

# MODULE CURRICULUM AND ASSESSMENT STANDARDS:

## SECTION D: INTRODUCTORY LEVEL

The following pages define the curriculum and assessment standards for the introductory level of Mechanics.

Introductory level modules help students build daily living skills and form the basis for further learning. Introductory modules are developed for students who have no previous experience in the strand.

Module learner expectations define the competencies a student must demonstrate to achieve success in a module. Assessment standards define the criteria and conditions to be used for assessing the competencies defined in the module learner expectations.

Specific learner expectations provide a detailed framework for instruction to help students build the competencies defined in the module learner expectations. Additional information and suggestions for instruction are provided in the Notes column; teachers may wish to use this space to record their ideas for instruction or student projects.

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**MODULE MEC1010: MODES & MECHANISMS****Level:** Introductory**Theme:** Vehicle Design and Ownership**Prerequisite:** None**Module Description:** Students research, design, build and test a model of a transportation vehicle, using a simple power source, common materials and tools.**Module Parameters:** Access to basic hand tools.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate safe use of tools, and follow established lab procedures</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observed performance related to:               <ul style="list-style-type: none"> <li>following established shop/lab routines</li> <li>maintaining a safe and tidy workplace</li> <li>selecting and safely using tools</li> <li>managing time and resources.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Laboratory Practice, Part 1, MEC1010-1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p>	10
<ul style="list-style-type: none"> <li>list and describe operating systems and structures common to all modes of transportation</li> </ul>	<ul style="list-style-type: none"> <li>identification and description of operating systems and structures common to all modes of transportation.</li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Laboratory Practice, Part 2, MEC1010-1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p>	20
<ul style="list-style-type: none"> <li>research, design, build and test a concept vehicle</li> </ul>	<ul style="list-style-type: none"> <li>observed performance related to:               <ul style="list-style-type: none"> <li>research skills</li> <li>designed product</li> <li>built product</li> <li>testing procedures.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Laboratory Practice, Part 3, MEC1010-1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p>	70

**MODULE MEC1010: MODES & MECHANISMS (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal exploration during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Health/Safety Hazards</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>demonstrate knowledge of and follow safety rules and guidelines related to the use of basic hand and power tools</li> <li>identify the hazards associated with the use of:                             <ul style="list-style-type: none"> <li>compressed gases</li> <li>liquids under pressure</li> <li>flammable materials</li> <li>components under tension.</li> </ul> </li> </ul>	<p>Discuss personal property and environmental concerns.</p>
<p>Identification/Function</p>	<ul style="list-style-type: none"> <li>identify a transportation mode that can be used to move passengers or goods in the following environments:                             <ul style="list-style-type: none"> <li>terrestrial</li> <li>marine</li> <li>atmospheric</li> <li>space</li> </ul> </li> <li>describe, in a given environment, what forces must be overcome to start and keep a vehicle/craft in motion</li> <li>list and describe the function of the following systems:                             <ul style="list-style-type: none"> <li>propulsion</li> <li>guidance</li> <li>control</li> <li>suspension</li> <li>structural</li> <li>solar and wind</li> </ul> </li> </ul>	

**MODULE MEC1010: MODES & MECHANISMS (continued)**

Concept	Specific Learner Expectations	Notes
<p>Identification/ Function (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe and demonstrate how energy is used to produce motion using:               <ul style="list-style-type: none"> <li>– gravity</li> <li>– elastic or spring materials under tension</li> <li>– compressed gases</li> <li>– liquids under pressure</li> <li>– electromagnets</li> <li>– combustion</li> </ul> </li> <li>• identify and compare the guidance and control mechanisms that are used in connection with a:               <ul style="list-style-type: none"> <li>– land vehicle</li> <li>– marine craft</li> <li>– aircraft</li> <li>– spacecraft</li> </ul> </li> <li>• identify and compare the means by which a vehicle or craft is supported:               <ul style="list-style-type: none"> <li>– on land</li> <li>– in air, water or space</li> </ul> </li> <li>• identify the types of structures and materials that are used to support vehicular systems to provide maximum safety and performance.</li> </ul>	
<p>Application</p>	<ul style="list-style-type: none"> <li>• research, design and construct a vehicle or craft for a predetermined use.</li> </ul>	<p>Follow design process.</p> <p>Projects depend on the selection of transportation mode and propulsion system.</p> <p>Project examples are:</p> <ul style="list-style-type: none"> <li>• CO<sub>2</sub> powered craft/vehicle</li> <li>• solar powered</li> <li>• rubber band powered</li> <li>• battery powered</li> <li>• bottle sockets.</li> </ul>

**MODULE MEC1010: MODES & MECHANISMS (continued)**

Concept	Specific Learner Expectations	Notes
Testing/Evaluating	<p><i>The student should:</i></p> <ul style="list-style-type: none"><li>• identify an appropriate measurement technique used to assess factors such as:<ul style="list-style-type: none"><li>– speed</li><li>– pulling power</li><li>– payload</li><li>– efficiency</li></ul></li><li>• describe operation and construction of the transportation vehicle.</li></ul>	Suggest self-evaluation.
Portfolio Development	<ul style="list-style-type: none"><li>• show notes, sketches, working drawings, pictures and performance records in a portfolio.</li></ul>	

