



Ontario
College of
Teachers

Ordre des
enseignantes et
des enseignants
de l'Ontario

Additional Qualification Course Guideline Teaching Transportation Technology - Heavy Duty and Agricultural Equipment

Schedule F Teachers' Qualifications Regulation

February 2015

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Additional Qualification Course Guideline

1. Introduction

The guideline for Teaching Transportation Technology - Heavy Duty and Agricultural Equipment is organized using the following framework.



Diagram 1: Guideline Organization

Teachers are able to take the Additional Qualification course: Teaching Transportation Technology - Heavy Duty and Agricultural Equipment if they hold a technological education qualification at Grades 9 and 10 or Grades 11 and 12 in the broad-based area of Teaching Transportation Technology.

The Additional Qualification Course: Teaching Transportation Technology - Heavy Duty and Agricultural Equipment employs a critical, pedagogical lens to explore in holistic and integrated manner theoretical foundations, development of learners, program planning and implementation, instructional practices, assessment and evaluation, the learning environment and ethical considerations related to teaching and learning.

The Ontario College of Teachers recognizes that candidates working in the publicly funded school system, independent/private institutions or First Nations schools will have a need to explore topics and issues of particular relevance to the context in which they work or may work.

Critical to the implementation of this course is the creation of positive learning experiences that reflect care, diversity and equity. This course supports the enhancement of professional knowledge, ethical practice, leadership and ongoing learning.

The French language and the English language communities will also need to implement these guidelines to reflect the unique contextual dimensions and needs of each community. Each of these language communities will explore the guideline content from distinct perspectives and emphasis. This flexibility will enable both language communities to implement Teaching Transportation Technology - Heavy Duty and Agricultural Equipment as understood from a variety of contexts.

The Teaching Transportation Technology - Heavy Duty and Agricultural Equipment additional qualification course guideline provides a conceptual framework for providers and instructors to develop and facilitate the Teaching Transportation Technology - Heavy Duty and Agricultural Equipment course. The guideline framework is intended to be a fluid, holistic and integrated representation of key concepts associated with Teaching Transportation Technology - Heavy Duty and Agricultural Equipment.

2. Regulatory Context

The College is the self-regulating body for the teaching profession in Ontario. The College's responsibility related to courses leading to additional qualifications includes the following:

- to establish and enforce professional standards and ethical standards applicable to members of the College
- to provide for the ongoing education of members of the College
- to accredit additional qualification courses or programs and more specifically,

The program content and expected achievement of persons enrolled in the program match the skills and knowledge reflected in the College's Standards

of Practice for the Teaching Profession and the Ethical Standards for the Teaching Profession and in the program guidelines issued by the College. (Accreditation of Teacher Education Programs Regulation, Part IV, Subsection 24).

Additional qualifications for teachers are identified in the *Teachers' Qualifications Regulation*. This regulation includes courses/programs that lead to Additional Qualifications, the Principal's Qualifications and the Supervisory Officer's Qualifications. A session of a course leading to an additional qualification shall consist of a minimum of 125 hours as approved by the Registrar. Accredited additional qualification courses reflect the *Ethical Standards for the Teaching Profession*, the *Standards of Practice for the Teaching Profession* and the *Professional Learning Framework for the Teaching Profession*.

The course developed from this guideline is open to candidates who meet the entry requirements identified in the *Teachers' Qualifications Regulation*.

Successful completion of the course leading to the Additional Qualification: Teaching Transportation Technology - Heavy Duty and Agricultural Equipment, listed in Schedule F of the *Teachers' Qualifications Regulation* is recorded on the Certificate of Qualification and Registration. Successful completion of three schedule F courses within a specific broad-based technology area will be deemed to be equivalent to one specialist or honour specialist qualification for purposes of entry into the principal's qualification or the supervisory officer qualification. (O. Reg. 176/10 S.49 (4) and (5))

In this document, all references to candidates are to teachers enrolled in the additional qualification course. References to students indicate those enrolled in school programs.

3. Foundations of Professional Practice

The *Foundations of Professional Practice* conveys a provincial vision of what it means to be a teacher in Ontario. This vision lies at the core of teacher professionalism. The *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession* (Appendix 1) are the foundation for the development and in the realization of the Additional Qualification course. These nine standards, as principles of professional practice, provide the focus for ongoing professional learning and are the foundation for the

development and implementation of the Additional Qualification Course: Teaching Transportation Technology - Heavy Duty and Agricultural Equipment. In addition, the *Professional Learning Framework for the Teaching Profession* is underpinned by the standards, articulates the principles on which effective teacher learning is based and acknowledges a range of options that promote continuous professional learning. The ongoing enhancement of informed professional judgment, which is acquired through the processes of lived experience, inquiry, and reflection, is central to the embodiment of the standards and the Professional Learning Framework within this AQ course and professional practice.

The *Ethical Standards of the Teaching Profession* and the *Standards of Practice for the Teaching Profession* serve as guiding frameworks that underpin professional knowledge, skills and experiences that teachers require in order to teach effectively within and contribute to an environment that fosters *respect, care, trust* and *integrity*.

Teacher-Education Resources

The College has developed resources to support the effective integration of the standards within Additional Qualification courses and programs. These teacher education resources explore the integration of the standards within professional practice through a variety of educative, research and inquiry-based processes. This guideline has been designed to reflect the *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession* and the *Professional Learning Framework for the Teaching Profession*. These resources can be found on the College web site (www.oct.ca). These resources support the development of professional knowledge and professional judgment through reflective practice. The lived experiences of Ontario educators are illuminated in the resources and serve as AQ course support for teacher education.

4. Conceptual Framework

The design, course content and implementation of the Additional Qualification Course Guideline: Teaching Transportation Technology - Heavy Duty and Agricultural Equipment support effective teacher education practices. These course guideline components provide a conceptual framework for the development of a holistic, integrated, experiential and inquiry-based course. The following conceptual framework supports and informs professional knowledge,

judgment and practices within the Additional Qualification Course: Teaching Transportation Technology - Heavy Duty and Agricultural Equipment.

