TECHNOLOGY AND LIVELIHOOD EDUCATION (TLE)
GRADES 9 or 10

COMPONENT: **INDUSTRIAL ARTS**
SECTOR: **AUTOMOTIVE AND SMALL ENGINE SERVICING**
DESCRIPTION: This is one of the sectors under the Industrial Arts consisting of the preliminary competencies in the specializations of Automotive and Small Engine Services. It covers the necessary procedures in ignition and engine servicing.

QUARTER I/III

CONTENT	**CONTENT STANDARD** The learners…	**LEARNING COMPETENCIES** The learners…
Automotive and Small Engine Services • development of an automotive engine • service specifications manuals ▪ service literature ▪ generic service manuals ▪ lubrication service manual ▪ owners' workshop manuals	demonstrate an understanding of the concepts and principles of ignition system servicing in automotive and small engines	1. interpret the fundamentals in automotive and small engine services
Automotive and Small Engine Servicing • tools and materials • consumables • equipment		2. discuss tools, materials, consumables, and equipment
Component Parts of Automotive and Small Engine Systems (Electrical) • ignition • starting		3. distinguish the component parts of automotive and small engine systems (electrical)

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
• charging • computer • lighting		
Diagrams of Engine Electrical System • components • signs and symbols		4. draw a diagram of an engine electrical system
Ignition System • parts and functions		5. describe the parts and functions of the ignition system
Ignition System Servicing • types of troubles • types of diagnostic tests • servicing procedure for the ignition system		6. apply servicing of the ignition system following the safety precautions
PERFORMANCE STANDARD	The learners perform ignition system servicing following the safety precautions	

QUARTER II/IV

CONTENT	**CONTENT STANDARD** The learners…	**LEARNING COMPETENCIES** The learners…
Engine Operation • two-stroke cycle • four-stroke cycle	demonstrate an understanding of the concepts and principles of engine servicing in automotive and small engines	1. differentiate types of engine operation
Engine Construction • cylinder head, cylinder block, and manifolds • crankshaft, bearings, rods, pistons, and rings		2. describe engine construction
Engine Services • engine tune-up procedure ▪ gas engine ▪ diesel engine		3. apply engine servicing following the safety precautions
PERFORMANCE STANDARD	The learners perform engine servicing with safety precautions	
Service Costing • flat rate manuals • manpower (labor cost) • material costs	demonstrate an understanding of the elements of cost for labor and materials for servicing	4. calculate labor and material costs for services
PERFORMANCE STANDARD	The learners compute costs for labor and materials for services	

COMPONENT: **INDUSTRIAL ART**
SECTOR: **ELECTRICAL AND ELECTRONICS SERVICING**
DESCRIPTION: This is one of the sectors under the Industrial Arts consisting of the preliminary competencies in the specializations of Electrical Installation and Maintenance, Electronics Product and Assembly Servicing, and Domestic Refrigeration and Air-conditioning Servicing. It covers the necessary procedures in household electrical installation, electronics product assembly, and residential refrigerant maintenance.

QUARTER I/III

CONTENT	**CONTENT STANDARD** The learners…	**LEARNING COMPETENCIES** The learners…
Fundamentals of Electrical and Electronics Services	demonstrate an understanding of the concepts and principles in electrical, electronics, and domestic refrigerant system services	1. discuss electrical and electronics services
Materials and/or Components for Electrical Installation and Electronics Servicing and Repair • electrical components • electronics components (passive and active components • types of Printed Circuit Board (PCB)		2. differentiate the types of materials and/or components for electrical installation and electronics servicing and repair
Circuit Diagrams • schematic • wiring • block • line diagram		3. draft a circuit diagram
PERFORMANCE STANDARD	The learners create a circuit diagram	
Household Electrical Installation		4. apply procedures in household electrical installation following the safety precautions