**MODULE MEC1020: VEHICLE SERVICE & CARE****Level:** Introductory**Theme:** Vehicle Design and Ownership**Prerequisite:** None**Module Description:** Students develop knowledge, skills and attitudes to care for and service a motor vehicle.**Module Parameters:** Access to commercially available products and related resources.**Note:** Customer work must be checked by qualified technician.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate safe use of tools, and follow established lab procedures</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observed performance related to:               <ul style="list-style-type: none"> <li>following established shop lab procedures</li> <li>proper handling of vehicle fluids</li> <li>safe handling of vehicle cosmetic/cleaning products</li> <li>maintaining a safe/tidy workplace.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Vehicle Service and Care, Part 1, MEC1020-1</i></p> <p><i>Standard</i> <i>Performance rating of 3 on each criteria</i></p>	10
<ul style="list-style-type: none"> <li>develop a preventive maintenance service schedule for a vehicle</li> </ul>	<ul style="list-style-type: none"> <li>developed service schedule for a given vehicle considering the following:               <ul style="list-style-type: none"> <li>items to be checked, serviced or routinely replaced</li> <li>items to be included are fluids, filters, tires, belts/chains, battery and lights</li> <li>distance/time intervals and operating conditions.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Vehicle Service and Care, Part 2, MEC1020-1</i></p> <p><i>Standard</i> <i>Performance rating of 1 or more on each criteria</i></p>	15

**MODULE MEC1020: VEHICLE SERVICE & CARE** (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• inspect and service a vehicle according to the vehicle service schedule</li>   <li>• clean and apply a protective coating to the exterior and interior surfaces of a vehicle for use or storage</li>   <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• observed performance related to:               <ul style="list-style-type: none"> <li>– completion of service schedule</li> <li>– selection and use of resources</li> <li>– time on task</li> <li>– quality of service.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Vehicle Service and Care, Part 3, MEC1020-1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p> <ul style="list-style-type: none"> <li>• observed performance in cleaning and applying protective coatings to a given vehicle, observing the following:               <ul style="list-style-type: none"> <li>– proper selection and use of equipment/materials</li> <li>– quality of completed task</li> <li>– ability to problem solve</li> <li>– time on task.</li> </ul> </li> </ul> <p><i>Assessment Tools</i>  <i>Task Assessment Checklist: Vehicle Service and Care, Part 4, MEC1020-1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal exploration during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and assessment tools noted above</i></p>	<p>50</p> <p>25</p> <p>Integrated throughout</p>

**MODULE MEC1020: VEHICLE SERVICE & CARE** (continued)

Concept	Specific Learner Expectations	Notes
Health/Safety Hazards	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• demonstrate knowledge of and follow practices that promote safety and protect the environment.</li> </ul>	
Consumer Awareness	<ul style="list-style-type: none"> <li>• explain why preventive maintenance can:               <ul style="list-style-type: none"> <li>– avoid expensive repairs</li> <li>– improve reliability and safety</li> <li>– improve efficiency</li> <li>– extend the life of the vehicle</li> </ul> </li> <li>• identify and locate a vehicle’s major mechanical and structural components that need regular service and care</li> <li>• identify and safely use common hand tools and equipment</li> <li>• identify from the owner’s manual the recommended:               <ul style="list-style-type: none"> <li>– type and grade of motor oil</li> <li>– type of engine coolant</li> <li>– brake fluid</li> <li>– power steering fluid</li> <li>– transmission fluid</li> <li>– type of filters</li> </ul> </li> <li>• identify potential trouble signs such as:               <ul style="list-style-type: none"> <li>– warning lights or gauges</li> <li>– unusual odours or noises</li> <li>– burning oil</li> <li>– leaks</li> <li>– other</li> </ul> </li> <li>• describe what steps should be taken when a vehicle is stored for a period of time</li> <li>• explain why it is necessary to shelter or protect a vehicle from:               <ul style="list-style-type: none"> <li>– the sun’s radiation</li> <li>– salt</li> <li>– heat and cold</li> <li>– other</li> </ul> </li> <li>• identify the components of a work order.</li> </ul>	

**MODULE MEC1020: VEHICLE SERVICE & CARE (continued)**

Concept	Specific Learner Expectations	Notes
Inspect/Service	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• prepare a repair order</li> <li>• demonstrate a visual inspection of:               <ul style="list-style-type: none"> <li>– fluid levels</li> <li>– hose and belt condition</li> <li>– tire pressure and condition</li> <li>– lights and accessories</li> <li>– battery condition</li> <li>– other</li> </ul> </li> <li>• prepare a service schedule using the owner’s manual or a shop manual to determine when to:               <ul style="list-style-type: none"> <li>– change lubrication fluids</li> <li>– replace filters</li> <li>– drain and replace coolants</li> <li>– lubricate body components</li> <li>– inspect and lubricate suspension and steering joints</li> <li>– inspect brake linings</li> <li>– repack wheel bearings</li> <li>– rotate tires</li> <li>– other</li> </ul> </li> <li>• demonstrate the procedure used to:               <ul style="list-style-type: none"> <li>– replace engine motor oil, coolant and filters</li> <li>– lubricate chassis and body parts</li> <li>– clean and check the battery condition</li> <li>– rotate tires</li> <li>– check tire pressure</li> <li>– dispose of used fluids and parts</li> <li>– other</li> </ul> </li> <li>• identify and demonstrate the use of products that can be safely used to:               <ul style="list-style-type: none"> <li>– clean a painted surface</li> <li>– degrease components</li> <li>– wax and polish a surface</li> <li>– other; e.g., chip protection</li> </ul> </li> </ul>	<p>Emphasize legal aspects of writing up and signing a work order.</p> <p>Relate to routine battery service.</p> <p>Should be developed to meet local conditions.</p> <p>For example, head lamp covers, nose guards, mud flaps, side protection moldings.</p>