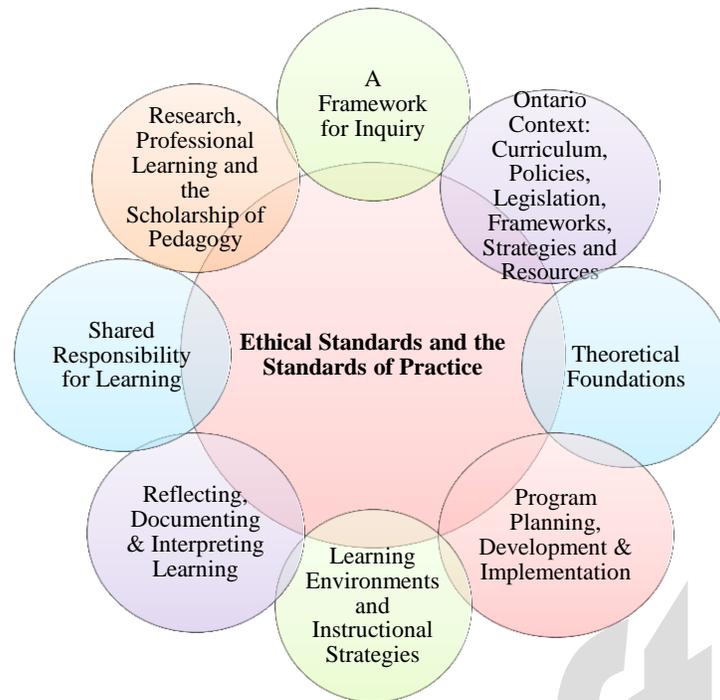


Diagram 2: Conceptual Framework for Teaching Transportation Technology - Heavy Duty and Agricultural Equipment

A. *The Ethical Standards for the Teaching Profession and the Standards of Practice for the Teaching Profession:*

The *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession* represent a collective vision of professional practice. At the heart of a strong and effective teaching profession is a commitment to students and their learning. Members of the Ontario College of Teachers, in their position of trust, demonstrate responsibility in their relationships with students, parents, guardians, colleagues, educational partners, other professionals, the environment and the public.

The holistic integration of the standards within all course components supports the embodiment of the collective vision of the teaching profession that guides

professional knowledge, learning, and practice. The following principles and concepts support this holistic integration within the AQ course.

- understanding and embodying care, trust, respect and integrity
- fostering commitment to students and student learning
- integrating professional knowledge
- enriching and developing professional practice
- supporting leadership in learning communities
- engaging in ongoing professional learning.

Through professional dialogue, collaborative reflection and an ethical culture, course candidates will continue to critically inquire into and refine professional practice and ethical culture through the lens of the *Standards of Practice for the Teaching Profession*.

B. A Framework for Inquiry

The *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession* are embedded throughout the Additional Qualification course guideline.

This Additional Qualification course supports critical reflective inquiry and dialogue informed by the following:

- analyzing, interpreting and implementing Ontario's curriculum, district school board policies, frameworks, strategies and guidelines related to the Broad Based Technology
- developing awareness of First Nations, Métis and Inuit ways of knowing and perspectives
- extending theoretical understanding to design, implement and assess practices and/or programs
- implementing pedagogical strategies and assessment and evaluation practices that are linked to expectations, meet the individual needs of students, and promote student learning

- creating holistic learning environments conducive to the intellectual, social, emotional, physical, linguistic, cultural, spiritual and moral development of students
- working collaboratively with school personnel, parents/guardians, caregivers, the community, local business and industry as it relates to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- exercising leadership in accessing a variety of resources, including technological resources, within and beyond the educational system to enhance and support student learning
- refining professional practice through ongoing collaborative inquiry, dialogue and reflection
- modelling ethical practices and addressing ethical issues
- critically exploring and integrating environmentally sustainable practices
- fostering responsible, active environmental citizenship
- collaboratively developing and sustaining professional learning communities for enhancing professional knowledge and supporting student learning
- fostering leadership in the integration of information and communication technology to enhance teaching and learning
- critically exploring innovative strategies to create and sustain safe, healthy, equitable and inclusive learning environments that honour and respect diversity and foster student learning
- understanding the importance of critically examining qualitative and quantitative research related to professional practice
- critically exploring strategies to understand, gain insight into and support learners' well-being and mental health needs
- working collaboratively with interdisciplinary school teams to develop and implement Individual Education Plans (IEPs) of students
- exploring strategies that contribute to a culture that promotes openness to innovation and change
- demonstrating an awareness of emerging technologies related to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment

- demonstrating an awareness of health and safety risks associated with Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- applying knowledge and skills to create and maintain a safe learning environment that addresses program needs: curriculum, material handling, tool handling and equipment storage, supervision, safety standards and practices that are respectful of the environment
- demonstrating technological literacy related to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- writing technical reports and creating and managing portfolios
- demonstrating mathematical literacy in Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- demonstrating an understanding of business management and entrepreneurial practices related to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- inquiring into practice through reflection, active engagement and collaboration
- enhancing awareness of holistic learning environments
- understanding the various professional practices and career opportunities in Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- critically exploring the relationship between education, mental health and well-being
- identifying ways to modify expectations, instructional strategies and assessment practices in Teaching Transportation Technology - Heavy Duty and Agricultural Equipment.

C. Ontario Context: Curriculum, Policies, Legislation, Frameworks, Strategies and Resources

The Additional Qualification Course: Teaching Transportation Technology - Heavy Duty and Agricultural Equipment is aligned with current Ontario curriculum, relevant legislation, government policies, frameworks, strategies and resources. These documents inform and reflect the development and implementation of the Additional Qualification Course: Teaching Transportation

Technology - Heavy Duty and Agricultural Equipment and can be viewed at www.edu.gov.on.ca.

Course candidates are also encouraged to critically explore the policies, practices and resources available at school and board levels that inform teaching and learning related to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment.

D. Theoretical Foundations of Teaching Transportation Technology - Heavy Duty and Agricultural Equipment

- understanding theories of student development (social, emotional, physical, intellectual, linguistic, cultural, spiritual and moral)
- understanding Ontario curriculum, resources and government policies, frameworks and strategies related to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- understanding learning theories and the particular learning needs of the adolescent in the Intermediate and Senior Divisions
- critically exploring a variety of conceptual frameworks related to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- reflecting on teaching practice and engaging in professional dialogue regarding the relationship between theory and practice
- integrating the *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession* as the foundation for teacher professionalism within the Additional Qualification Course: Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- critically exploring the significance of relevant legislation including the Ontario Human Rights Code, Ontarians with Disabilities Act, and the Accessibility for Ontarians with Disabilities Act (AODA) and associated responsibilities within professional practice
- recognizing teachers' legal obligations and ethical responsibilities according to current provincial legislation
- critically inquiring into the dimensions associated with creating and sustaining safe learning environments
- critically exploring holistic and inclusive educational programs that build on learners' abilities and empower them to reach their learning goals

- critically exploring problem solving processes, methods and approaches as they relate to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- critically exploring the fundamental technological concepts in Teaching Transportation Technology - Heavy Duty and Agricultural Equipment.

