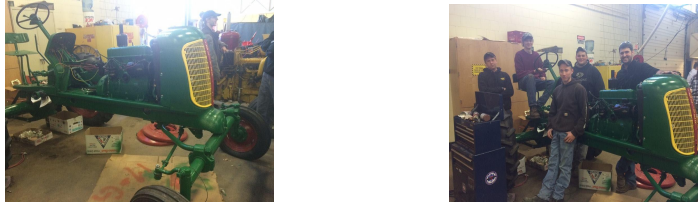
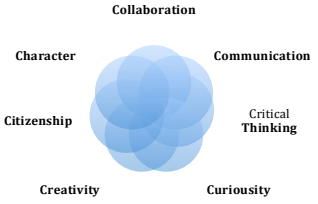


Content Area: Agriscience DRAFT	Agriscience Engineering	Level: Year B
	<p>R14 The Seven Cs of Learning</p> 	
Unit Titles	Length of Unit	
<ul style="list-style-type: none"> • <i>Shop Maintenance and Safety</i> 	2 weeks	
<ul style="list-style-type: none"> • <i>Tractor Maintenance and Repair</i> 	12 weeks	
<ul style="list-style-type: none"> • <i>Machinery Maintenance</i> 	1 week	
<ul style="list-style-type: none"> • <i>SAE Proficiencies</i> 	3 weeks	
<ul style="list-style-type: none"> • <i>Electrical Controls</i> 	4 weeks	
<ul style="list-style-type: none"> • <i>Plumbing</i> 	4 weeks	
<ul style="list-style-type: none"> • <i>Hydraulics</i> 	4 weeks	
<ul style="list-style-type: none"> • <i>Commercial Driver's License and Equipment Loading and Transport</i> 	4 weeks	

Strands	Course Level Expectations
Maintenance and Safety	<p>A safe environment prevents injuries, protects equipment and the environment, and increases productivity. Combustible materials such as gas, oil and grease all have different chemical properties and we must know these properties to address fire safety.</p> <p>A well-organized and well-maintained shop ensures effective use of time and increased longevity of equipment</p>
Tractor Maintenance & Repair	<p>Preventative maintenance ensures equipment longevity, decreased cost over time, and protection of equipment to avoid failures.</p> <p>Proper calibration & adjustment allows for a reduced cost in repairs, more efficient fuel use & increase operational hours.</p> <p>Gasoline, diesel and liquid propane engines ignite through methods requiring different engine components and servicing techniques.</p> <p>A complete knowledge of how a well-maintained tractor operates is necessary in order to properly diagnose and perform maintenance.</p>
Electrical Controls	<p>Electrical Theory includes scientific principles and laws and in turn are essential to maintaining safety protocol with electrical circuits.</p> <p>Universal electrical symbols and schematics are used to create an industry wide understanding in order to maintain consistency and safety.</p>
Plumbing and Hydraulics	<p>The properties and fundamentals of plumbing material vary and each requires different tools, connection methods and maintenance.</p> <p>A safe environment prevents injuries, protects equipment and the environment, and increases productivity.</p> <p>Understanding mathematical law allows you to determine the force, pressure and power of any given hydraulic system.</p> <p>Hydraulic systems that are inaccurately assembled would create an unsafe work environment and danger.</p>
Loading and Transporting	<p>Pre-trip inspection of equipment allows for the operator to fully examine all safety protocol to ensure transportation.</p> <p>Securing a load includes finding the center of gravity, distribution of weight, using properly rated tie downs.</p>

Unit Title	Shop Maintenance and Safety	Length of Unit	2 weeks
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Inquiry Questions (Engaging & Debatable)	<ul style="list-style-type: none"> • Why is shop safety essential? • How does knowledge of science help us create a safe environment? • Why is shop maintenance and organization important?
Standards	<p>Power, Structural and Technical Systems Standards and Performance Elements</p> <p>Pathway Content Standard: Use physical science principles and engineering applications with power, structural, and technical systems to solve problems and improve performance.</p> <p>PST.01- Use physical science principles and engineering applications with power, structural and technical systems to solve problems and improve performance. PST.01.0 – Apply physical science laws and principles to identify, classify, and use lubricants.</p> <p>PST.04- Follow architectural and mechanical plans to construct agricultural buildings and facilities.</p> <p>PST.04.04. Follow architectural and mechanical plans to construct and/or repair equipment, buildings and facilities.</p>
Unit Strands & Concepts	Reviewing Shop Rules, Reviewing Safety Precautions, Shop Maintenance, Facility Review and Repair, preventative moves, organization and reasoning, shop rules, identification processes, local, state and federal regulations, outbuilding repair
Key Vocabulary	elevation, survey, angle, theory, leveling, foundation, stadia, outbuilding, regulation, longevity