**MODULE MEC1020: VEHICLE SERVICE & CARE** (continued)

Concept	Specific Learner Expectations	Notes
Inspect/Service (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• list items to be taken on trips (winter, summer)</li> <li>• remove and replace tire and rim from a vehicle</li> <li>• boost (jump-start) a vehicle</li> <li>• demonstrate basic troubleshooting on a stalled vehicle.</li> </ul>	<p>Emergency kit.</p> <p>Practise using vehicle jack and wheel nut wrench.</p> <p>Follow recommended procedure to avoid damage to vehicle or battery explosion.</p>
Careers	<ul style="list-style-type: none"> <li>• list personal characteristics of a service centre technician</li> <li>• describe further education, working conditions and career opportunities.</li> </ul>	



**MODULE MEC1040: ENGINE FUNDAMENTALS****Level:** Introductory**Theme:** Propulsion Systems**Prerequisite:** None**Module Description:** Students investigate and describe operating principles, construction and applications of engines.**Module Parameters:** Access to engine measuring tools, related resources, engine units.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate safe use of tools, and follow established lab procedures</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observed performance related to:               <ul style="list-style-type: none"> <li>following established lab procedures</li> <li>selecting proper tools</li> <li>demonstrating safe use of tools</li> <li>recognizing hazards of gasoline and other fuels.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Engine Fundamentals, Part 1, MEC1040-1</i></p> <p><i>Standard</i>  <i>Performance rating of 2 on each criteria</i></p>	10
<ul style="list-style-type: none"> <li>compare operating principles of two- and four-cycle piston engines</li> </ul>	<ul style="list-style-type: none"> <li>a report comparing the operating principles of the following engine types:               <ul style="list-style-type: none"> <li>two-stroke cycle</li> <li>four-stroke cycle.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Engine Fundamentals, Part 2, MEC1040-1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p>	20

**MODULE MEC1040: ENGINE FUNDAMENTALS** (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• determine the condition of an internal combustion engine</li> <li>• describe the by-products of combustion and their impact on the environment</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstration of problem-solving skills to determine the condition of a given engine by:               <ul style="list-style-type: none"> <li>– using the appropriate resources</li> <li>– determining mechanical condition including compression checks</li> <li>– identifying spark plug voltages and spark timing settings</li> <li>– examining fuel supply to the cylinder</li> <li>– making engine measurements for bore, stroke and displacement.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Engine Fundamentals, Part 3, MEC1040–1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p> <ul style="list-style-type: none"> <li>• listing/describing combustion by-products and their impact on the environment, including:               <ul style="list-style-type: none"> <li>– carbon dioxide</li> <li>– carbon monoxide</li> <li>– oxides of nitrogen</li> <li>– particulates.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Engine Fundamentals, Part 4, MEC1040–1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal exploration during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and assessment tools noted above</i></p>	<p>60</p> <p>10</p> <p>Integrated throughout</p>

**MODULE MEC1040: ENGINE FUNDAMENTALS (continued)**

Concept	Specific Learner Expectations	Notes
Health/Safety Hazards	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• demonstrate knowledge of and follow lab safety procedures</li> <li>• describe the hazards associated with:               <ul style="list-style-type: none"> <li>– gasoline and other flammable liquids</li> <li>– exhaust gases</li> <li>– hot coolants and liquids.</li> </ul> </li> </ul>	
Identification/Function	<ul style="list-style-type: none"> <li>• identify and use measuring tools in both Imperial and metric systems of measurement, such as:               <ul style="list-style-type: none"> <li>– steel rule</li> <li>– calipers and dividers</li> <li>– micrometer</li> <li>– dial indicator</li> <li>– torque wrench</li> <li>– pressure gauges</li> <li>– other</li> </ul> </li> <li>• identify and use fasteners associated with engines (measurements in both imperial and metric), such as:               <ul style="list-style-type: none"> <li>– bolts, studs and nuts</li> <li>– washers</li> <li>– pins</li> <li>– keys</li> <li>– snap rings</li> <li>– machine screws</li> <li>– other</li> </ul> </li> <li>• describe the effects of heating a gas in an enclosed space</li> <li>• identify the types of fuels commonly used in combustion engines</li> <li>• describe the by-products of combustion and their effects on personal health and the environment.</li> <li>• describe the difference between an internal and an external combustion engine</li> <li>• identify the type of engines and fuels that are used for air, land, sea and space applications</li> </ul>	