E. Program Planning, Development and Implementation

- applying the *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession* to inform a program planning framework
- critically exploring the influence of society's diverse and changing nature on student learning and well-being
- deepening understanding of program planning, development, implementation strategies and frameworks related to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- deepening understanding of differentiated instruction, universal design and the tiered approach in program planning, development and implementation
- critically exploring learning resources (for example, print, visual, digital) that support student learning
- understanding the types of secondary school pathways (including apprenticeship, college, university, workplace) and their relationship to students' post-secondary goals and career opportunities
- critically exploring how students' lived experiences, development, strengths, interests and needs can inform program planning, development and implementation
- integrating culturally responsive pedagogy within program planning and development
- critically exploring strategies that support learners' well-being and mental health needs
- planning instructional strategies that integrate students' learning styles, strengths and experiences
- demonstrating leadership in implementing local and provincial guidelines and policies that support safe and effective learning environments

- inspecting and reporting on the learning environment, facilities, equipment needs, resources and state of maintenance and repair for delivering Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- applying the theoretical foundations of Teaching Transportation Technology - Heavy Duty and Agricultural Equipment by incorporating the broad-based pedagogical approach that embeds problem solving and the fundamental technological concepts
- identifying the safe, ethical and legal use of technology in Teaching Transportation Technology - Heavy Duty and Agricultural Equipment programs
- critically exploring and integrating multiple formal and informal assessment methods and data to inform program planning and support student learning.

F. Learning Environments and Instructional Strategies

- creating and sustaining positive, ethical, equitable, accepting and safe learning environments
- critically exploring strategies for fostering a collaborative community of empowered learners
- fostering engaging, trusting and inviting learning environments that promote student voice, leadership, critical inquiry and self-regulation
- critically exploring a variety of instructional strategies to support student learning
- developing strategies to create a positive and collaborative learning environment to support student learning
- cultivating safe, ethical and respectful practices in the use of technology in purposeful and legal ways
- integrating information and communication technologies that support student learning
- providing leadership in adapting instruction to meet the needs of all learners
- critically exploring strategies that engage students as active citizen in supporting environmental, social and economic sustainability

- using pedagogies that reflect the professional identity of educators as described in the *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession* and in the *Foundations of Professional Practice*
- creating inclusive learning environments that reflect the ethical standards and standards of practice
- implementing safe and effective management of a variety of technical learning environments
- planning, organizing and implementing effective health, safety, sanitation and environmental standards in the Teaching Transportation Technology - Heavy Duty and Agricultural Equipment facility
- demonstrating an understanding of facility design and maintenance practices as per industry standards
- understanding and complying with workplace health and safety legislation and standards related to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment.

G. Reflecting, Documenting and Interpreting Learning

- collaboratively integrating fair and equitable, transparent, valid and reliable assessment and evaluation methods that honour the dignity, emotional wellness and cognitive development of all students
- critically exploring and collaboratively integrating assessment, evaluation and reporting practices that align with the principles and processes of Ontario's curriculum, frameworks and policy documents
- using assessment for the following three purposes: to provide feedback to students and to adjust instruction (assessment for learning); to develop students' capacity to be independent, autonomous learners (assessment as learning); to make informed judgements about the quality of student learning (assessment of learning)
- critically exploring the use of baseline data as well as current assessment data to reflect on how the students are progressing and the effectiveness of the learning strategies used.

H. Shared Responsibility for Learning

- critically exploring and collaboratively integrating a variety of effective communication and engagement strategies for authentic collaboration with parents/guardians, school/board personnel and community agencies
- critically exploring and engaging in strategies and opportunities for professional collaboration that supports student learning and well-being
- collaboratively designing programs that address biases, discrimination and systemic barriers in order to support student learning, well-being and inclusion
- fostering and sustaining a positive, inclusive educational culture in which all perspectives are encouraged, valued and heard
- understanding and respecting the importance of shared responsibility and partnership as conveyed in the standards and the Foundations of Professional Practice
- developing strategies to establish links between the school community, industry and the Teaching Transportation Technology - Heavy Duty and Agricultural Equipment program
- critically exploring sector-specific learning opportunities in other curriculum areas
- critically exploring professional collaboration within interdisciplinary teams to support student learning, self-advocacy and transitions.

I. Research, Professional Learning and the Scholarship of Pedagogy

- critically exploring past, present and evolving practices in Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- critically exploring professional practice through ongoing inquiry into theory and pedagogy/andragogy
- engaging in professional learning through research, scholarship and leadership
- integrating research and the scholarship of pedagogy/andragogy into teaching practice
- collaborating in research and the scholarship of pedagogy/andragogy

- critically exploring knowledge-creation and mobilization as professional practice.

5. Instructional Practice in the Additional Qualification Course: Teaching Transportation Technology - Heavy Duty and Agricultural Equipment

Candidates will collaboratively develop with course instructors the specific learning inquiries, learning experiences, and forms of assessment and evaluation that will be used throughout the course.

In the implementation of this Additional Qualification course, instructors use strategies that are relevant, meaningful and practical in providing candidates with learning experiences about instruction, pedagogy and assessment and evaluation. These include but are not limited to: experiential learning, small group interaction; action research; presentations; independent inquiry; problem solving; collaborative learning and direct instruction.

Instructors model the *Ethical Standards of the Teaching Profession* and the *Standards of Practice for the Teaching Profession*, honour the principles of adult learning, recognize candidates' experience and prior learning and respond to individual needs. Important to the course are opportunities for candidates to create support networks and receive feedback from colleagues and instructors and share the products of their learning with others. Opportunities for professional reading, reflection, dialogue and expression are also integral parts of the course.

Instructors model effective instructional and assessment strategies that can be replicated or adapted in a variety of classroom settings.

A. Experiential Learning

Candidates will be provided with opportunities to engage in experiential learning related to key concepts and aspects of Teaching Transportation Technology - Heavy Duty and Agricultural Equipment as collaboratively determined by both the instructor and course candidates. The intent of the experiential learning opportunities is to support the application and integration of practice and theory within the authentic context of teaching and learning. Candidates will also engage in critical reflection and analysis of their engagement in experiential

learning opportunities related to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment. The professional judgment, knowledge and pedagogy of candidates will be enhanced and refined through experiential learning and inquiry.

The College's standards resources help to support experiential learning through various forms of professional inquiry.

6. Assessment and Evaluation of Candidates

At the beginning of the course, candidates will collaboratively develop with course instructors the specific learning inquiries, learning experiences, and forms of assessment and evaluation that will be used throughout the course. Instructors will provide opportunities for regular feedback regarding candidates' progress throughout the course.

A balanced approach to candidate assessment and evaluation is used. It includes the combination of candidate self and peer assessment, as well as instructor evaluation. The assessment and evaluation strategies reflect effective, collaborative and inquiry-based practices. A variety of assessment approaches will be used that enable candidates to convey their learning related to course inquiries. The course provides opportunities for both formative and summative assessment and evaluation.

Central to candidates enrolled in Additional Qualification courses is the opportunity to be engaged in relevant and meaningful inquiries. Assignments, artefacts and projects enable candidates to make connections between theory and practice. At the same time, assignments must allow candidates flexibility, choice and individual inquiry opportunities.

Part of the evaluation process may include a major independent project or action research component over the duration of the course. This project is an opportunity for candidates to illustrate a high level of professional knowledge, communication skills, pedagogy, ethical practices and instructional leadership. Similarly, if a portfolio assignment is used it will also include reflections and analysis of a candidate's learning over time.

