

**Agricultural Equipment Technician/Heavy Duty Equipment
Technician/Truck and Transport Mechanic/Transport Trailer Technician:
Common Core - Level 1**

Agricultural Equipment Technician/Heavy Duty Equipment Technician/ Truck and Transport Mechanic/Transport Trailer Technician

Unit: A1 Learning About Work

Level: One

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

One sign that an apprentice has become competent in a task or technique is to be asked to share this knowledge. Jobsite skills-exchange has long been fundamental to trade-learning. Even trade veterans rely on peers to refine their knowledge and skill. The opportunity to benefit from this process, however, is shaped by complex factors that include jobsite “politics” and industrial/construction deadlines. As adult trade-learners, apprentices at all levels of training must use their observational, listening and interpersonal skills to benefit from the JP’s knowledge and experience. This requires understanding the trade’s dynamics, as well as the roles and responsibilities which order workplace/jobsite work-life.

This unit profiles the trade’s structure and scope as determined by the Apprenticeship and Certification Act, regulations, Provincial Advisory Committees and the National/Provincial Occupational Analysis from which the training standards are derived (core tasks and skill requirements), as well as its job-ladders and long-term career options and social competencies. This includes information about major areas of working knowledge, activities and interactions at work, and expansive and restrictive workplaces, stressing their application to apprenticeship on-the-job training.

A sound grasp of the roles, workplace relationships, and possibilities introduced in this unit are part of ‘learning to learn’ in Manitoba’s apprenticeship system. Senior apprentices are later offered information about learning to *teach* in this system – a central and time-honored foundation of Trades journeywork.

Note: No percentage-weightings for test purposes are prescribed for this unit’s objectives. Instead, a ‘Pass/Fail’ grade will be recorded for the unit in its entirety.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
<p>1. Describe structure and scope of the Agricultural Equipment Technician/Heavy Duty Equipment Technician/Truck and Transport Mechanic/Transport Trailer Technician trades.</p> <p>a. The Apprenticeship and Certification Act</p> <ul style="list-style-type: none"> • Apprenticeship and Certification Board and Provincial Advisory Committees • General and specific trade regulation • Policies regarding attendance, evaluation procedures, conduct and progression requirements (Apprenticeship Manitoba, Training provider) <p>b. Uses of the National Occupational Analysis (NOA)</p> <ul style="list-style-type: none"> • Technical training in-school curriculum • On-the-job record book of hours (Manitoba blue book) • Examinations (level placement tests, final certification examinations) 	n/a

- c. Opportunities and future career options
 - Generalists and specialists. The move toward specialization is well known to modern tradespeople. Some prefer to specialize and others want to do it all. Supervisory positions require a broad scope
 - Lead hands and other immediate supervisors. Apprentices need to know how to become a lead-hand as much as they need to know the benefits and pit-falls of leadership between management and shop floor workers
 - Geographic mobility. What does it mean to a construction/industrial worker to have to travel to find work? Are there more opportunities if they do? What are they? What are the drawbacks to being away from home for several weeks at a time?
 - Job hierarchies and innovations. What trade specific special training opportunities are available in your trade? Is there travel involved? Is there an opportunity to move up the ladder on a work crew as opposed to staying in the shop?

2. Describe two levels of workplace competency. n/a

- a. Job competencies related to workplace culture
 - Knowledge of workplace equipment and materials
 - Skills and techniques
- b. Social competencies related to workplace culture
 - Frame of reference for evaluation workplace events
 - Language of work
 - Workplace belief systems
 - Rules and meanings
 - Multiculturalism and equity in the workplace

3. Describe accommodation for apprentices with disabilities. n/a

- a. Technical training
 - Requirements
 - Roles and responsibilities
 - Services and information required by persons with disabilities
- b. On-the-job
 - Requirements
 - Roles and responsibilities
 - Services and information required by persons with disabilities

Agricultural Equipment Technician/Heavy Duty Equipment Technician/ Truck and Transport Mechanic/Transport Trailer Technician

Unit: A2 Trade Safety Awareness

Level: One

Duration: 7 hours

Theory: 7 Hours

Practical: 0 Hours

Overview:

Safe working conditions, injury prevention, and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers, supervisors, and workers. It is imperative to be familiar and apply the Manitoba Workplace Safety and Health Act and Regulations. Safety education is an integral part of apprenticeship training both in school and on-the-job. This unit is an overview of occupational safety and health best practices in Manitoba and covers Personal Protective Equipment, the Workplace Hazardous Materials Information System, and Safe Work Procedures. The unit also describes injury prevention and response. Finally, the unit reinforces these best practices by navigating the SAFE Work Manitoba website through each objective to apply Manitoba's most current safety and health standards. Additionally, trade safety awareness related resources are located on the Apprenticeship Manitoba website link below. Trade specific hazards and safe work practices are supplemented and delivered in-context within technical training units.