Unit Title	Shop Maintenance and Safety	Length of Unit	2 weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> • why a well run shop has rules for work and rules for safety. • ways to identify tools and equipment. • why cleaning and maintenance is important a high functioning work environment. • local, state and federal regulations regarding safety of a shop, materials and lubricants. 	<ul style="list-style-type: none"> • explain shop rules and safety precautions to another. • provide a tour of facility and shop • conduct a facility review and shop tour • identification of equipment and tools essential to task. • organize and cleaning of shop equipment and facility • paint or protect with coatings. • preform equipment preventative maintenance • select, use and dispose of lubricants according to local, state and federal regulations. • work on an outbuilding repair project.

Assessments:	<ul style="list-style-type: none"> • Summative Assessment: Terminology, Content Knowledge, Diagrams, Measurement. • Formative Assessments (Terminology) • Performance Assessment – Safety Mapping Project
Teacher Resources:	<ul style="list-style-type: none"> ❖ Cooper, Elmer. <u>Agricultural Mechanics: Fundamental and Applications</u>. 2nd Edition. Delmar Publishers Inc. 1992

Unit Title	Tractor Maintenance and Repair	Length of Unit	12 weeks
Inquiry Questions (Engaging Debatable):	<ul style="list-style-type: none"> • Why is preventative maintenance important? • How does calibration and adjustment of different mechanical systems directly correlate to tractor longevity? • How do chemical properties of different fuels affect engine ignition? • Why do we need to know how each system within the body functions? 		
Standards	<p>Power, Structural and Technical Systems Standards: PST.01. The physical science principles and engineering applications with power, structural and technical systems to solve problems and improve performance. PST.01.0. Apply physical science laws and principles to identify, classify and use lubricants. PST.01.02. Identify and use hand and power tools and equipment for service, construction and fabrication. PST.02. Design, operate and maintain mechanical equipment, structures, biological systems, land treatment, power and technology. PST.02.01. Perform service routines to maintain power unit and equipment. PST.02.02. Operate service and diagnose the condition of power units and equipment. PST.03. Service and repair agricultural mechanical equipment and power systems. PST.03.02. Service and repair power transmission systems of agricultural equipment. PST.03.04. Installs, maintains and troubleshoots agricultural electrical systems.</p>		
Unit Strands & Concepts	<p>Understanding Intake and Exhaust, Understanding Lubrication in an Engine, Understanding Cooling Systems , engine parts, intake and exhaust systems, fuel systems, lubrication systems, cooling systems, fuel, oil, coolant and transfer pumps, circuits, air, fuel and water filters, clearance, friction wear, value system, compression ratios, oxidation</p>		
Key Vocabulary	<p>precleaner, manifold, carburetor, stroke, octane, cetane, carburetor, governor, crankcase, regulator, viscosity, thermostat, hydrometer, alternator, generator, starter, coil, ignition voltage regulator, electrolyte, hydrogen, distributor, points, condenser, rotor, polarization</p>		

Unit Title	<i>Tractor Maintenance and Repair</i>	Length of Unit	12 weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> • engine intake and exhaust systems • and identify engine fuel systems • and identify engine lubrication systems • and identify engine cooling systems • and identify engine electrical systems 	<ul style="list-style-type: none"> • share shop rules and safety precautions and their importance • explain preventative maintenance techniques and implement tractor safety • diagnose engine intake and exhaust systems • diagnose engine fuel systems • diagnose engine lubrication systems • diagnose engine cooling systems • diagnose engine electrical systems