A final culminating experience in the course is recommended. This experience may take the form of a written assessment, a research paper, a performance, an inquiry project or a product that is original, meaningful and practical.

The following list of assessment strategies which are reflective of experiential learning is not exhaustive; it is intended to serve as a guide only.

- a) Performance assessment: designing a sample unit which includes a culminating activity and appropriate assessment and evaluation tools, incorporates a variety of technologies and resources relevant to the study of Teaching Transportation Technology - Heavy Duty and Agricultural Equipment, and is based on Ministry of Education expectations
- b) Written assignment: reflecting critically on issues arising from articles, publications, research and/or other resources related to the teaching or practice to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- c) Presentation: developing a digital story, presenting an issue related to the teaching and learning related to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- d) Portfolio: creating a portfolio of practical resources, artefacts, photographs and recording critical reflections for one or several components related to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- e) Action research: engaging in action research by reflecting and acting upon a specific inquiry into teaching practice related to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- f) Independent project: addressing any aspect of the course that is approved by the instructor
- g) Instructional resource: developing a meaningful resource that will support instruction and pedagogy related to the teaching and learning of Teaching Transportation Technology - Heavy Duty and Agricultural Equipment
- h) Reflective writing: reflecting on professional practice through journal-writing, or writing a case or vignette that will support instruction and pedagogy related to the teaching and learning of Teaching Transportation Technology - Heavy Duty and Agricultural Equipment

- i) Case inquiry: writing or exploring a case related to collaboration and shared partnerships, with parents, colleagues, and community organizations
- j) IEP development: collaboratively develop an IEP related to Teaching Transportation Technology - Heavy Duty and Agricultural Equipment with the family, student and school team
- k) Facilitating a Learning Experience: developing and implementing an engaging learning experience that reflects differentiated instruction and universal design and the tiered approach.

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7. Demonstrated Knowledge and Skill in Teaching Transportation Technology - Heavy Duty and Agricultural Equipment

Successful candidates will be able to demonstrate technical knowledge and skill in the following:

	Transportation Technology Fundamentals	Transportation Technology Skills
Understanding Engines	<p>Be able to demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Diesel Engine Four Stroke Basic Operation (for example, Intake, Compression, Power, Exhaust) • Diesel Engine Two Stroke Basic Operation • Diesel Engine Construction and Design • Engine Maintenance Techniques and Service Procedures pertaining to manufacturer recommendations (injector service, valve lash adjustment) • Various fuel systems types and their operation that are used on Diesel powered Heavy Duty and Agricultural Equipment including fuel injection pumps and hydraulic fuel injection • Lubrication systems, cooling systems, intake and exhaust systems principles (for example, oil pump operation, radiator design) • Forced Air Induction systems and operation (for example, turbochargers, superchargers, 	<p>Be able to apply:</p> <ul style="list-style-type: none"> • Troubleshooting and problem solving skills to diagnose engine faults correctly (for example, engine noise, engine overheating) • Manufacturer recommendations for engine maintenance procedures correctly (for example, oil change, valve lash adjustment) • Interruption of measurement reading to determine engine component condition (for example, crankshaft run out, cylinder taper). <p>Be able to demonstrate:</p> <ul style="list-style-type: none"> • Proper diagnostic and repair techniques in disassembling and reassembling a diesel on heavy duty and agricultural equipment (for example, remove oil pan, remove engine crankshaft) • Proper testing and servicing procedures for cylinder heads, valve trains, and related components

	Transportation Technology Fundamentals	Transportation Technology Skills
	<p>intercoolers)</p> <ul style="list-style-type: none"> • Proper use of measurement tools (for example, Micrometer, torque wrench). <p>Be able to recognize and interpret:</p> <ul style="list-style-type: none"> • Engine Design Characteristics when visually identifying engine manufacturer (for example, New Holland, JCB) • Engine Noise to determine engine component failure (for example, piston slap, rod knock, valve train noise) • Precision measurement tool readings and compare to manufacturer specifications (engine cylinder taper, crankshaft journal out of rod). <p>Be able to identify and describe:</p> <ul style="list-style-type: none"> • parts of the diesel internal combustion engine, used in agriculture and heavy duty machinery (for example, crankshafts, pistons, connecting rods, pistons) • The operation of the Four Stroke Cycle of a Diesel Engine • Engine Identification (for example, fuel used, cylinder arrangement, camshaft location) • Diesel engine valve and fuel injection pump 	<p>following manufacturers' recommendations and safe work practices. (for example, remove valves, adjust valve lash)</p> <ul style="list-style-type: none"> • Proper testing and servicing procedures for cooling and lubricating systems components and coolants following manufacturers' recommendations and safe work practices (for example, pressure test cooling system for leaks, high pressure oil pump replacement) • Proper testing and servicing procedures for air induction, fuel, and exhaust systems following manufacturers' recommendations (for example, replace turbocharger, replace fuel injector). <p>Be able to use:</p> <ul style="list-style-type: none"> • Diagnostic flowcharts and diagnostic equipment to correctly troubleshooting engine concerns (engine misfire, engine knock) • A variety of hand and power tools safely and correctly to perform service procedures on diesel engine components (for example, cylinder head removal) • Specialty measurement and diagnostic equipment correctly to apply to engine component evaluation (for example, compression gauge, micrometer, dial

	Transportation Technology Fundamentals	Transportation Technology Skills
	timing used and how it effects engine performance.	indicator, fuel pressure gauge).
Understanding Engine Management Systems	<p>Be able to demonstrate an understanding of:</p> <ul style="list-style-type: none"> • The principles of engine management systems that apply to fuel metering, engine timing devices, and emissions devices (for example, input, program, output) • Types of emission gases produced by the diesel engines and how they are controlled by engine management devices (for example, diesel particulate filters) • A variety of electronic controlled fuel systems used in industry (for example, PowerTech PVX, ACERT) • The principles of pipe-line-nozzle technology (PLN) used in heavy duty and agricultural equipment • Interim Tier 4 engine emission standards and heavy duty and agricultural equipment manufacturer resolutions (for example, Catalytic Reduction (SCR) and Cooled Exhaust Gas Recirculation (CEGR) systems). <p>Be able to recognize and interpret:</p> <ul style="list-style-type: none"> • Diagnostic flow charts to assist in engine 	<p>Be able to apply:</p> <ul style="list-style-type: none"> • Manufacturers' trouble code charts and diagnostic procedures to troubleshoot faults displayed by on-board diagnostic data • Ohm's Law to assist in diagnostic procedures when determining cause of engine management concerns (for example, high resistance in engine coolant temperature sensor). <p>Be able to demonstrate:</p> <ul style="list-style-type: none"> • Proper identification and location of engine management sensors, actuators, and modules on heavy duty and agricultural equipment (for example, engine coolant temperature sensor, injector pressure control solenoid, powertrain control module) • Interruption of sensor and actuator data retrieved from diagnostic equipment to correctly diagnose engine control systems and components (for example, DataStream, oscilloscope) • Proper fuel injection pump timing adjustment and its effects on engine performance and engine