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
• switches (SPST, SPDT, 3-way, 4-way, ganged switches) • convenience outlets • circuit protection devices Power Supply Assembly etching process • soldering practices • power supply assembly (bridge-type rectifier with 12V output)		5. apply procedures in power supply assembly with safety precautions
PERFORMANCE STANDARD	The learners perform household electrical installation and electronic product assembly procedures following the safety precautions	

QUARTER II/IV

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
Residential Refrigeration • refrigeration system ▪ mechanical ▪ electrical • refrigeration cycle • types of refrigerants conventional and inverter type	demonstrate an understanding of the concepts and principles in electrical, electronics, and domestic refrigerant system services	1. differentiate the two kinds of refrigeration systems
Preventive Maintenance Servicing • household electrical system • household electronic products • residential air-conditioning		2. apply preventive maintenance servicing procedures following the safety precautions
PERFORMANCE STANDARD	The learners perform preventive maintenance servicing following the safety precautions	
Service Costing • manpower (labor cost) • material costing	demonstrate an understanding of calculating the costs of labor and materials for servicing	3. calculate labor and material costs for services
PERFORMANCE STANDARD	The learners calculate labor and material costs for the rendered services	

COMPONENT: **INDUSTRIAL ARTS**
SECTOR: **RESIDENTIAL CARPENTRY**
DESCRIPTION: This is one of the sectors under the Industrial Arts consisting of the preliminary competencies in the specializations of Carpentry. It covers the necessary procedures in wood project fabrication, repair servicing of interior and exterior components of a residential house that covers doors, windows, floors, roofs, ceilings, countertops, stairs, railings, wall partitions, and decorative molding.

QUARTER I/III

CONTENT	**CONTENT STANDARD** The learners…	**LEARNING COMPETENCIES** The learners…
Introduction to Carpentry • rough carpentry • finishing carpentry • woodworking • fabrication	demonstrate an understanding of the concepts and principles in carpentry works	1 discuss principles and concepts in carpentry
Career/Business Opportunities		2. discuss career/business opportunities in carpentry
Wood Lumber, Bamboo, and Rattan Types • types of wood lumber, bamboo, and rattan • wood lumber cuts and applications • defects • new technologies for bamboo-made products		3. discuss the wood lumber, bamboo, and rattan classification

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
Carpentry Byproducts • wood ▪ plywood ▪ plyboard • non-wood ▪ composite materials ▪ engineered bamboo		4. recognize the use of carpentry byproducts
Forestry Regulatory Laws • DENR Administrative Orders 2021-05 (“Rules and regulations governing the establishment, harvest and transport of bamboo”) • DENR Administrative Orders 2021-11 (“Revised regulations governing the establishment and operations of wood processing plants”) • DENR Administrative Order No 89-04 (“Rattan cutting contract and other party to cut gather and transport rattan”)		5. discuss the principles and concepts related to forestry regulatory laws
Wood Lumber Computation and Pricing • board meter computation • board foot computation		6. apply wood lumber calculation and pricing

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
Carpentry Power Tools and Equipment • power tools ▪ circular saw ▪ jigsaw ▪ miter saw ▪ planer ▪ router • equipment ▪ bandsaw ▪ jointer machine ▪ table saw ▪ wood lathe machine		7. demonstrate the use of power tools and equipment following the safety precautions
Maintenance of Power Tools and Equipment • storage • care		8. demonstrate the maintenance of power tools and equipment
Handling and Storing of Consumables • hardware • laminations • wood • wood fasteners • wood finishing materials		9. discuss the handling and storing of consumables
Common Wood Joint • butt • mortise and tenon joints • splice miter		10. demonstrate procedure in wood joints with safety
PERFORMANCE STANDARD	The learners perform making wood joints following the safety precautions	
Project Planning • Parts of Project Plan		11. prepare a project plan