Assessments:	<ul style="list-style-type: none"> ● Summative Assessment: Terminology, Content Knowledge, Diagrams, Measurements. ● Performance Assessments: <ul style="list-style-type: none"> ● Farm Tractor Tune Up ● Electrical Analysis – ● Engine Timing and Valve Clearance Exercise ● Lubrication and Fluids Service and Changing ● Vacuum Testing (Intake Manifold) ● Setting Points on Carbureted Gasoline Tractors
Teacher Resources:	❖ Preventative Maintenance. Fundamentals of Machine Operation. John Deere. 1992

Unit Title	<i>Electrical Controls</i>	Length of Unit	12 weeks
Inquiry Questions (Engaging Debatable):	<ul style="list-style-type: none"> • How does understanding Electrical Theory create and maintain a safe working environment? • Why are interpreting electrical symbols and schematics important? 		
Standards	<p>Power, Structural and Technical Systems Standards Pathway Content Standard: Use physical science principles and engineering applications with power, structural, and technical systems to solve problems and improve performance. PST.02. Design, operate and maintain mechanical equipment, structures, biological systems, land treatment, power and technology. PST.02.01. Perform service routines to maintain power unit and equipment. PST.03. Service and repair agricultural mechanical equipment and power systems. PST.03.04. Installs, maintains and troubleshoots agricultural electrical systems.</p>		
Unit Strands & Concepts	Opening Up Information Using Ohm’s Law, A Variety of Electrical Controls, Ways to Wire, How to Troubleshoot Electric Issues, Ohms Law, Electrical Controls, Circuits Electrical failures,		
Key Vocabulary	Voltage, Amperage, Current, Wattage, Resistance, Electrical potential, Ohm’s Law Pole, Throw, Neutral, Ground, Magnetic motor starter switch, Momentary switch, Resistor		

Unit Title	<i>Electrical Controls</i>	Length of Unit	12 weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> ● Ohms law and its importance ● identify various (14) electrical controls ● ways to wire an electrical switch ● how to read a multi-meter ● a process for calculating voltage, wattage and resistance 	<ul style="list-style-type: none"> ● calculate voltage, wattage, and resistance through Ohm's Law ● identify Ohms on a resistor using color charts. ● install, and operate 14 electrical controls. correctly wire an electric switch ● utilize a multi-meter to diagnose electrical failures

Assessments:	<ul style="list-style-type: none"> ● Terminology Formative Assessments ● Calculate Voltage, Wattage, and Resistance with Ohm's Law. ● Electric Controls Exercise.
Teacher Resources:	<ul style="list-style-type: none"> ❖ <i>Cooper, Elmer. <u>Agricultural Mechanics: Fundamental and Applications</u>. 2nd edition. Delmar Publishers Inc. 1992</i>

Unit Title	<i>Plumbing</i>	Length of Unit	4 weeks
Inquiry Questions (Engaging Debatable):	<ul style="list-style-type: none"> • Why is it important to understand the properties of different plumbing materials? • Why do properties and fundamentals of plumbing material vary and require different tools, connection methods and maintenance. • Why do craftsman strive for a safe environment? 		
Standards	<p>Power, Structural and Technical Systems Standards Pathway Content Standard: Use physical science principles and engineering applications with power, structural, and technical systems to solve problems and improve performance PST.01. Use physical science principles and engineering applications with power, structural and technical systems to solve problems and improve performance. PST.01.02. Identify and use hand and power tools and equipment for service, construction and fabrication. PST.04. Follow architectural and mechanical plans to construct agricultural buildings and facilities.: PST.04.04 Follow architectural and mechanical plans to construct and/or repair equipment, buildings and facilities.</p>		
Unit Strands & Concepts	Pipe Collections, Understanding Connectors, Sweat and Solder connections, sealing, soldering, sweating		
Key Vocabulary	PVC, CPVC, ABS, PE, Schedule, Pipe thread, Galvanize Street elbow, Coupling, Union, Cap, Plug, Solder		

Unit Title	<i>Plumbing</i>	Length of Unit	4 weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> • identify pipe collections • different plastic pipes • different cleaners, glues and connections • a way to sweat a copper pipe • solder methods 	<ul style="list-style-type: none"> • identify and utilize pipe collection • distinguish between four different plastic pipes • identify ten pipe connection • bond plastic pipes using cleaner, glue, and connection • successful sweat a copper pipe connection with flux and solder • use Teflon tape to produce air tight connection with steel threaded pipe.