	Transportation Technology Fundamentals	Transportation Technology Skills
	<p>performance diagnostics</p> <ul style="list-style-type: none"> • Service manual information and technical service bulletins • Various terminologies used by Heavy Duty and Agricultural Equipment manufacturers • Performance analysis and tune up procedures used by manufacturers (for example, change fuel filter, change air filter). <p>Be able to identify and describe:</p> <ul style="list-style-type: none"> • Control devices commonly used in engine management (for example, powertrain control module, Electronic control unit) • Diesel engines sensors and actuators (for example, engine coolant temperature sensor, electronic pressure control solenoid, etc. • Turbocharger performance issues and diagnostic testing (for example, boost pressure, waste gate operation). 	<p>emissions (for example, poor fuel economy, engine running hot).</p> <p>Be able to use:</p> <ul style="list-style-type: none"> • Diagnostic equipment correctly and safely to diagnose and repair engine electronic and performance malfunctions (for example, multimeter, fuel pressure tester, exhaust gas analyzer) • A variety of hand and power tools correctly to repair and service engine management components on heavy duty and agricultural equipment (fuel injector removal tool, fuel injection pump timing).
Understanding Power Transfer Devices	<p>Be able to demonstrate an understanding of:</p> <ul style="list-style-type: none"> • The construction, operating principles; testing and servicing of power train assemblies, gearing fundamentals, drive shafts, universal joints and drive axle assemblies. • Transmission torque converters, differentials, and 	<p>Be able to apply:</p> <ul style="list-style-type: none"> • Pascal's Law to assist in hydraulic drivetrain diagnostics (for example, bulldozer will not move, no reverse in tractor) • Manufacturers' recommendations when performing routine service procedures on machinery drivetrains

	Transportation Technology Fundamentals	Transportation Technology Skills
	<p>final drives used in the heavy duty and agricultural sector</p> <ul style="list-style-type: none"> • Constant mesh, sliding gear, hydrostatic synchromesh, and power shift transmissions involving planetary gear sets. • Constantly Variable Transmissions and Hydrostatic Transmission operation • Track type operation (for example, bulldozers, excavators) • Operation of Power Take offs, four wheel drive operation including transfer case operation. <p>Be able to recognize and interpret:</p> <ul style="list-style-type: none"> • Power flow through transmission and other drive train components (for example, rear axle, track type, power take off) used in heavy duty and agricultural equipment • Diagnostic flow charts to identify mechanical issues. <p>Be able to identify and describe:</p> <ul style="list-style-type: none"> • How energy is converted into motion (for example, electrical to mechanical) • Power Take Off operation and use (for example, snow blower, hay baler) 	<p>(for example, lubrication pivot points, change transmission oil)</p> <p>Be able to demonstrate:</p> <ul style="list-style-type: none"> • A basic knowledge to identify various types of drivetrain components commonly used in the heavy duty and agricultural equipment (for example, hydrostatic transmission, driveshaft, power take off, transfer case) • Proper inspection techniques of drivetrain components to determine cause of failure (for example, excessive backlash in ring gear, excessive clearance in clutch pack). <p>Be able to use:</p> <ul style="list-style-type: none"> • Diagnostic flowcharts and specialty diagnostic equipment to correctly troubleshooting drivetrain concerns (power take off in inoperative, bulldozer track is loose) • hand and power tools safely and correctly to perform service procedures on drivetrain components (for example, replace universal joints, replace torque convertor).

	Transportation Technology Fundamentals	Transportation Technology Skills
	<ul style="list-style-type: none"> • Various transmission and Final drive components (for example, axle, pinion gear, ring gear, countershaft) • Gear ratio that is used for torque multiplication (for example, 2:1). 	
Understanding Electrical and Electrical Circuits & Components	<p>Be able to demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Fundamental principles of basic electrical circuits and their components (for example, Ohm's Law, Watt's Law, series circuit, parallel circuit) • Electronic fundamentals and their components (for example, capacitors, integrated circuits, diodes) • 12 volt and 24 volts electrical systems used on heavy duty equipment (for example, excavators) • Diagnostic tools, troubleshooting and wiring repair procedures (for example, test light, soldering). • Alternator, starter and battery operation • Yield monitors and auto guidance electrical systems on agricultural vehicles (for example, Combine IntelliSteer™ Auto Steering System). <p>Be able to recognize and interpret:</p> <ul style="list-style-type: none"> • Wiring diagrams to aid in troubleshooting 	<p>Be able to apply:</p> <ul style="list-style-type: none"> • Principles of Ohm's Law and Watt's Law when interpreting electrical diagrams and circuits to assist in diagnosing Heavy Duty and Agricultural Equipment (for example, voltage drops, circuit resistance) • Diagnostics and troubleshooting skills when determining a fault of an operative electrical circuit (for example, blown fuse, open circuit, faulty relay) in a heavy duty and agricultural vehicle. <p>Be able to demonstrate:</p> <ul style="list-style-type: none"> • Proper inspection techniques and testing of a variety of electrical circuits (amperage draw test on circuits, voltage drop test) on heavy duty and agricultural equipment • Proper wiring and circuit repair procedures using the correct tools safely (soldering wires with solder gun, replacing faulty electrical terminals).

	Transportation Technology Fundamentals	Transportation Technology Skills
	<p>electrical circuits</p> <ul style="list-style-type: none"> • Multimeter readings based on electrical test results (for example, voltage drops, resistance checks) • Electrical systems analysis including preventive maintenance (for example, battery condition, electrical connections). <p>Be able to identify and describe:</p> <ul style="list-style-type: none"> • Electrical units of measure (for example, volts, ohms, amperage) • Fundamentals of electronic circuits and components (for example, transistors, relays) • Electrical faults and proper repair procedures (for example, short, open) • Electrical components from electrical schematics (for example, motors, switches). 	<ul style="list-style-type: none"> • <p>Be able to use:</p> <ul style="list-style-type: none"> • Electrical diagnostic equipment correctly when diagnosing heavy duty and agricultural equipment starting/charging systems (for example, Battery/Starting/Charging System Tester, battery load tester) • a wide range of electrical test equipment on heavy duty and agricultural equipment (for example, multimeter, test light) to measure voltage, amperage, and resistance of electrical circuits • A variety of hand and power tools correctly and safely to replace a starter, alternator/generator, and battery on several types of heavy duty and agricultural vehicles (for example, wrenches, ratchet, sockets).
Troubleshooting the Powertrain	<p>Be able to demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Appropriate diagnostics steps to assist in troubleshooting (for example, technical service bulletins, service manuals) • Testing and service procedures of power train clutch assemblies, gearing fundamentals, countershaft manual transmissions, drive shafts, 	<p>Be able to apply:</p> <ul style="list-style-type: none"> • Proper diagnostics steps to assist in troubleshooting heavy duty and agricultural equipment powertrain concerns (for example, technical service bulletins, service manuals) • Pascal's Law when interpreting hydraulic flowcharts and diagnosing heavy duty and