- **SAFE Work Manitoba website:** <https://www.safemanitoba.com/>
- **Safety resources:** <http://www.gov.mb.ca/aesi/apprenticeship/generalinfo/instructoreducators.html>

Note: No percentage-weightings for test purposes are prescribed for this unit's objectives. Instead, a 'Pass/Fail' grade will be recorded for the unit in its entirety.

Objectives and Content:	Percent of Unit Mark (%)
1. Define and describe Manitoba safety and health requirements.	n/a
a. Overview of the <i>Workplace Safety and Health Act and Regulations</i>	
• Rights and responsibilities of workers under the <i>Act</i>	
• Rights and responsibilities of supervisors under the <i>Act</i>	
• Rights and responsibilities of employers under the <i>Act</i>	
b. Public agencies	
• Workplace Safety and Health (Enforcement)	
• SAFE Work Manitoba (Prevention)	
• Other	
c. Codes of practice, guidelines, policies and standards (differences)	
d. Worker rights	
• Right to know, participate, refuse	
• Protection from reprisal	
e. Workplace safety and health program (worker's involvement)	
• Workplace safety and health committee	
• Participation in investigation and inspection process	

- 2. Identify and describe personal protective equipment (PPE) requirements and standards in the workplace.** n/a
- a. Employer, supervisor and worker responsibilities
 - b. Hierarchy of control measures
 - c. Personal protective equipment (PPE)
 - Eye and face protection
 - Hearing protection
 - Foot, head, hand and skin protection
 - Respiratory protection
 - Protective clothing (including Hi-Visibility/Hi-Vis)
 - Fall protection (trade specific)
- 3. Identify and describe the Workplace Hazardous Material Information System (WHMIS) and procedures.** n/a
- a. Hazard identification
 - b. Product labels, symbols and classification
 - Supplier
 - Workplace
 - c. Safety Data Sheets (SDS)
 - d. Chemical and biological hazards
 - Emergency washing
 - Transportation of dangerous goods
 - Storage and handling
- 4. Identify and describe Safe Work Procedures (SWP).** n/a
- a. Hazard identification
 - b. Uncontrolled risk
 - c. SWP development
- 5. Identify and describe injury prevention.**
- a. Hazard recognition, evaluation, and control (SAFE acronym)
 - b. Occupational disease and illness
 - c. Musculoskeletal
 - Ergonomics
 - d. Psychological health and safety
 - Harassment and violence
 - Working alone
 - e. Young workers
 - f. Physical hazards
 - g. Chemical and biological hazards, and exposures
 - Dust and fibres
 - Fumes, aerosols, gases and vapours
 - h. Confined space entry
 - i. Electrical safety
 - Lockout/tagout procedures
 - j. Fire types, fire extinguisher classifications and applications
- 6. Identify and describe injury response.** n/a
- a. Control the scene
 - b. Incident investigation
 - Near miss
 - Incident
 - Serious incident

- c. Corrective actions
- d. Follow-up
- e. Reporting an injury (Workers Compensation Board of Manitoba (WCB))

7. Demonstrate navigation and retrieval of key content areas from SAFE Work Manitoba's website and apply resources directly to unit objectives. n/a

- a. Legislation
- b. Bulletins
- c. Templates
- d. Shop Talk
- e. Other resources

Agricultural Equipment Technician/Heavy Duty Equipment Technician/ Truck and Transport Mechanic/Transport Trailer Technician

Unit: A3 Tools and Equipment

Level: One

Duration: 28 hours

Theory: 7 hours

Practical: 21 hours

Overview:

This unit is designed to provide the apprentice with knowledge about workshop practices and materials when working with today's agricultural, heavy duty and truck and transport, and trailer equipment. Beginning with the terminology associated with workshop practices and materials, the unit covers major types of tools and equipment that are used and principles of their use. Finally, the unit covers procedures related to starting, moving, and shutting down machinery.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with workshop practices and materials.	35%
a. Tools and equipment	
b. Hoisting and lifting	
c. Moving machinery	
d. Materials	
• Aluminum	
• Steel	
• Cast iron	
• Brass	
• Copper	
• Plastics/composites	
e. Fasteners and sealants	
• Gaskets	
• Seals	
• Sealing compounds	
• Nuts/bolts/screws	
• Tubes/hoses/fittings/clamps	
f. Bearings	
• Friction-type	
• Non friction-type	
2. Describe and identify tools and equipment.	25%
a. Hand tools	
b. Measuring tools	
c. Power tools	

d. Shop equipment

3. Explain and demonstrate the principles of use of workshop tools and equipment. 25%

- a. Tools and equipment
 - Hand tools
 - Measuring tools
 - Cleaning tools
- b. Materials
 - Aluminum
 - Steel
 - Cast iron
 - Brass
 - Copper
 - Plastics/composites
- c. Fasteners and sealants
 - Gaskets
 - Seals
 - Sealing compounds
 - Nuts/bolts/screws
 - Tubes/hoses/fittings/clamps

4. Describe the procedures used to start, move, and shutdown machinery. 15%

- a. Lock out/tag out
- b. Situational awareness

Agricultural Equipment Technician/Heavy Duty Equipment Technician/ Truck and Transport Mechanic/Transport Trailer Technician

Unit: A4 Trade Communications, Documents and Computer Skills

Level: One

Duration: 21 hours

Theory: 21 hours

Practical: 0 hours

Overview:

This unit is designed to provide the apprentice with knowledge about trade related communications, documents, and computer skills when working with today's agricultural, heavy duty, truck and transport, and trailer trailers. The unit covers the role of effective communication and methods of professional communication. It also covers the identification codes found on vehicles and vehicle components. Finally, the unit provides knowledge on both general organization and basic retrieval strategies for trade-related documents and trade-related computer skills.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
<p>1. Describe the importance of effective communication.</p> <ul style="list-style-type: none"> a. Customers b. Co-workers c. Related professionals d. Journeyperson/apprentice 	10%
<p>2. Describe and demonstrate the methods of professional communication.</p> <ul style="list-style-type: none"> a. Phone b. Email c. Instant messaging/texting d. Fax e. Other methods of communication 	10%
<p>3. Locate and interpret identification codes found on the vehicle and vehicle components.</p> <ul style="list-style-type: none"> a. Vehicle Identification Numbers (VINs) b. Serial numbers <ul style="list-style-type: none"> • Vehicle ID • Part ID • Model ID 	5%
<p>4. Identify and interpret types of service related documents.</p> <ul style="list-style-type: none"> a. Work orders b. Schematics and service information c. Technical service bulletins (TSB) 	25%

- d. Preventive maintenance schedules
- e. Parts lists
- f. Time estimates
- g. Component specifications, OEM vs. provincial (safety inspections)

5. Describe general organization and basic retrieval strategies for trade-related documents. 25%

- a. Service bulletins
- b. Tech bulletins
- c. Service manuals
- d. Other publications
- e. Online resources, including Learning Management Systems (LMSs)

6. Demonstrate trade-related computer skills. 25%

- a. Basic computer skills
 - Application programs
 - Common computer commands
 - File management tasks (create and organize)
- b. Internet searching skills for trade-related research
 - Search engines via Universal Resource Locator (URL) addresses
 - Key word search
 - Filtering results

Apprenticeship Manitoba

Agricultural Equipment Technician/Heavy Duty Equipment Technician/ Truck and Transport Mechanic/Transport Trailer Technician

Unit: A5 Engine Principles

Level: One

Duration: 35 hours

Theory: 7 hours

Practical: 28 hours

Overview:

This unit is designed to provide the apprentice with knowledge about engine principles when working with today's agricultural, heavy duty, truck and transport, and trailer equipment, including principles and theories of engine operation and major engine components.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with engine principles.	30%
2. Explain the principles and theories of engine operation.	30%
a. Basic combustion principles	
b. Two-stroke cycle	
c. Four-stroke cycle	
d. Compression ignition	
e. Spark ignition	
3. Identify types and classifications of engines and describe their applications.	10%
a. Diesel	
b. Gasoline	
c. Liquid-cooled	
d. Air-cooled	
4. Identify major engine components and describe their purpose and operation.	30%
a. Cooling	
b. Lubrication	
c. Diesel fuel supply systems	
d. Intake and exhaust	
e. Starting aids	
f. Base engine components	
• Cylinder block and head	
• Valve train	
• Pistons and connecting rods	
• Crankshaft	
g. Emission components	

Apprenticeship Manitoba

Agricultural Equipment Technician/Heavy Duty Equipment Technician/ Truck and Transport Mechanic/Transport Trailer Technician