**MODULE MEC1040: ENGINE FUNDAMENTALS (continued)**

Concept	Specific Learner Expectations	Notes
Identification/ Function (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify and label the major parts of a reciprocating engine</li> <li>• demonstrate how reciprocating motion is converted to rotary motion</li> <li>• explain the difference between a two- and a four-stroke cycle engine</li> <li>• explain the purpose of the following support systems:               <ul style="list-style-type: none"> <li>– cooling</li> <li>– lubrication</li> <li>– ignition</li> <li>– fuel</li> <li>– exhaust</li> </ul> </li> <li>• demonstrate how engines differ according to their:               <ul style="list-style-type: none"> <li>– number of cylinders</li> <li>– design</li> <li>– size</li> <li>– make and model</li> <li>– other</li> </ul> </li> <li>• appraise the condition of an engine.</li> </ul>	Emphasize purpose only.
Identify/Analyze	<ul style="list-style-type: none"> <li>• locate and use resources related to:               <ul style="list-style-type: none"> <li>– service bulletins and repair manuals</li> <li>– engine specifications documentation</li> <li>– parts numbers and assembly procedures.</li> </ul> </li> </ul>	
Careers	<ul style="list-style-type: none"> <li>• describe further education, working conditions and career opportunities.</li> </ul>	

**MODULE MEC1090: ELECTRICAL FUNDAMENTALS**

**Level:** Introductory

**Theme:** Guidance and Control Systems

**Prerequisite:** None

**Module Description:** Students identify and describe the operating principles and applications of electricity.

**Module Parameters:** Access to multimeter, battery hydrometer, battery charger, related battery tools, electrical supplies.

**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate safe use of electrical tools and equipment, and follow established lab procedures</li> <li>• apply electrical principles and concepts to test electrical circuits and components</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• observed performance related to:               <ul style="list-style-type: none"> <li>– following established lab/shop procedures using personal protective equipment, recognizing electrical hazards, proper storage battery handling/service and correct use of electrical meters.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Electrical Fundamental, Part 1, MEC1090–1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p> <ul style="list-style-type: none"> <li>• observed performance in:               <ul style="list-style-type: none"> <li>– recognition of series and series parallel circuits on a vehicle</li> <li>– measuring voltages, resistances and current flow in lighting, charging and starting systems</li> <li>– testing a battery.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Electrical Fundamentals, Part 2, MEC1090–1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal exploration during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>15</p> <p>85</p> <p>Integrated throughout</p>

**MODULE MEC1090: ELECTRICAL FUNDAMENTALS (continued)**

Concept	Specific Learner Expectations	Notes
Health/Safety Hazards	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• safely use tools/equipment and follow established lab procedures</li> <li>• identify causes of battery explosion/acid burns</li> <li>• describe electrical shock/burns/fires</li> <li>• outline a plan of action when an accident occurs.</li> </ul>	Use face/eye protection when working around batteries.
Identification/Function	<ul style="list-style-type: none"> <li>• describe magnetic attraction and repulsion</li> <li>• produce a temporary and permanent magnet</li> <li>• find the polarity of an electromagnet</li> <li>• describe the electron theory in relation to the parts of an atom</li> <li>• describe production of electricity:               <ul style="list-style-type: none"> <li>– chemically</li> <li>– thermally</li> <li>– photoelectrically</li> <li>– piezoelectrically</li> <li>– electromagnetically</li> </ul> </li> <li>• explain the difference between AC and DC current.</li> <li>• identify and label the parts of a simple circuit</li> <li>• identify the physical form and circuit symbol of a:               <ul style="list-style-type: none"> <li>– light</li> <li>– motor</li> <li>– heating element</li> <li>– solenoid</li> <li>– fuse</li> <li>– other</li> </ul> </li> <li>• describe what conditions create:               <ul style="list-style-type: none"> <li>– an open circuit</li> <li>– a closed circuit</li> <li>– a short circuit</li> <li>– a grounded circuit</li> </ul> </li> </ul>	Explain how static charges are produced and their effects on a vehicle.

**MODULE MEC1090: ELECTRICAL FUNDAMENTALS (continued)**

Concept	Specific Learner Expectations	Notes
Identification/ Function (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe how a frame-ground circuit operates on a motor vehicle</li> <li>• define what is meant by:               <ul style="list-style-type: none"> <li>– amperage</li> <li>– voltage</li> <li>– resistance</li> </ul> </li> <li>• compare the similarity between electrical and fluid energy.</li> </ul>	
Inspect/Service	<ul style="list-style-type: none"> <li>• construct and compare a series and a parallel circuit</li> <li>• measure, with appropriate meters, the resistance, voltage and amperage in a given circuit</li> <li>• describe the relationship that exists among the amperage, voltage and resistance within a circuit</li> <li>• describe condition of a battery and service.</li> </ul>	<p>Develop a working model, block diagrams of lighting, starting charging system.</p> <p>Be aware of the hazards associated with testing and charging a battery</p>
Careers	<ul style="list-style-type: none"> <li>• identify further education and work opportunities related to servicing electrical circuits and components.</li> </ul>	



## MODULE MEC1110: PNEUMATICS & HYDRAULICS

**Level:** Introductory

**Theme:** Guidance and Control Systems

**Prerequisite:** None

**Module Description:** Students identify and describe the operating principles and applications of pneumatic and hydraulic systems.