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	<p>universal joints and drive axle assemblies. (for example, pressure checks, shaft run out).</p> <p>Be able to recognize and interpret:</p> <ul style="list-style-type: none"> • Proper diagnostic equipment readings (for example, voltmeter, pressure gauge, micrometer) • Manufacturer specifications (for example, clearance between two components) • Component failure (for example, faulty synchronizer prevented tractor from shifting into second gear). <p>Be able to identify and describe:</p> <ul style="list-style-type: none"> • Equipment symptoms that can be resolved through proper diagnostic steps (for example, tractor does not move, power take off inoperative). 	<p>agricultural equipment automatic powertrains (for example, clutch application, hydraulic circuits).</p> <p>Be able to demonstrate:</p> <ul style="list-style-type: none"> • Proper measurement information retrieved from precision tools (for example, micrometers, dial indicator) to make accurate conclusions on component condition (for example, checking for worn, loose, damaged, missing, or defective components) used in the heavy duty and agricultural industry. <p>Be able to use:</p> <ul style="list-style-type: none"> • Proper diagnostic equipment to troubleshoot heavy duty and agricultural equipment powertrain concerns effectively (for example, pressure gauges, micrometers).
Understanding Major Systems & Components	<p>Be able to demonstrate an understanding of:</p> <ul style="list-style-type: none"> • The operation, and function of the major steering systems of agricultural and heavy duty equipment (for example, hydrostatic, hydraulic assist, skid steer) • The operation and function of the front suspension systems of agricultural and heavy duty 	<p>Be able to apply:</p> <ul style="list-style-type: none"> • fluid power fundamentals, flowcharts, principles of operation and the application of diagnostic tools to evaluate hydraulic system operation (for example, hydraulic brake system, power steering, and hydraulic cylinder operation) in heavy duty and agricultural equipment (for example, Pascal's Law)

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	<p>equipment (for example, elastic-mounted undercarriage, Triple-Link Suspension (TLS))</p> <ul style="list-style-type: none"> • The operation and function of the brake systems of agricultural and heavy duty equipment (for example, hydraulic, wet multi-disc brakes) • Various agricultural and heavy duty equipment implements operation (for example, cutting, baling, tillage) • The principles of hydraulics and their applications to agricultural and heavy duty machinery • Hydraulic circuits and components dealing with the hydraulic lift systems, power steering, power brakes, and external cylinder operation. • Operation of anti-lock braking systems and automatic traction control systems. <p>Be able to recognize and interpret:</p> <ul style="list-style-type: none"> • Brake, Steering, and Suspension components (for example, tie rod, brake drum) • Hydraulic schematics and perform pressure, force, and area calculations related to hydraulics. • Hydraulic oil flow through the systems and state the systems operation. <p>Be able to identify and describe:</p> <ul style="list-style-type: none"> • Diagnostic procedures of steering and suspension 	<ul style="list-style-type: none"> • Identification of major components of the undercarriage, brake, suspension, and steering systems of heavy duty and agricultural equipment (for example, kingpins, wet multi disc brake, bulldozer steering clutch). <p>Be able to demonstrate:</p> <ul style="list-style-type: none"> • Proper testing and servicing procedures of steering systems, brake systems, suspension systems, tires, wheels and hubs (for example, replace tire, service wet disc brake system) • Basic knowledge of location of fluids, filters, and connectors while performing proper heavy duty and agricultural equipment scheduled maintenance on brakes, steering, and suspension systems (for example, lubricate steering/suspension pivot points, service brakes) • Correct service and diagnostic procedures on agricultural and heavy duty equipment implements (for example, combine grain head, cultivator, baler). <p>Be able to use:</p> <ul style="list-style-type: none"> • Proper precision tools to measure component tolerances when servicing and repairing steering,

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	<p>systems</p> <ul style="list-style-type: none"> • Various components of the brake, steering, suspension, and hydraulic systems (for example, brake rotor, tie rod, hydraulic cylinder) • Repair procedures on the brake, steering, suspension, and hydraulic systems • A variety of agricultural and heavy duty equipment implements (for example, front load bucket, hay baler) • Describe the service procedures of hydraulic fluids, reservoirs, and conditioners following manufacturers' recommendations • Diagnostic and service procedures typical hydraulic and antilock braking systems. 	<p>brake, and suspension systems on heavy duty and agricultural equipment (for example, rotors, gear train, hydraulic cylinder)</p> <ul style="list-style-type: none"> • Proper hand and power tools correctly and safely when replacing and repairing heavy duty and agricultural equipment brake, steering, hydraulic, and suspension components.
Technological Literacy / Numeracy	<p>Be able to demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Proper use of technological terminology related to the agricultural and heavy duty vehicles (for example, hydraulic flowcharts, work orders) • The Essential Skills as identified in the Ontario Skills Passport (for example, reading text, writing, document use, computer use, oral communication, numeracy, and thinking skills) • The principles of the science and behavior of magnetism, electricity, electronics and heat 	<p>Be able to apply:</p> <ul style="list-style-type: none"> • Appropriate scientific principles, and mathematical procedures when reporting and/or conducting work on heavy duty/agricultural equipment (for example, foot pounds, pounds per square inch, convert measurements) <p>Be able to demonstrate:</p> <ul style="list-style-type: none"> • Proper terminology of tools and equipment when repairing and servicing agricultural and heavy

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	<p>energy as they are used to aid in diagnostic procedures.</p> <p>Be able to recognize and interpret:</p> <ul style="list-style-type: none"> • Technical terms and information located in manufacturer service manuals, electrical circuit diagrams, and technical service bulletins • A wide range of measurements related to agricultural and heavy duty equipment (for example, horsepower output, hydraulic pressure). <p>Be able to identify and describe:</p> <ul style="list-style-type: none"> • The appropriate technical language used for work orders that is related to agricultural and heavy duty equipment (for example, remove and replace, remove and inspect). 	<p>equipment (for example, wrenches, air impact gun, battery chargers)</p> <ul style="list-style-type: none"> • Calculations of various measurements related to heavy duty and agricultural equipment (hydraulic cylinder pressure, engine compression ratio, electrical circuit resistance). <p>Be able to use:</p> <ul style="list-style-type: none"> • Drawings and flowcharts to assist in equipment repairs and diagnostics (for example, electrical schematics, diagnostic flow charts, hydraulic flow charts) • Appropriate technical language and mathematical calculations when preparing reports for a range of audiences (for example, work orders, parts lists) • Proper resources to find information to perform repairs and servicing on heavy duty and agricultural equipment (Technical service bulletins, shop manuals).
Design Process / Solving Repair Challenges	<p>Be able to demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Scientific and mathematical concepts that will assist in Heavy Duty and Agricultural Equipment repair (for example, hydraulic cylinder failure and replacement) • Proper tools and equipment selection as it applies 	<p>Be able to apply:</p> <ul style="list-style-type: none"> • Client work orders invoices, estimated hours, and disbursements related to Heavy Duty and Agricultural Equipment repairs • Apply Diagnosis and process steps in a typical repair service manual, and electrical circuit

