Republic of the Philippines
DEPARTMENT OF EDCUATION

K to 12 BASIC EDUCATION CURRICULUM

TECHNOLOGY AND LIVELIHOOD EDUCATION

TEACHER'S GUIDE

Exploratory Course on

RAC SERVICING (DOM RAC)

INDUSTRIAL ARTS – RAC SERVICING (DOM RAC)
(Exploratory)

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Teacher's Guide for TLE Exploratory Course on RAC Servicing (DOM RAC)

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 21st century skills who is adequately prepared for work, entrepreneurship, middle level skills development and higher education.* The overarching 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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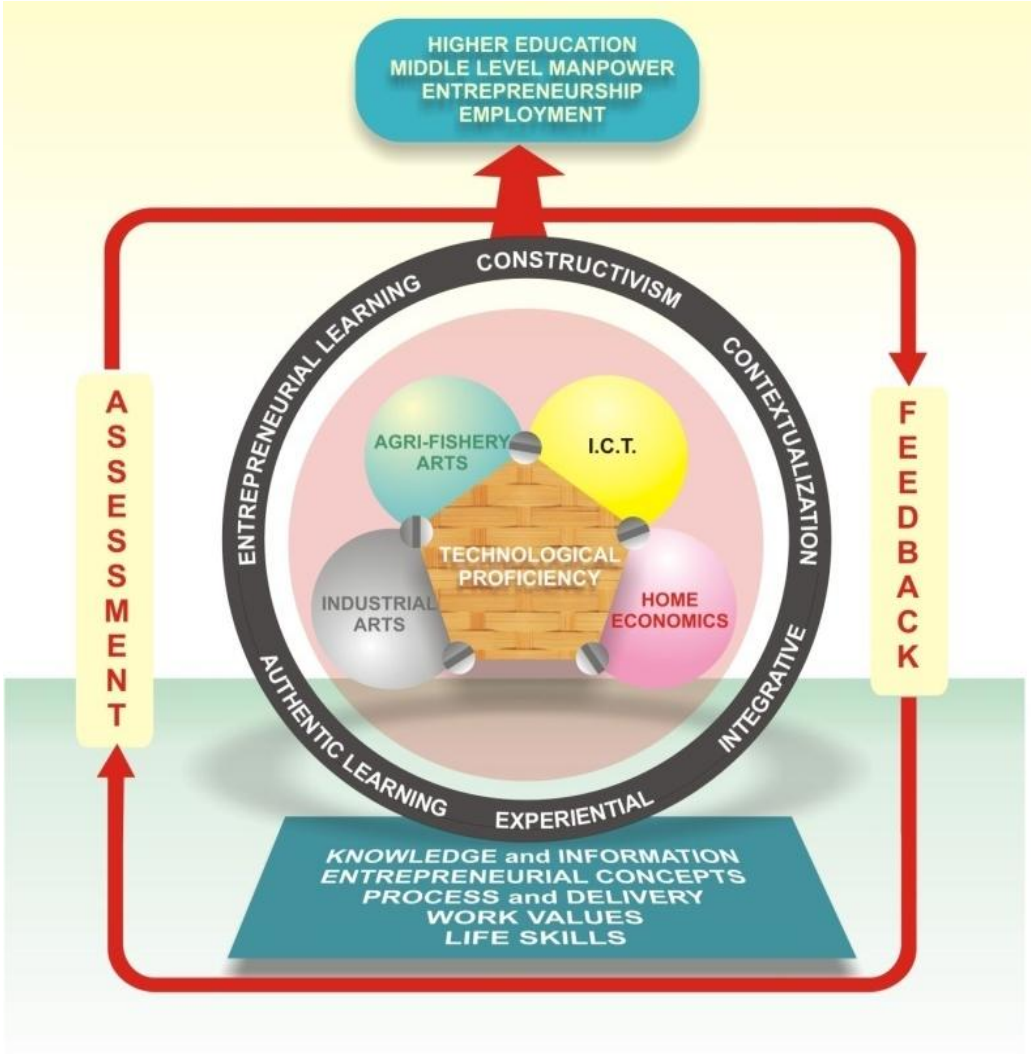

Figure 1.TLE Framework

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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.

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 one that…

a. is built on adequate mastery of knowledge and information, skills and processes, acquisition of right work values and life skills;
b. equips students with skills for lifelong learning; and
c. 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.[1]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

[1] There are 24 TLE courses but there are only 23 Learning Modules because there is only one Learning Module for Tailoring and Dressmaking.

are these competencies described basic? Because they are competencies that students must acquire in order that they can do higher level competencies. They are also described common because these are true to all TR-based TLE courses.

4. **Time allotment for Technology and Livelihood Education is four hours per week.**

The Learning Modules and Lessons

There is a Learning Module for each exploratory course. If there are 24exploratory courses then you have 24 Learning Modules in your hands. But you will use 4 Modules only for the entire year in Grade 7 and another 4 Modules in Grade 8. In these exploratory courses, you are expected to integrate Income Generating Projects (IGP) to help your students earn while they learn.