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
▪ title ▪ objectives ▪ tools and materials ▪ safety precautions ▪ procedures ▪ working ▪ drawing • costing and canvassing of materials • project market value		
Fabricated Wood/ Bamboo/Rattan Project (furniture /fixture)		12. apply procedures in wood/bamboo/rattan projects following the safety precautions
Types of Wood Finishing • laminating • painting • pyro finishing • varnishing		13. apply procedures in wood/bamboo/rattan finishing following the safety precautions
PERFORMANCE STANDARD	The learners perform wood/bamboo/rattan project fabrication following the safety precautions	

QUARTER II/IV

CONTENT	**CONTENT STANDARD** The learners…	**LEARNING COMPETENCIES** The learners…
Carpentry Works in Residential Structure • roofs • ceilings • doors • windows • floors • partitions • stairs and railings • cabinets	demonstrate an understanding of the concepts and principles of carpentry works in residential structures	1. discuss the importance of carpentry works in residential structure
Materials and Consumables for Residential Carpentry Repair According to the following: • fasteners • finishing materials • hardware • lumber materials		2. classify materials and consumables for residential carpentry repairs following the safety precautions
Residential Repair Cost Estimate • material costing • fixed labor costing (minimum wage)		3. prepare an estimate of residential repair cost-based outputs
Residential Carpentry Repairs • roofs • ceilings • doors • windows • floors • partitions • stairs and railings • cabinets		4. apply procedures in residential carpentry repairs with safety precautions
PERFORMANCE STANDARD	The learners perform residential carpentry repairs following the safety precautions	

COMPONENT: **INDUSTRIAL ARTS**
SECTOR: **RESIDENTIAL MASONRY AND TILE SETTING**
DESCRIPTION: This is a course in Industrial Arts consisting of the preliminary competencies in the specializations of Residential Masonry and Tile Setting. It covers the necessary procedures for site preparations, concrete reinforcements, formworks, concrete preparations, classification of tiles, and tile setting.

QUARTER I/III

CONTENT	**CONTENT STANDARD** The learners…	**LEARNING COMPETENCIES** The learners…
Masonry Works ● indoor construction ▪ flooring works ▪ block laying works ▪ plastering works ▪ precast installation works ● outdoor construction ▪ building construction ▪ roads ▪ bridges ▪ boundary ▪ landmark ▪ amusement parks	demonstrate an understanding of the concepts and principles in masonry works	1. identify masonry works
Masonry Works ● materials ▪ aggregates ▪ cement ▪ lime ▪ CHB and bricks ▪ reinforce steel bar ● consumables ▪ GI wire ▪ nails		2. differentiate materials, consumables, tools, equipment, and special tools in masonry works

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
▪ lumber ▪ plywood ● roughing-up tools ● masonry surface finishing tools ● special tools ▪ H-frame scaffolding ▪ wheelbarrow ▪ mixing board ▪ mortar box ● equipment ▪ bagger mixer ▪ jackhammer ▪ humper tamper ▪ cut-off machine		
Single-Story Residential plan ● floor plan ▪ dining room ▪ living room ▪ bedroom ▪ kitchen ▪ comfort room ● elevation plan		3. illustrate a single-story residential plan
Site Preparation ● excavation ● backfilling ● compaction *(note: Mock-up Board may be used if the site is unavailable)*		4. apply site preparation following the safety precautions

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
Concrete Reinforcement ● classification of steel bar ▪ corrugated bar ▪ size of steel bars ● spacing of steel bar ● steel tying		5. identify types of steel bars 6. apply procedures in concrete reinforcement following the safety precautions
Formworks • assembly • disassembly		7. apply procedures in formworks assembly and disassembly following the safety precautions
Concrete Preparation • types of mixture proportion • mixing concrete • depositing of concrete • curing concrete		8. apply procedures in concrete preparation following the safety precautions
PERFORMANCE STANDARD	The learners perform concrete preparations following the safety precautions	