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	<p>to the design process</p> <ul style="list-style-type: none"> • Various fabrication processes as it applies to the design process (for example, Gas Metal Arc Welding, Shielded, Arc Welding). <p>Be able to recognize and interpret:</p> <ul style="list-style-type: none"> • Service manual procedures when servicing or repairing Heavy Duty and Agricultural Equipment (remove and replace turbocharger) • Diagnostic steps in a typical service manual when problem solving Heavy Duty and Agricultural Equipment issues (for example, drivability flow chart) • electrical circuit diagrams when diagnosing electrical issues of Heavy Duty and Agricultural Equipment (for example, inoperative lights on backhoe). <p>Be able to identify and describe:</p> <ul style="list-style-type: none"> • Repair or challenge issues that could affect the outcome of the repair (for example, availability of parts, specialty tools) • The elements of design (for example, line, shape, form, size, colour, texture, space) • Principles of design (for example, proportion, 	<p>diagrams for Heavy Duty and Agricultural Equipment repair.</p> <p>Be able to demonstrate:</p> <ul style="list-style-type: none"> • Proper use of the diagnostic process when problem solving Heavy Duty and Agricultural Equipment issues (for example, drivability concern, pto inoperative) • The design process to plan and develop products or processes with a focus on the Heavy Duty and Agricultural Equipment industry. <p>Be able to use:</p> <ul style="list-style-type: none"> • Research Reports and presentations found in industry (for example, cost estimation, warranty period reports, cost estimation) • Various fabrication techniques related to the Heavy Duty and Agricultural Equipment industry (for example, metal fabrication, welding) • Technical drawings to assist in equipment modifications and repairs (for example, remove wheels and install tracks on tractor).

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	patterns, movement).	
Tools, Equipment, and Materials	<p>Be able to demonstrate an understanding of:</p> <ul style="list-style-type: none"> Types of hand and power tools used in the heavy duty and agricultural equipment industry including safety precautions (for example, ratchets, wrenches, air gun) How to use measuring tools and how to interpret readings (for example, micrometer, dial indicator). <p>Be able to recognize and interpret:</p> <ul style="list-style-type: none"> Proper tool terminology (for example, rib joint pliers, snap ring pliers, feeler gauge) Diagnostic equipment data (for example, scan tool, diesel fuel injector balance test, hydraulic pressure gauge, multimeter). <p>Be able to identify and describe:</p> <ul style="list-style-type: none"> Various types of power and hand tools used in the heavy duty and agricultural equipment industry (for example, torque wrench, combination wrench, diagonal cutting pliers). 	<p>Be able to apply:</p> <ul style="list-style-type: none"> Measurement information retrieved from precision tools (for example, micrometers, dial calipers, verniers) to make accurate conclusion on component condition (for example, brake rotors, crankshaft) used in the heavy duty and agricultural industry. <p>Be able to demonstrate:</p> <ul style="list-style-type: none"> Interpretation of information retrieved from diagnostic equipment (scan tool, multimeters, diesel injector pressure gauges) that will assist in proper heavy duty and agricultural equipment fault diagnostics Proper tool and equipment identification is essential when performing service and maintenance procedures on heavy duty and agricultural equipment (for example, International injector removal tool, hydraulic cylinder seal installer). <p>Be able to use:</p> <ul style="list-style-type: none"> Proper required tools and equipment when repairing and servicing heavy duty and agricultural equipment (for example, wrenches, air impact gun,

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		battery chargers) <ul style="list-style-type: none"> Diagnostic tools effectively in assisting for proper evaluation of components on heavy duty and agricultural equipment (for example, glow plug tester, oscilloscope, battery tester).
Transportation Technology and The Environment	<p>Be able to demonstrate an understanding of:</p> <ul style="list-style-type: none"> Environmental harmful gasses are produced through combustion (for example, two stroke and four stroke engines) and how the engine management systems control the level of emissions in the exhaust gas. <p>Be able to recognize and interpret:</p> <ul style="list-style-type: none"> Recyclable materials used on agricultural and heavy duty equipment (for example, tires, engine oil, coolant, batteries). <p>Be able to identify and describe:</p> <ul style="list-style-type: none"> The actions being taken by agricultural and heavy duty equipment manufacturers to reduce greenhouses gases and ozone depleting materials (for example, diesel particulate filters, antifreeze, R-12 Freon) Government requirements / regulations on 	<p>Be able to apply:</p> <ul style="list-style-type: none"> Legal requirements and emission standards when servicing, repairing, testing heavy duty and agricultural equipment (for example, diesel particulate filters, Diesel Oxidation Catalysts). <p>Be able to demonstrate:</p> <ul style="list-style-type: none"> Proper procedures to remove waste and recyclable products from heavy duty and agricultural equipment that minimizing impact on the environment (for example, used oil, used tires, battery recycle). <p>Be able to use:</p> <ul style="list-style-type: none"> Procedures and training required to prevent the release of ozone depleting materials and harmful substances used in the agricultural and heavy duty industry during servicing and repair (for example, R-12 Freon, electrolyte, diesel fuel, hydraulic

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	emission testing.	fluid).
Transportation Technology and Society	<p>Be able to demonstrate an understanding of:</p> <ul style="list-style-type: none"> The relationship between various aspects of the heavy duty and agricultural industry and society (for example, sustainability of human wellbeing due to crop removal). <p>Be able to recognize and interpret:</p> <ul style="list-style-type: none"> Economic, environmental, and social impact of the agricultural and heavy duty sector within supporting communities (for example, increased employment, exhaust emission pollutants, new businesses). <p>Be able to identify and describe:</p> <ul style="list-style-type: none"> The effects that increase society's daily costs due to the heavy duty and agricultural sector (for example, higher food and material costs due to fuel price increase). 	<p>Be able to apply:</p> <ul style="list-style-type: none"> Recent technological innovations in the heavy duty and agricultural sector (for example, John Deere active front suspension systems, yield monitors) to increase vehicle productivity. <p>Be able to demonstrate:</p> <ul style="list-style-type: none"> the effects of various types of energy sources to power heavy duty and agricultural equipment (for example, natural gas, biodiesel, diesel) from a consumer's perspective. how current society needs influence heavy duty and agricultural industry (for example, demand for oil which requires more productive and effective equipment to be used in the oil sands). <p>Be able to use:</p> <ul style="list-style-type: none"> Information of potential technologies to assist in advancing today's society (for example, providing new agricultural equipment to assist in more efficient crop harvesting).