**Module Parameters:** Access to related pneumatic/hydraulic units and resources.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate the safe use of pneumatic and hydraulic tools and equipment, and follow established lab procedures</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observed performance related to:               <ul style="list-style-type: none"> <li>recognition of dangers involved when working with pressurized pneumatic and hydraulic systems</li> <li>selection and safe use of tools</li> <li>clean-up of hydraulic fluids.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Pneumatic and Hydraulic Systems, Part 1, MEC1110-1</i></p> <p><i>Standard</i>  <i>Performance rating of 2 on each criteria</i></p>	10
<ul style="list-style-type: none"> <li>compare operating principles of pneumatic and hydraulic systems</li> </ul>	<ul style="list-style-type: none"> <li>comparing operating principles of pneumatic and hydraulic systems indicating:               <ul style="list-style-type: none"> <li>identification and description of components</li> <li>application of systems on vehicles.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Pneumatic and Hydraulic Systems, Part 2, MEC1110-1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p>	30
<ul style="list-style-type: none"> <li>apply principles and concepts of pneumatics and hydraulics to test and operate a pneumatic and/or hydraulic system</li> </ul>	<ul style="list-style-type: none"> <li>observed performance in operating and testing one pneumatic and one hydraulic system.</li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Pneumatic and Hydraulic Systems, Part 3, MEC1110-1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p>	60

**MODULE MEC1110: PNEUMATICS & HYDRAULICS (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal exploration during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Health/Safety Hazards</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>demonstrate knowledge of and follow laboratory safety procedures</li> <li>list hazards related to working with fluids and gases under pressure and related equipment.</li> </ul>	<p>Serious injury results from inappropriate handling of high pressures in both hydraulic and pneumatics.</p>
<p>Identification/Function</p>	<ul style="list-style-type: none"> <li>state why fluid systems are widely used in transportation and power application</li> <li>contrast hydraulic and pneumatic systems</li> <li>demonstrate how pressure affects a liquid and a gas in an enclosed space</li> <li>describe what units are used to measure pressure in a fluid</li> <li>describe what units are used to calculate the flow of fluid past a point</li> <li>demonstrate the relationship between flow rate and pressure in a fluid system</li> <li>describe how a small force can be multiplied in a fluid system</li> <li>contrast the action of common pumps and compressors such as: <ul style="list-style-type: none"> <li>– impeller</li> <li>– gear</li> <li>– piston</li> <li>– diaphragm</li> <li>– vane type</li> </ul> </li> <li>locate examples of these pumps and compressors in a motor vehicle or some other power system</li> </ul>	<p>Dismantle shop units to identify components and operating principles.</p>

**MODULE MEC1110: PNEUMATICS & HYDRAULICS (continued)**

Concept	Specific Learner Expectations	Notes
<p>Identification/ Function (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• observe and demonstrate the use of valves to control:               <ul style="list-style-type: none"> <li>– direction of flow</li> <li>– pressure of fluids</li> <li>– flow rate of fluids</li> </ul> </li> <li>• locate valves on a given vehicle</li> <li>• demonstrate how fluids under pressure can be used to move a:               <ul style="list-style-type: none"> <li>– motor</li> <li>– cylinder</li> <li>– diaphragm</li> </ul> </li> <li>• identify and operate pneumatic and hydraulic units on a given vehicle</li> <li>• describe the principles in a fluid system such as:               <ul style="list-style-type: none"> <li>– hydraulic hoist</li> <li>– hydraulic brakes.</li> </ul> </li> </ul>	<p>Create demonstration units.</p>
<p>Inspect/Repair</p>	<ul style="list-style-type: none"> <li>• demonstrate how to check and adjust fluid levels</li> <li>• demonstrate how to double and single flare a steel line and indicate when each flare type should be used.</li> </ul>	
<p>Careers</p>	<ul style="list-style-type: none"> <li>• identify further education and work opportunities related to the use and service of pneumatic and hydraulic systems.</li> </ul>	



**MODULE MEC1130: MECHANICAL SYSTEMS****Level:** Introductory**Theme:** Guidance and Control Systems**Prerequisite:** None**Module Description:** Students identify and describe the operating principles and applications of mechanisms used to transmit and control mechanical energy.**Module Parameters:** Access to examples of mechanical units and related resources.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate safe use of tools, and follow established lab procedures</li> <li>• describe principles and concepts related to the use of mechanisms to control and transmit force and motion in a mechanical system</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• observed performance related to: <ul style="list-style-type: none"> <li>– following established shop/lab routines</li> <li>– proper selection and safe use of tools</li> <li>– use of guards and shields.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Mechanical Systems, Part 1, MEC1130-1</i></p> <p><i>Standard</i> <i>Performance rating of 2 on each criteria</i></p> <ul style="list-style-type: none"> <li>• report listing/describing and providing examples of the following: <ul style="list-style-type: none"> <li>– simple machines</li> <li>– types of mechanical motion</li> <li>– direct and indirect power transmission units</li> <li>– conversion of mechanical energy.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Mechanical Systems, Part 2, MEC1130-1</i></p> <p><i>Standard</i> <i>Performance rating of 1 or more on each criteria</i></p>	<p>10</p> <p>30</p>