Each Learning Module consists of 4 to 5 Lessons[2]. The Lessons are focused on the 4 to 5 common competencies. To avoid meaningless repetition of the teaching of the 5 common competencies, we 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 RAC Servicing (Dom RAC) but in the context of RAC Servicing (Dom RAC) and so your tools will not be entirely the same. Definitely, there are some tools that are common to all the courses.

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 a higher level that is required by industries. This he/she earns after passing an assessment given by TESDA.

[2] 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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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.

Student's choice of TLE specialization begins in Grade 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 Aquaculture 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) What Is Your Score?
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 the limited time.

c. The **Self-check** given after the pretest and information sheet/s can also serve as the posttest of the lesson.

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
1. Learning outcomes 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.	Students acquaint themselves with the learning outcomes and performance standards and make them their personal goals.	You introduce the learning outcomes to your students and make sure that they understand them and make these learning targets their own. Make these your goals for instruction.
2. Performance Standards are referred to as "performance criteria" in the TESDA TR. They are more specific descriptions of the student's behavior that serve as evidence	Students clearly understand the performance standards and make them their own learning goals.	You introduce the performance standards to your students and make sure that they understand them and make these performance standards their own.

that the expected learning outcomes have been realized with the expected level of proficiency or in accordance with established standards. 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.		Let these standards give your lesson its specific direction.
3. Materials/Resources and References To teach effectively, you need **materials** and **references**. Materials may include equipment, hand tools or consumables. The **references** 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.	Get to know the materials. They are part of the Lesson. By all means, read the references for lesson mastery.	Prepare the materials you need in advance. For gadget, tool or equipment, it is always wise to prepare, check and try them in advance to ensure that they function when you use them. As the saying goes “forewarned is forearmed.” 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. For effective teaching, your lesson preparation should include reading the list of references. Do not limit yourself to the list of references. If you discover good reference material/s, add to the list of references.

		Introduce the references to your students. Motivate them to read these references as they go through the module for mastery of the lesson.
4. The **definition of terms** and **acronyms** 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.	Refer to the definition of terms for greater understanding of the lesson.	Remind your students to refer to the definition of terms and acronyms for clearer understanding of the lesson.
5. The section **"What Do You Already Know"** is intended to determine entry knowledge and skills of your students to find out if you have to 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.	Take the test honestly. Check answers against the answer key provided.	Tell your students to accomplish the pretest. Ask your students to use a separate sheet of paper for their answers. Explain that the purpose of the pretest is to find out how much they already know about the 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. Make it clear to them that their scores will not be recorded for grading purposes and will not be taken against them. 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. This means that you always start your lesson presentation with the results of the pretest because you are going to teach them what they do not yet know and correct whatever wrong concepts they have at the beginning of the lesson.
6. "What Do You Need To Know?"- This section contains 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.	Read and understand the Information Sheet/s and /or Operation Sheet. Be prepared For a Self-check which serves as a posttest. Correct answers by referring to the answer key.	Make sure students are engaged in reading the Information Sheet/Observation Sheet and in answering the self-check. Give assistance to your students where needed.
7. "How Do You Apply What You Learned?" – In this section, you give your student the 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	Do the Activity. To determine level of performance, use the scoring rubrics or check answers against the answer key, whichever is applicable.	Find a way to test real life application of what your students have learned. Do not hesitate to use ways of determining how your students can apply learned facts and concepts which are more authentic and realistic

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.	Reflect on assessment results.	than that/those given in the Module. Reflect on assessment results. Use assessment results in planning the next steps for instruction.
8. How Do You Extend Your Learning? – As the word implies, this activity is done outside class hours for enrichment purposes. This can reinforce lesson mastery.	Do the task assigned outside class hours.	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 .

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 RAC Servicing (Dom RAC)

For you to get a complete picture of the complete TLE exploratory course on RAC Servicing (Dom RAC), you are hereby provided with the Curriculum Guide on RAC Servicing (Dom RAC).

Content Standard	Performance Standard	Learning Competencies	Projects/Activities	Assessment	Duration
LESSON 1: PREPARE MATERIALS AND TOOLS					
• Use of copper tube in Refrigeration an	• Job requirements is identified • HVAC materials and	LO	Making Clip Arts or Album of Materials, Tools and	• Written Test • Pe	4 Hrs

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d Air-conditioning Unit • Types of Copper Tubes and tubing • Fitting • Common flare type	tools are identified • Quantity of each material to be use is determined or specified • Correct quantity and quality of material		Equipment Identification of different tools and instruments in Domestic refrigeration	rformance test	

fittings • Filter Drier • Flar • Rel • Different Refrigeration and air conditioning tools	s are determined as per job requirement				