Unit: A6 Electrical Fundamentals

Level: One

Duration: 70 hours

Theory: 14 hours

Practical: 56 hours

Overview:

This unit is designed to provide the apprentice with knowledge about electrical systems when working with today's agricultural, heavy duty, truck and transport, and trailer equipment. The unit covers the principles of electrical systems, electricity and electronics. The unit also covers schematics and symbols, and the maintenance and testing of batteries.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with electrical systems.	15%
a. Electricity, electronics, and magnetism	
b. Batteries	
c. Lighting circuits, wiring harnesses, gauges, and accessories	
2. Identify hazards and describe safe work practices pertaining to electrical systems.	10%
a. Electricity, electronics, and magnetism	
b. Batteries	
c. Lighting circuits, wiring harnesses, gauges, and accessories	
3. Identify and describe tools and equipment used to service and repair electrical systems.	10%
a. Laptop	
b. Scanners	
c. Multimeters/amp clamps	
d. Battery load testers	
4. Explain and apply the principles of electrical systems and electricity.	10%
a. Magnetism	
b. Ohm's Law	
c. Voltage potential	
d. Current flow	
e. Resistance	
f. Conductors	
g. Insulators	

- 5. Identify conventional electrical system components. 10%**
- a. Batteries
 - b. Lighting
 - c. Circuit protection
 - d. Relays, switches, and solenoids
 - e. Motors and actuators
 - f. Gauges
- 6. Identify electronic system components. 5%**
- a. Semi-conductors
 - b. Capacitors
 - c. Resistors
- 7. Interpret schematics and symbols. 15%**
- a. Conventional electrical systems
 - b. Electronic components
- 8. Describe and maintain batteries. 15%**
- a. Types of batteries
 - b. Testing and evaluating battery condition
 - Specific gravity
 - Load testing
 - Capacitance
 - c. Charging and boosting procedures
 - d. Hook up procedures for 12V/24V
- 9. Perform basic tests to service and repair electrical systems. 10%**
- a. Charging and starting systems
 - b. Lighting circuits, wiring harnesses, gauges and accessories

Agricultural Equipment Technician/Heavy Duty Equipment Technician/ Truck and Transport Mechanic/Transport Trailer Technician

Unit: A7 Braking Systems and Wheel-End Safety

Level: One

Duration: 35 hours

Theory: 12 hours

Practical: 23 hours

Overview:

This unit is designed to provide the apprentice with knowledge about brake systems and wheel-end safety when working with today's agricultural, heavy duty, truck and transport, and trailer equipment. The unit begins by covering terminology and safe work practices for brake systems and wheels. The unit then covers the tools and equipment used when servicing and repairing vehicle brake systems and wheels. Finally, the unit covers the brake system components, tires, rims and wheels, and servicing procedures for hydraulic and electric braking systems.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with the braking system and wheel-end.	5%
a. Hydraulic	
b. Electric	
c. Air	
d. Tires	
e. Rims	
f. Wheels	
2. Identify hazards and describe safe work practices pertaining to the brake system and wheel-end.	5%
a. Hydraulic	
b. Electric	
c. Air	
d. Tires	
e. Rims	
f. Wheels	
3. Identify and describe tools and equipment used to service and repair vehicle brake systems, tires, rims, and wheels.	5%
a. Hydraulic	
b. Electric	
c. Air	

4. **Identify types of tires, rims, and wheels, and describe their characteristics and applications.** **10%**
- a. On-road
 - Radial
 - Bias-ply
 - Tube
 - Tubeless
 - b. Off-road
 - Loaded
 - Non-loaded
 - c. Codes and regulations
 - Jurisdictional requirements
 - d. Rims and wheels
 - Hub pilot
 - Stud pilot
 - Spoke wheel
 - Multi-piece
5. **Explain the types and principles of vehicle brake systems.** **15%**
- a. Hydraulic/pneumatic-related formula
 - b. Coefficient of friction
 - c. Stopping distance calculations
 - d. Drum
 - e. Disc
 - f. Wedge
6. **Identify the following hydraulic brake system components and describe their purpose and operation.** **15%**
- a. Master cylinder
 - b. Brake booster
 - c. Foundation brake (disc and drum)
 - d. Hydraulic brake valves, cylinders, and switches
 - e. Hydraulic ABS system components
7. **Describe vehicle hydraulic brake system components and demonstrate service procedures.** **15%**
- a. System components
 - b. Service procedures
 - Bleeding
 - Inspection
 - Adjustment
8. **Describe vehicle electric brake system components and demonstrate service procedures.** **10%**
- a. System components
 - b. Service procedures
 - Inspection
 - Adjustment
9. **Describe vehicle basic air brake system components and demonstrate service procedures.** **10%**
- a. System components
 - b. Service procedures