**MODULE MEC1130: MECHANICAL SYSTEMS (continued)**

Concept	Specific Learner Expectations	Notes
<p>Identification/ Function</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe the application of mechanical systems that are found in all aspects of human endeavour</li> <li>• demonstrate the use of simple machines to change the:               <ul style="list-style-type: none"> <li>– direction in which a force acts</li> <li>– size of the force</li> <li>– place where the force acts.</li> </ul> </li> <li>• identify and describe a mechanism that produces:               <ul style="list-style-type: none"> <li>– linear motion</li> <li>– reciprocating motion</li> <li>– oscillating motion</li> <li>– rotary motion</li> <li>– other</li> </ul> </li> <li>• use a graph to describe the action of a cam as it changes rotary motion to linear motion</li> <li>• explain the difference between direct and indirection transmission of power</li> <li>• describe the purpose and types of:               <ul style="list-style-type: none"> <li>– shafts</li> <li>– couplers</li> <li>– universal joints</li> <li>– pins</li> <li>– others</li> </ul> </li> <li>• demonstrate the use of simple machines to:               <ul style="list-style-type: none"> <li>– start and stop motion</li> <li>– change directions</li> <li>– increase or decrease speed</li> <li>– increase or decrease torque</li> </ul> </li> <li>• describe the relationship between torque, velocity and gear ratios</li> </ul>	<p>Group activity.</p> <p>Consider bicycle drive mechanism and model engines.</p> <p>Use of sample transmissions/rear axles; e.g.:</p> <ul style="list-style-type: none"> <li>• self-propelled lawn mowers</li> <li>• riding mowers</li> <li>• basic automobile, transmissions, drive shafts, differentials.</li> </ul>

**MODULE MEC1130: MECHANICAL SYSTEMS (continued)**

Concept	Specific Learner Expectations	Notes
<p>Identification/ Function (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• explain why friction has both positive and negative attributes</li> <li>• compare the coefficient of friction between two different materials</li> <li>• describe how friction can be increased or decreased in a mechanical system</li> <li>• calculate the mechanical advantage of one or more mechanisms to determine the efficiency of the system.</li> <li>• explain how mechanical energy can be changed to:               <ul style="list-style-type: none"> <li>– heat energy</li> <li>– electrical energy</li> <li>– fluid energy</li> <li>– other.</li> </ul> </li> </ul>	<p>Use/construct unit similar to oil additive demonstration unit.</p>
<p>Inspect/Service</p>	<ul style="list-style-type: none"> <li>• list, observe and service mechanical systems on a given vehicle.</li> </ul>	<p>Service and repair a bicycle, rototiller, garden tractor, etc.</p>

**MODULE MEC1150: RIDE & CONTROL SYSTEMS****Level:** Introductory**Theme:** Suspension and Structural Systems**Prerequisite:** None**Module Description:** Students develop a basic knowledge of ride and control systems associated with vehicles.**Module Parameters:** Access to floor jack, safety stands, suspension/steering system and related resources.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate safe use of tools, and follow established lab procedures</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observed performance related to:               <ul style="list-style-type: none"> <li>following established shop/lab routines</li> <li>use of floor jack and safety stands.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Ride and Control Systems, Part 1, MEC1150-1</i></p> <p><i>Standard</i> <i>Performance rating of 2 on each criteria</i></p>	10
<ul style="list-style-type: none"> <li>describe the purpose, operation and interdependent nature of ride and control systems</li> </ul>	<ul style="list-style-type: none"> <li>report showing purpose and operation of suspension, steering and braking system used on land vehicles</li> <li>report showing how hydraulics, pneumatics and electrical are applied to ride and control systems.</li> </ul> <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Ride and Control Systems, Part 2, MEC1150-1</i></p> <p><i>Standard</i> <i>Performance rating of 1 or more on each criteria</i></p>	30
<ul style="list-style-type: none"> <li>inspect and service ride and control systems</li> </ul>	<ul style="list-style-type: none"> <li>observed performance in inspecting/servicing suspension, steering and brake systems including the following:               <ul style="list-style-type: none"> <li>labelling and checking parts subject to wear</li> <li>inspecting and repacking a wheel bearing</li> <li>identifying tire wear problems.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Ride and Control Systems, Part 3, MEC1150-1</i></p> <p><i>Standard</i> <i>Performance rating of 1 or more on each criteria</i></p>	60

**MODULE MEC1150: RIDE & CONTROL SYSTEMS (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal exploration during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Health/Safety Hazards</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• demonstrate knowledge of and follow established safety procedures.</li> </ul>	
<p>Identification/Function</p>	<ul style="list-style-type: none"> <li>• locate and identify the components that are used to provide:               <ul style="list-style-type: none"> <li>– stopping action</li> <li>– directional control</li> <li>– rolling action</li> <li>– stabilization</li> <li>– cushioning</li> <li>– other</li> </ul> </li> <li>• describe methods of directional control on land, sea and air vehicles/crafts</li> <li>• describe the method of steering used by most wheeled vehicles</li> <li>• explain the purpose of the parts of a conventional steering system; e.g., steering gear, tie rod end, idler arm, pitman arm and steering knuckle</li> <li>• list the parts of a steering system that are subject to wearing or bending.</li> </ul>	