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• Preparing Service Report • Part of a service report • Preparing Job Report Form • Preparing Requisition form/s	• Refrigeration materials needed are requested according to list prepared. • Requisition form / slip is accomplished accu	LO2	Research Work on Procedure on How to Request of Tools Accomplishing job order and requisition form/s	• Written Test • Performance test	4 Hr

lip	ratel y and prop erly. • Req uest is done as per com pany stan dard oper atin g proc edur e.		lip		
LESSON 2: PERFORM MENSURATION AND CALCULATIONS					

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• Types of measuring instruments • How to use multitester • Un	• Object or component to be measured is identified, classified and interpreted to the appropriate regular geometric shape. • Measuring tools are	LO1	Perform actual mensuration of a given object Reading of graduations in metric rule. Perform how	• Written Test • Performance test	4 Hrs

• Conversion of Temperatures • He	selected/identified as per object to be measured or job requirements. • Workpieces are measured according to job requirements.		to use a multi tester		

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• Linear measurements • Mathematical	• Accurate measurements are obtained according to job requirem	LO2	Performmensuration and calculation Performmat		4 Hrs

conversion table • Weight conversion table • Unit of measure And their	ents. • Instruments are read to the limit of accuracy of the tool. • Work pieces are measured according to job requirements.		hematical conversion and temperature conversion		

equivalent • Temperature measurement and conversion					
LESSON 3: INTERPRET TECHNICAL DRAWINGS AND PLANS					
• Common	• Sign, sym	LO1.	Making Sch	• Wri	4 Hrs

n Refrigeration electrical symbols and signs • Wiring diagram of water cooler	bols and data are determined according to classification or as appropriate in drawing.	Analyze signs, symbols and data	ematic Diagram, Pictorial Drawing used in RAC.	tten Test • Performance test	
• B	• Com	LO		• W	3

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lueprint Sample of blueprint plan	ponents, assemblies or object are recognized as per job requirement. • Dimensions and specification are identified accordin			rittten Test • Performance test	Hrs

for electrical installation	g to job requirements.				
LESSON 4: MAINTAIN TOOLS AND EQUIPMENT					
• Classif	• Tools	LO	Identific	• Wr	3 Hr

ica tio n of To ols • F u n c t i o n a l a n d • N o n f u n c t i	and equi pme nt are mai ntai ned • Non- func tion al tools and equi pme nt are segr egat ed and label ed. • Non- func tion al tools are		atio n of fun ctio nal and non - fun ctio nal tool s and equi pme nt	i t t e n T e s t • P e r f o r m a n c e t e s t	s

onal tools • Checking condition of tool • Record Cards • Inspection of	stored prior for repair. • Safe handling of tools and equipment are applied. • Safe working habits are observed.				

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tools					
• Classification of lubricants • Purpose of lubicating • Accomplish inv	• Appropriate lubricants are identified according to types of equipment. • Lubricated hand tools are properly stored. • Invent	LO2. Perform basic preventive maintenance	Marking or labeling the storage area of tools and materials. Applying oil/lubricants in different tool	• Written Test • Performance test	4 Hrs

entory of HVAC/Req uipment, tools and instrument types and specifications • Lubricat	ory of tools, instruments and equipment are conducted and recorded. • Defective hand tools, instruments, equipme		s		

ion procedures	nt and accessories are replaced according to manufacturer's specification. • Proper housekeeping is applied				
LESSON 5: PERFORM HOUSEKEEPING AND SAFETY PRACTICES					
• 5 S	• Mate		Clas	• W	3

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methodology • Procedure in arranging and storing tools and equipment • Preventive Measures	rials, tools and equipment are classified according to their kind. • Appropriate areas for materials, tools and equipment are designated. •	LO	sifying of tools, equipment, and materials. Apply preventive measures Apply first aid in the workplace	ritten Test • Performance test	Hr

from exposure to workplace accident and condition • First Aid in the workplace • Protection against fire			Study and practice use of fire extinguisher4		

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• Fire scape planning					
• Work area housekeeping • Preventive maintenance task • • Procedures in	• Cleaning materials are identified according to specified application and procedures • Work place area, tools, mate	LO 2. Clean work place area	Perform cleaning in specific workplace area	• Written examination	3 Hr

cleaning workplace area, tools and equipment. • Consideration of a safe workplace area, too	rials and equipment are cleaned using specified cleaning materials. • Workplaces are in safe condition in accordance with safety regul	rea, materials, tools and equi			

ls and equipment.	ation practices.	pment.			
• Proper storage of tools and equipment • Maintenance and safety sto	• System for requesting, borrowing and returning of materials, tools, and equipment is followed and implement	LO3. Systematize dispensing and retrieval of materials, tools and equi	Perform proper dispensing and retrieval of tools and equipment Follow sug gest	• Written exami nation	4 Hrs

rage of tools and equipment • Different forms and equipment management • Procedure in bar	ed. • Form used is completely filled-up and filed. • Borrowed tools and equipment are returned to designated area. • Materials are consumed as reque	pment	ed flowchart in borrowing and tools and equipment		

rowing tools and equipment • Flowchart in returning the borrowed tools and equipment.	sted. .				

(Diagram)					
					40 Hours

"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