- Inspection
- Adjustment

10. Describe the procedures used to service, inspect, and maintain tires, rims, and wheels. 10%

- a. System components
 - Remove and install
 - Repair tires
 - Balance
 - Torque and re-torque
- b. Hub inspection
 - Wheel bearings
 - Wheel hub seals

Agricultural Equipment Technician/Heavy Duty Equipment Technician/ Truck and Transport Mechanic/Transport Trailer Technician

Unit: A8 Hoisting and Lifting

Level: One

Duration: 7 hours

Theory: 2 hours

Practical: 5 hours

Overview:

This unit of instruction is designed to provide the agricultural equipment technician, heavy duty equipment technician, truck and transport mechanic, and transport trailer technician apprentice with the working knowledge required to effectively and safely use proper lifting techniques and equipment as defined by broad occupational health and safety standards.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with hoisting and lifting.	45%
2. Describe towing, lifting, and hoisting equipment and their procedures.	55%
a. Hoisting and lifting equipment, including their limitations	
b. Safety practices, hand signals communications, and maintenance of hoisting and lifting equipment	
c. Towing, transporting, and coasting precautions	
d. Hoisting and lifting equipment construction, grading, sizing, and limits	
e. Selection and inspection of correct equipment for rigging typical loads	
f. Hoisting and lifting equipment including slings, ropes, and chains	

Agricultural Equipment Technician/Heavy Duty Equipment Technician/ Truck and Transport Mechanic/Transport Trailer Technician

Unit: A9 Basic Hydraulic Systems

Level: One

Duration: 21 hours

Theory: 7 hours

Practical: 14 hours

Overview:

This unit is designed to provide the apprentice with knowledge about hydraulic systems when working with today's agricultural, heavy duty, truck and transport, and trailer technician equipment. The unit begins by covering terminology and safe work practices for hydraulic systems. The unit then covers tools and equipment used when servicing and repairing hydraulic systems. Finally, the unit covers the hydraulic systems and components, and their inspection, diagnosis and servicing procedures.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with hydraulic/hydrostatic systems and system components.	10%
2. Identify hazards and describe safe work practices pertaining to hydraulic/hydrostatic systems.	10%
a. Hydraulic system and hydraulic system components	
b. Hydraulic fittings, piping, tubing, hoses	
c. Reservoirs, coolers, and filters	
3. Identify and describe tools and equipment used to service and repair hydraulic/hydrostatic systems.	10%
a. Hydraulic system and hydraulic system components	
b. Hydraulic fittings, piping, tubing, hoses	
c. Reservoirs, coolers, and filters	
4. Explain the principles and theories of hydraulics/hydrostatics.	10%
a. Pascal's law	
b. Bernoulli's principle	
c. Units of measure	
d. Formulae and their applications	
5. Identify hydraulic/hydrostatic system components and interpret hydraulic/hydrostatic-related symbols.	20%
a. Schematics	
b. Pumps	
• Positive displacement	

- Non-positive displacement
 - Fixed displacement
 - Variable displacement
 - Charge pump
- c. Actuators
- Linear
 - Rotary
- d. Valves
- Pressure
 - Directional
 - Flow control
- e. Reservoirs, coolers, and accumulators
- f. Fluids and filters
- g. Fittings, piping, tubing, and hoses
- h. Motors

6. Describe and demonstrate procedures used to inspect, diagnose, and maintain hydraulic/hydrostatic systems. 20%

- a. Hydraulic system and hydraulic system components
- b. Hydraulic fittings, piping, tubing, hoses
- c. Reservoirs, coolers, and filters

7. Describe and demonstrate servicing procedures for hydraulic/hydrostatic systems. 20%

- a. Hydraulic system and hydraulic system components
- b. Hydraulic fittings, piping, tubing, hoses

Agricultural Equipment Technician/Heavy Duty Equipment Technician/ Truck and Transport Mechanic/Transport Trailer Technician

Unit: A10 Frames, Suspensions, and Structural Components

Level: One

Duration: 14 hours

Theory: 14 hours

Practical: 0 hours

Overview:

This unit is designed to provide the apprentice with knowledge about frames, suspension systems, as well as structural (cab) components when working with today's agricultural, heavy duty, truck and transport, and transport trailer technician equipment. The unit begins by covering terminology and safe work practices for frames, suspension systems, and cab components. The unit then covers the tools and equipment used when servicing and repairing frames, suspension systems, and cab components. Finally, the unit covers the procedures used to inspect, diagnose and maintain, and service frames, suspension systems, cab components, and their related components.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with frames, front and rear axles, suspension systems, and cab components.	10%
2. Identify hazards and describe safe work practices pertaining to frames, front and rear axles, suspension systems, and cab components.	5%
3. Identify and describe tools and equipment used to service and repair frames, front and rear axles, and suspension systems.	5%
4. Describe the operation of frames, front and rear axles, and suspension systems.	15%
5. Identify the following frame, suspension system, and cab components, and describe their purpose and operation.	15%
a. Frames	
• Cross members	
b. Front and rear axles	
• Single	
• Multi	
• Solid ("I" beam)	
c. Suspension systems	
• Spring (steel and composite)	
• Air	
• Rubber block	
d. Interior cab	

- Pedals
 - Seats
 - Restraints
 - Windows and windshields
- e. Exterior cab
- Wipers
 - Mirrors
 - Door handles
 - Steps
 - Latches and cables
 - Proximity/backup alarms
 - Roll-over protective structure (ROPS)

6. Describe and demonstrate procedures used to inspect, diagnose and maintain: 25%

- a. Frames
- Cross members
 - Alignment
- b. Front and rear axles
- Single
 - Multi
 - Solid ("I" beam)
- c. Suspension systems
- Spring (steel and composite)
 - Air
 - Rubber block
- d. Tracks and track frames
- e. Hitches and couplers

7. Describe and demonstrate servicing procedures for systems: 15%

- a. Frames
- Cross members
 - Welding and reinforcement
- b. Front and rear axles
- Single
 - Multi
 - Solid ("I" beam)
- c. Suspension systems
- Spring (steel and composite)
 - Air
 - Rubber block
- d. Tracks and track frames
- e. Hitches and couplers

8. Describe and demonstrate servicing procedures for cab components. 10%

- a. Interior
- Pedals
 - Seats
 - Restraints
 - Windows and windshields
- b. Exterior
- Wipers

- Mirrors
- Door handles
- Steps
- Latches and cables
- Proximity/backup alarms
- Roll-over protective structure (ROPS)

Agricultural Equipment Technician/Heavy Duty Equipment Technician/ Truck and Transport Mechanic/Transport Trailer Technician

Unit: A11 HVAC and Environmental Controls I

Level: One

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

This unit is designed to provide the apprentice with knowledge about heating, ventilation, and air conditioning (HVAC) systems when working with today's agricultural, heavy duty, truck and transport, and transport trailer technician equipment. The unit covers terminology and safe work practices for HVAC systems.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with heating, ventilation, and air conditioning (HVAC) systems and system components.	50%
2. Identify hazards and describe safe work practices pertaining to HVAC systems.	50%
a. Air conditioning, including: <ul style="list-style-type: none">• Refrigerants• High pressure gas safety (nitrogen testing)	
b. Heating systems	

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Unit: A12 Welding I

Level: One

Duration: 28 hours

Theory: 7 hours

Practical: 21 hours

Overview:

This unit is designed to provide the apprentice with knowledge about welding (heating and cutting) when working with today's agricultural, heavy duty, truck and transport, and transport trailer technician equipment. The unit begins with terminology, hazards and safe work practices related to heating, cutting, and welding. The unit covers oxy-fuel types of welding and cutting equipment and their principles of operation.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
<p>1. Define terminology associated with cutting, heating, and welding.</p> <ul style="list-style-type: none"> a. Oxyacetylene b. Metallurgy 	10%
<p>2. Identify hazards and describe safe work practices pertaining to cutting, heating, and welding.</p> <ul style="list-style-type: none"> a. Personal b. Shop/facility <ul style="list-style-type: none"> • Awareness of surroundings c. Equipment/vehicle d. Ventilation e. Oxyacetylene equipment 	10%
<p>3. Identify and describe the types of oxyacetylene cutting, heating, and welding equipment</p>	10%
<p>4. Explain and demonstrate the principles of operation of oxyacetylene cutting, heating, and welding equipment.</p>	10%
<p>5. Demonstrate and perform the following processes using oxyacetylene equipment.</p> <ul style="list-style-type: none"> a. Cutting b. Heating c. Welding and/or brazing 	60%