QUARTER II/IV

CONTENT	**CONTENT STANDARD** The learners…	**LEARNING COMPETENCIES** The learners…
Classification of Tiles • ceramic tile • porcelain tile • marble • glass tile • terracotta tile • quarry tile • concrete tile • natural stone tile	demonstrate an understanding of the concepts and principles in tile setting works	1. discuss the classification of tiles
Tools, Materials, and Equipment in Tile Setting • Tools ▪ tile scriber ▪ straight edge ▪ margin trowel ▪ finishing trowel ▪ gauging trowel ▪ notch trowel ▪ pointing trowel ▪ spiral mixer ▪ spacer ▪ tile nipper • Equipment ▪ wet saw ▪ table wet saw ▪ tile cutter ▪ angle grinder • Consumables ▪ fine sand		2. demonstrate tools, equipment, and materials for residential tile setting

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
▪ cement ▪ lime ▪ grout		
Tile Installation • floor bed preparation • tile-cutting techniques • tile installation techniques • grouting techniques • polishing techniques		3. apply procedures in tile installation following the safety precautions
PERFORMANCE STANDARD	The learners perform tile installation following the safety precautions	
Service Costing • material costs • labor costs	demonstrate an understanding of masonry/tile installation services computation	4. compute masonry/tile setting service cost
PERFORMANCE STANDARD	The learners compute masonry and tile setting service cost	

COMPONENT: INDUSTRIAL ARTS
SECTOR: RESIDENTIAL PLUMBING
DESCRIPTION: This is one of the sectors under the Industrial Arts consisting of the preliminary competencies in the specializations of Technical Drafting and Residential Plumbing. It covers the necessary procedures in drafting floor plan layout, pipe installation, and repair.

QUARTER I/II

CONTENT	**CONTENT STANDARD** The learners…	**LEARNING COMPETENCIES** The learners…
Fundamentals of Residential Plumbing • plumbing system ▪ drainage ▪ waste ▪ water supply - hot and cold	demonstrate an understanding of the concepts and principles in residential plumbing works	1. discuss the residential plumbing system and its components
Residential Floor Plan with Plumbing Layout • features ▪ floor plan ▪ plumbing layout – drainage – waste – water supply ▪ plumbing system diagram (isometric)		2. discuss the different features of a residential floor plan with plumbing layout
Drafting Floor Plan with Plumbing Layout • drawing tools, materials, and draft design		3. draft the floor plan with the plumbing layout

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
• walls, doors ▪ fixtures ▪ signs and symbols ▪ plumbing system diagram (Isometric) ▪ dimensioning - elements - systems - methods		4. draft the fixtures, signs, and symbols on the floor plan with plumbing layout & its diagram 5. label the floor plan with plumbing layout and its diagram with dimensions
PERFORMANCE STANDARD	The learners draft floor plan with plumbing layout and its diagram with dimensions.	

QUARTER II/IV

CONTENT	**CONTENT STANDARD** The learners…	**LEARNING COMPETENCIES** The learners…
Handling and Storing of Consumables • joints • fittings • fixtures • adhesive • de-clogger • sealants	demonstrate an understanding of the concepts and principles in residential plumbing works	1. discuss the handling and storing of consumables
Hand Tools • cutting • reaming • threading • de-clogger Maintenance of Hand Tools • storage • care		2. demonstrate the use of hand tools and equipment following the safety precautions 3. demonstrate the maintenance of hand tools following the safety precautions
Pipe Installation • specification, measurement, and design • pipe joining and fitting method Pipe Installation Testing		4. apply procedures in pipe installation with safety precautions 5. apply procedures in testing pipe installation with safety precautions
Pipeline Testing and Troubleshooting • types of troubles • types of tests ▪ leak test ▪ system test ▪ pressure test		6. apply procedures in pipeline testing and troubleshooting following the safety precautions

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
Pipeline Repair		7. apply procedures in pipeline repair following the safety precautions
PERFORMANCE STANDARD	The learners perform pipeline services following the safety precautions	
Plumbing System Repair ● material costing ● manpower (labor costing)	demonstrate an understanding in repair service cost	8. compute repair service cost
PERFORMANCE STANDARD	The learners compute pipeline services cost.	