	Transportation Technology Fundamentals	Transportation Technology Skills
Health and Safety	<p>Be able to demonstrate an understanding of:</p> <ul style="list-style-type: none"> • Proper safety practices, housekeeping practices, lifting procedures, and fire prevention (spill cleanup, tripping hazards) • legislation and regulations related to procedures and operations used in transportation technology facilities (for example, Occupational Health and Safety Act [OHSA]; regulations and standards outlined in the Workplace Hazardous Materials Information System [WHMIS]; Apprenticeship and Certification Act [ACA]); • Professional responsibilities in the agricultural and heavy duty equipment industry with regard to personal and public safety (for example, excellent workmanship, service excellence). <p>Be able to recognize and interpret:</p> <ul style="list-style-type: none"> • Safety hazards in the work area and the ability to resolve these issues (oil spills, loose extension cords) • Safety hazards and the ability to follow safety protocol when repairing agricultural or heavy duty equipment (for example, power take offs, belt and pulley systems). 	<p>Be able to apply:</p> <ul style="list-style-type: none"> • Proper safety practices in the work environment to avoid injury (for example, safety guards are in place on pedestal grinder, equipment is secured properly) <p>Be able to demonstrate:</p> <ul style="list-style-type: none"> • Mandated safety practices and good housekeeping skills in the heavy duty and agricultural working environment (for example, work area cleanup, clear tripping hazards) • Appropriate safety precautions when servicing and repairing heavy duty and agricultural equipment (for example, high pressure in fuel system, excessive heat from exhaust system, power take off turning) • follow legislation and regulations related to procedures and operations used in the heavy duty and agricultural industry (for example, Workplace Hazardous Material Information, Material Data Safety Sheets). <p>Be able to use:</p> <ul style="list-style-type: none"> • Correct protective personal equipment and clothing to ensure own and others' safety protection in the work space (for example, protective gloves, eye

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	<p>Be able to identify and describe:</p> <ul style="list-style-type: none"> potential health risks (for example, fertilizers, diesel fuel, cleaners) when working with agricultural or heavy duty equipment, and demonstrate the use of safe procedures to mitigate these hazards (for example, use appropriate ventilation and breathing protection). 	<p>protection).</p>
Career Opportunities	<p>Be able to demonstrate an understanding of:</p> <ul style="list-style-type: none"> the Essential Skills as identified in the Ontario Skills Passport (for example, reading text, writing, document use, computer use, oral communication, numeracy, and thinking skills) Required work habits that are necessary to become successful in agricultural and heavy equipment industry (discipline, reliability, initiative). <p>Be able to recognize and interpret:</p> <ul style="list-style-type: none"> Regulations regarding restricted and non-restricted skill sets in the Apprenticeship and Certification Act (available at www.e-law.gov.on.ca). 	<p>Be able to apply:</p> <ul style="list-style-type: none"> their knowledge of the employment process, students develop resumes, letters and applications, as well as identify and use effective interviewing techniques within heavy duty and agricultural sector. <p>Be able to demonstrate:</p> <ul style="list-style-type: none"> Proper work habits that will create success in the heavy duty and agricultural industry (for example, safety, teamwork, organization). <p>Be able to use:</p> <ul style="list-style-type: none"> A portfolio that includes pieces of work and other materials that provide evidence of their skills and

	Transportation Technology Fundamentals	Transportation Technology Skills
	<p>Be able to identify and describe:</p> <ul style="list-style-type: none"> • Training required for a variety of career opportunities in the agricultural and heavy equipment sector (for example, heavy duty equipment technician, farm equipment sales person, parts person). 	<p>achievements in Heavy duty and agricultural technology (for example, Passport to Safety certificate, skills checklist, Ontario Skills Passport Work Plan and Transition Plan), and explain why having a current portfolio is important for career development and advancement.</p>

Draft

Appendix 1

The *Ethical Standards for the Teaching Profession*

The *Ethical Standards for the Teaching Profession* represent a vision of professional practice. At the heart of a strong and effective teaching profession is a commitment to students and their learning. Members of the Ontario College of Teachers, in their position of trust, demonstrate responsibility in their relationships with students, parents, guardians, colleagues, educational partners, other professionals, the environment and the public.

The Purposes of the Ethical Standards for the Teaching Profession are:

- to inspire members to reflect and uphold the honour and dignity of the teaching profession
- to identify the ethical responsibilities and commitments in the teaching profession
- to guide ethical decisions and actions in the teaching profession
- to promote public trust and confidence in the teaching profession.

The Ethical Standards for the Teaching Profession are:

Care

The ethical standard of *Care* includes compassion, acceptance, interest and insight for developing students' potential. Members express their commitment to students' well-being and learning through positive influence, professional judgment and empathy in practice.

Respect

Intrinsic to the ethical standard of *Respect* are trust and fair-mindedness. Members honour human dignity, emotional wellness and cognitive development. In their professional practice, they model respect for spiritual and cultural values, social justice,

confidentiality, freedom, democracy and the environment.

Trust

The ethical standard of *Trust* embodies fairness, openness and honesty. Members' professional relationships with students, colleagues, parents, guardians and the public are based on trust.

Integrity

Honesty, reliability and moral action are embodied in the ethical standard of *Integrity*. Continual reflection assists members in exercising integrity in their professional commitments and responsibilities.

The Standards of Practice for the Teaching Profession

The *Standards of Practice for the Teaching Profession* provide a framework of principles that describes the knowledge, skills, and values inherent in Ontario's teaching profession. These standards articulate the goals and aspirations of the profession. These standards convey a collective vision of professionalism that guides the daily practices of members of the Ontario College of Teachers.

The Purposes of the Standards of Practice for the Teaching Profession are:

- to inspire a shared vision for the teaching profession
- to identify the values, knowledge and skills that are distinctive to the teaching profession
- to guide the professional judgment and actions of the teaching profession
- to promote a common language that fosters an understanding of what it means to be a member of the teaching profession.

The Standards of Practice for the Teaching Profession are:

Commitment to Students and Student Learning

Members are dedicated in their care and commitment to students. They treat students equitably and with respect and are sensitive to factors that influence individual student learning. Members facilitate the development of students as contributing citizens of Canadian society.

Professional Knowledge

Members strive to be current in their professional knowledge and recognize its relationship to practice. They understand and reflect on student development, learning theory, pedagogy, curriculum, ethics, educational research and related policies and legislation to inform professional judgment in practice.

Professional Practice

Members apply professional knowledge and experience to promote student learning. They use appropriate pedagogy, assessment and evaluation,

resources and technology in planning for and responding to the needs of individual students and learning communities.

Members refine their professional practice through ongoing inquiry, dialogue and reflection.

Leadership in Learning Communities

Members promote and participate in the creation of collaborative, safe and supportive learning communities. They recognize their shared responsibilities and their leadership roles in order to facilitate student success. Members maintain and uphold the principles of the ethical standards in these learning communities.

Ongoing Professional Learning

Members recognize that a commitment to ongoing professional learning is integral to effective practice and to student learning. Professional practice and self-directed learning are informed by experience, research, collaboration and knowledge.