**MODULE MEC1150: RIDE & CONTROL SYSTEMS (continued)**

Concept	Specific Learner Expectations	Notes
<p>Identification/ Function (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify and describe the action of the following types of braking systems and possible application: <ul style="list-style-type: none"> <li>– mechanical</li> <li>– hydraulic</li> <li>– electric</li> <li>– air</li> <li>– other</li> </ul> </li> <li>• explain the difference between the braking action of a disc and drum brake</li> <li>• determine how tires and tracks vary according to: <ul style="list-style-type: none"> <li>– road or terrain use</li> <li>– seasonal use</li> <li>– methods of construction</li> </ul> </li> <li>• show how to examine the wear pattern on a tire to determine whether it has been: <ul style="list-style-type: none"> <li>– over or under inflated</li> <li>– improperly aligned</li> <li>– subject to suspension faults</li> <li>– balanced improperly.</li> </ul> </li> </ul>	<p>Examine the construction of highway and off-highway tires.</p>
<p>Identify/Service</p>	<ul style="list-style-type: none"> <li>• check and complete a tire repair</li> <li>• complete a tire balance</li> <li>• identify tire wear problems</li> <li>• inspect and repack wheel bearing</li> <li>• list and identify the parts of a braking system that are subject to wearing, seizing or leaking.</li> </ul>	



**MODULE MEC1160: STRUCTURES & MATERIALS****Level:** Introductory**Theme:** Suspension and Structural Systems**Prerequisite:** None**Module Description:** Students identify the types of materials and components used in vehicle construction.**Module Parameters:** Access to vehicle, hand tools, fasteners, materials and related resources.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate safe use of tools, and follow established lab procedures</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observed performance related to:               <ul style="list-style-type: none"> <li>following lab/shop established routines</li> <li>recognition of health hazards and safety procedures associated with coated surfaces</li> <li>safe handling and disposal of materials.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Vehicle Structures and Materials, Part 1, MEC1160-1</i></p> <p><i>Standard</i> <i>Performance rating of 2 on each criteria</i></p>	10
<ul style="list-style-type: none"> <li>explain the relationship between the function of a vehicle and the materials used in its construction</li> </ul>	<ul style="list-style-type: none"> <li>report indicating how the function of a vehicle dictates the type of structure and materials used in interior and exterior components.</li> </ul> <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Vehicle Structures and Materials, Part 2, MEC1160-1</i></p> <p><i>Standard</i> <i>Performance rating of 1 or more on each criteria</i></p>	30
<ul style="list-style-type: none"> <li>examine and identify the basic parts and materials used in vehicle construction</li> </ul>	<ul style="list-style-type: none"> <li>observed performance in identification of vehicle structures, parts and materials.</li> </ul> <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Vehicle Structures and Materials, Part 3, MEC1160-1</i></p> <p><i>Standard</i> <i>Performance rating of 1 on each criteria</i></p>	60

**MODULE MEC1160: STRUCTURES & MATERIALS (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal exploration during the instructional period.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
Health/Safety Hazards	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>state health and environmental issues related to the replacement and repair of coated surfaces</li> <li>state how hazardous materials are handled and disposed of.</li> </ul>	
Consumer Awareness	<ul style="list-style-type: none"> <li>outline the historical development of materials used in transportation vehicles</li> <li>identify what parts of a vehicle are recyclable</li> <li>cite examples of initiatives that will increase the percentage of parts that can be recycled</li> <li>list ways government regulations have altered the design and construction of vehicles.</li> </ul>	<i>Highway Traffic Act.</i>
Identification/Function	<ul style="list-style-type: none"> <li>identify and discuss the factors that have contributed to the use and development of new structural materials</li> <li>identify the factors used to select a material for a given function</li> <li>indicate how design and construction of a vehicle is affected by the medium (land, sea, air, space) that it operates in</li> <li>identify the monoliths and composite materials used in a modern vehicle</li> </ul>	This module could be a vehicle-dismantling project—group work possibilities.

**MODULE MEC1160: STRUCTURES & MATERIALS (continued)**

Concept	Specific Learner Expectations	Notes
<p>Identification/ Function (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe the most appropriate methods of identifying the type of materials used in a part or structure</li> <li>• describe the action of a coil spring when subject to rapid loading</li> <li>• identify design features that are tied more closely to consumer taste than function</li> <li>• describe how to:               <ul style="list-style-type: none"> <li>– reduce the weight of a vehicle</li> <li>– reduce drag</li> <li>– increase passenger safety</li> <li>– increase longevity of structural parts</li> <li>– improve passenger comfort and space</li> </ul> </li> <li>• demonstrate knowledge of common types of fasteners used, such as:               <ul style="list-style-type: none"> <li>– studs, bolts, screws</li> <li>– nuts</li> <li>– rivets</li> <li>– clips</li> <li>– clamps</li> </ul> </li> <li>• identify what structural coatings are used to:               <ul style="list-style-type: none"> <li>– protect against corrosion</li> <li>– add to the appearance</li> <li>– reduce effects of the sun’s radiation</li> <li>– reduce noise.</li> </ul> </li> </ul>	
<p>Careers</p>	<ul style="list-style-type: none"> <li>• describe growth occupations that are associated with transportation vehicles</li> <li>• research further education and career opportunities.</li> </ul>	<p>Designing, building, recycling.</p>



