed.</li> <li>2. Safety procedures are practiced.</li> </ol>	<p>.LO2 . Observe occupational health and safety practices.</p>	<ol style="list-style-type: none"> <li>1. Arranging laboratory equipment, tables, chairs, and other related facilities in line with standard OH and S.</li> </ol>	<ul style="list-style-type: none"> <li>• Performance test</li> <li>• Written test</li> <li>• Interview</li> </ul>	



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Content Standard	Performance Standard	Learning Competencies	Project/ Activities	Assessment	Duration
<b>LESSON 5: MAINTAIN HAND TOOLS AND EQUIPMENT</b>					
<p><i>Demonstrate understanding of/on:</i></p> <ul style="list-style-type: none"> <li>Maintenance of tools</li> <li>Storage of tools</li> <li>Standard operational procedures, principles, and techniques in maintaining tools</li> </ul>	<ol style="list-style-type: none"> <li>Tools are used according to tasks undertaken.</li> <li>Routine maintenance of tools are undertaken according to standard operational procedures, principles and techniques.</li> <li>Tools are stored safely in appropriate locations in accordance with manufacturer specifications or standard operating procedures.</li> </ol>	LO1. Maintain hand tools	<ol style="list-style-type: none"> <li>Performing maintenance procedure on electronic tools and equipment.</li> <li>Performing functional arrangement of electronic hand tools and equipment in cabinet.</li> </ol>	Written test, Oral test Performance test	6 hours
<ul style="list-style-type: none"> <li>Preventive maintenance of hand tools and equipment</li> </ul>	<ol style="list-style-type: none"> <li>Tools and equipment are maintained according to its physical material.</li> <li>Preventive maintenance are regularly conducted</li> </ol>	LO2. Perform basic maintenance of hand tools and equipment .	<ol style="list-style-type: none"> <li>Performing preventive Maintenance on individual Tool and equipment</li> </ol>	Written test, Oral test Performance test	
					<b>40 hours</b>

“By three methods we may learn wisdom: First, by reflection, which is noblest; second, by imitation, which is easiest; and third by experience, which is the bitterest.”

**- Confucius**