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COMPONENT: **INDUSTRIAL ARTS**
SECTOR: **SHIELDED METAL ARC WELDING (SMAW)**
DESCRIPTION: This is one of the sectors under Industrial Arts consisting of the preliminary competencies in the specializations of Shielded Metal Arc Welding. It covers necessary procedures in welding techniques, joints, defects, and repair.

QUARTER I/III

CONTENT	**CONTENT STANDARD** The learners…	**LEARNING COMPETENCIES** The learners…
Introduction to Arc Welding Processes • arc welding processes ▪ Shielded Metal Arc Welding (SMAW) ▪ Flux-Cored Arc Welding (FCAW) ▪ Gas Metal Arc Welding (GMAW) ▪ Gas Tungsten Arc Welding (GTAW) ▪ Submerged Arc Welding (SAW) ▪ Plasma Arc Welding (PAW)	demonstrate an understanding of the concepts and principles in shielded arc welding works	1. discuss the arc welding processes
Parts and Functions of Shielded Metal Arc Welding (SMAW) Machine • types and uses of SMAW Machine ▪ transformer ▪ rectifier ▪ inverter ▪ motor engine generator • procedures in setting up of SMAW Machine		2. demonstrate setting-up of welding machine based on required specifications and/or manufacturer's instructions following the safety precautions

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
Types of Welding Positioners, Jigs, and Fixtures • uses and Functions • weld locations ▪ fieldwork ▪ stationary		3. assemble welding positioner, jigs, and fixtures according to job requirements following the safety precautions
Types of Weld Joints and Procedures • butt joint • tee joint • corner joint • lap joint • edge joint		4. differentiate the types of weld joints and procedures
Welding Codes and Standards • American Welding Society (AWS) • American Society of Mechanical Engineers (ASME)		5. discuss welding codes and standards based on AWS and ASME
AWS Electrode Specifications • tensile strength • position of the weld • type of electrode coating • current supply (AC/DC) and polarity		6. distinguish electrodes according to job specifications
Plate Welding Positions and Preparations • welding positions		7. distinguish plate welding positions

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
▪ flat ▪ horizontal ▪ vertical ▪ overhead ▪ groove weld position ▪ fillet weld position • cutting and edge preparations • mechanical • gas • plasma		8. apply plate cutting and edge preparations following the safety precautions
Welding Defects and Inspection Methods • defects ▪ types ▪ causes ▪ remedies • Non-Destructive Testing (NDT) • Destructive Testing (DT)		9. distinguish welding defects and inspection methods
PERFORMANCE STANDARD	The learners perform plate cutting and edge preparations	

QUARTER II/IV

CONTENT	CONTENT STANDARD The learners…	LEARNING COMPETENCIES The learners…
Shielded Metal Arc Welding (SMAW) Processes and Techniques • welding techniques ▪ current setting ▪ length of arc ▪ angle of electrode ▪ speed of travel ▪ selection of electrode	demonstrate an understanding of the concepts and principles in shielded arc welding works	1. explain welding techniques
Striking an Arc • scratching • tapping		2. apply the methods of striking an arc following the safety precautions
Weld Beads • types • characteristics		3. apply weld beads in flat and horizontal positions following the safety precautions
Weld Repairs • weld defects removal and excavation • re-welding procedures		4. apply weld repairs with safety
PERFORMANCE STANDARD	The learners perform Shielded Metal Arc Welding processes and techniques	
Service Cost • material costing • manpower (labor costing)	demonstrate an understanding of computing cost services	5. compute the service cost based on the job requirements
PERFORMANCE STANDARD	The learners compute the service cost based on job requirements	