**MODULE MEC1170: METAL FORMING & FINISHING****Level:** Introductory**Theme:** Suspension and Structural System**Prerequisite:** MEC1160 Structures & Materials**Module Description:** Students repair and re-form damaged metal panels.**Module Parameters:** Access to oxy-fuel welding equipment, basic autobody hand/power tools, basic metal refinishing material and resources.**Supporting Module:** FAB1040 Oxyacetylene Welding**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate safe work practices when metal forming and finishing, and follow established lab procedures</li> <li>describe effects of physical damage caused by distortion and corrosion on sheet metal components</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observed performance related to:               <ul style="list-style-type: none"> <li>following established lab/shop procedures</li> <li>safe use of tools/equipment related to metal forming and finishing</li> <li>recognizing and following personal protective procedures.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Metal Forming &amp; Finishing, Part 1, MEC1170-1</i></p> <p><i>Standard</i>  <i>Performance rating of 2 on each criteria</i></p>	10
	<ul style="list-style-type: none"> <li>report indicating effects of physical damage and corrosion on ferrous sheet metal including:               <ul style="list-style-type: none"> <li>stretching</li> <li>work hardening of sheet metal</li> <li>weakening of components through corrosion.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Metal Forming &amp; Finishing, Part 2, MEC1170-1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p>	20



**MODULE MEC1170: METAL FORMING & FINISHING (continued)**

Concept	Specific Learner Expectations	Notes
Identify/Analyze (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify processes for metal working and repairing small dents using:               <ul style="list-style-type: none"> <li>– pry bar</li> <li>– pulling tools</li> <li>– hammering techniques</li> </ul> </li> <li>• describe possible methods of small rust out repair</li> <li>• describe the best method of small rust out repair</li> <li>• identify various plastic filler materials available</li> <li>• describe the suitable type of plastic fillers to be used</li> <li>• complete a small rust out repair.</li> </ul>	<p>Have student distort and reshape a mild steel panel.</p> <p>Demonstrate paintless dent-repair procedures.</p> <p>Use fibreglass, welded patches.</p>
Inspect/Repair	<ul style="list-style-type: none"> <li>• demonstrate how to:               <ul style="list-style-type: none"> <li>– hammer and dolly metal panel to smooth contour</li> <li>– pick, file and grind panel to desired finish</li> <li>– prepare the surface for filler application</li> <li>– apply plastic fillers and refinish.</li> </ul> </li> </ul>	<p>Demonstrate use of fibreglass, aluminum, light/premium, polyester fillers.</p>
Careers	<ul style="list-style-type: none"> <li>• research further education, working conditions and career opportunities.</li> </ul>	



**MODULE MEC1190: SURFACE PREPARATION 1****Level:** Introductory**Theme:** Suspension and Structural Systems**Prerequisite:** None**Module Description:** Students assess the state of a painted surface, and use appropriate restoration procedures.**Module Parameters:** Access to painting facilities, surface preparation tools/materials and related resources.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate safe work practices for surface preparation, and follow established lab procedures</li> <li>• identify products, equipment and procedures associated with surface preparation</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• observed performance related to:               <ul style="list-style-type: none"> <li>– following established lab/shop routines with respect to abrasive dust and chemical fumes</li> <li>– safe use of tools/equipment and use of hazardous materials</li> <li>– identification and use of WHMIS bulletins.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Surface Preparation, Part 1, MEC1190-1</i></p> <p><i>Standard</i>  <i>Performance rating of 2 on each criteria</i></p> <ul style="list-style-type: none"> <li>• a report that includes the following:               <ul style="list-style-type: none"> <li>– list of damage and appropriate repair procedures</li> <li>– list of tools/equipment required</li> <li>– list of appropriate abrasive and other surface preparation materials.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Assessment Checklist: Surface Preparation, Part 2, MEC1190-1</i></p> <p><i>Standard</i>  <i>Performance rating of 1 or more on each criteria</i></p>	<p>10</p> <p>30</p>

**MODULE MEC1190: SURFACE PREPARATION 1** (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>prepare and perform a surface preparation</li> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>proper analysis and preparation of a surface.</li> </ul> <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Surface Preparation, Part 3, MEC1190-1</i></p> <p><i>Standard</i> <i>Performance rating of 1 or more on each criteria</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal exploration during the learning process.</li> </ul> <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>60</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
Health/Safety Hazards	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>demonstrate safe practices in relation to: <ul style="list-style-type: none"> <li>abrasive dust</li> <li>chemicals/fumes.</li> </ul> </li> </ul>	<p>Demonstrate grinding, sandblasting and paint-stripping procedures.</p> <p>Be aware of potential health hazards.</p>
Identify/Analyze	<ul style="list-style-type: none"> <li>identify and describe problem conditions in painted surfaces</li> <li>list types of equipment/tools used in surface preparation processes</li> <li>list types of abrasives used in surface preparation</li> <li>identify alternative method of surface preparation; e.g., chemical stripping, blasting</li> <li>demonstrate knowledge of types, purpose and methods of applying undercoats</li> <li>identify types and uses of putties</li> <li>identify methods of masking</li> <li>list equipment used in masking.</li> </ul>	<p>Paint oxidized, peeled, chips, rust, cracking.</p> <p>Masking tape, foam tape, liquid masking and paper types.</p>

**MODULE MEC1190: SURFACE PREPARATION 1** (continued)

Concept	Specific Learner Expectations	Notes
Identify/Repair	<i>The student should:</i> <ul style="list-style-type: none"><li>• explain and demonstrate methods of sanding</li><li>• use appropriate methods of surface preparation</li><li>• identify and apply appropriate metal conditioner</li><li>• demonstrate how to mask a surface prior to painting.</li></ul>	
Careers	<ul style="list-style-type: none"><li>• research further education, working conditions and career opportunities.</li></ul>	