Assessments:	<ul style="list-style-type: none"> • Performance Assessment: Students Choose between steel, copper, and plastic pipe to perform a correct connection procedure. • Summative Assessment: Terminology, content knowledge, diagrams, diagnosis scenarios. <ul style="list-style-type: none"> • Copper Sweating Exercise • PVC Connection Exercise • Steel Pipe Connection Exercise • Terminology Formative Assessments
Teacher Resources:	<ul style="list-style-type: none"> ❖ Cooper, Elmer. <u>Agricultural Mechanics: Fundamental and Applications</u>. 2nd edition. Delmar Publishers Inc. 1992

Unit Title	<i>Hydraulics</i>	Length of Unit	4 weeks
Inquiry Questions (Engaging Debatable):	<ul style="list-style-type: none"> • How do mathematical laws apply to the fundamentals of hydraulics? • Why is it important to understand how hydraulic systems are put together? 		
Standards	<p>Power, Structural and Technical Systems Standards Pathway Content Standard: Use physical science principles and engineering applications with power, structural, and technical systems to solve problems and improve performance PST.01. Use physical science principles and engineering applications with power, structural and technical systems to solve problems and improve performance. PST.01.02. Identify and use hand and power tools and equipment for service, construction and fabrication. PST.03. Service and repair agricultural mechanical equipment and power systems. PST.03.03. Service and repair hydraulic and pneumatic systems.</p>		
Unit Strands & Concepts	Pascal's Law, Pumps and Purpose, Open vs. Closed Systems, Pumping, Open systems, Closed systems,		
Vocabulary	Pascal's Law Flared Tubing, Internal gear pump, External gear pump, Lobe pump, Rotor pump, Vane pump, Open system, Closed system, Trapped oil, Pressure relief valve		

Unit Title	<i>Hydraulics</i>	Length of Unit	4 weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> • five hydraulic pumps • how to identify hydraulic connections • Pascal's laws • various hydraulic concepts 	<ul style="list-style-type: none"> • Identify hydraulic connections • explain five hydraulic pumps and their workings • calculate hydraulic force • utilize Pascal's Law in operations • Apply hydraulic concepts to a simulator

Assessments:	<ul style="list-style-type: none"> • Performance Assessment – Complete Training Program on the Hydraulic Simulator. • Summative Assessment: Terminology, Content Knowledge, Diagrams, Diagnosis Scenarios
Teacher Resources:	<ul style="list-style-type: none"> ❖ Cooper, Elmer. <u>Agricultural Mechanics: Fundamental and Applications</u>. 2nd edition. Delmar Publishers Inc. 1992

Unit Title	CDL & Equipment Loading and Transportation	Length of Unit	4 weeks
Inquiry Questions (Engaging Debatable):	<ul style="list-style-type: none"> • What is the importance of performing a pre-trip inspection? • How do you safely secure a load? 		
Standards	<p>Power, Structural and Technical Systems Standards Pathway Content Standard: Use physical science principles and engineering applications with power, structural, and technical systems to solve problems and improve performance. PST.01. Use physical science principles and engineering applications with power, structural and technical systems to solve problems and improve performance. PST.01.02. Identify and use hand and power tools and equipment for service, construction and fabrication. PST.02. Design, operate and maintain mechanical equipment, structures, biological systems, land treatment, power and technology. Performance Indicator: PST.02.02. Operate service and diagnose the condition of power units and</p>		
Unit Strands & Concepts	Understanding How to Conduct a Pre-trip inspection, Being Aware of Hazards, Safe Operation of Commercial Vehicles, Forklifts, Loading and Tie Downs, standard transmissions, inspections, hazards, tie down, commercial driving		
Vocabulary	Air Brake, Pre-trip inspection, Service Brake, Parking Brake, Steering box, Drag link, Pitman arm, Steering knuckle, Tie rod		

Unit Title	CDL & Equipment Loading and Transportation	Length of Unit	4 weeks
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> • the parts of an air braking system on a commercial vehicle • strategies for operating a vehicle with standard transmission • safety measures necessary when operating a forklift • a process for pre inspection. 	<ul style="list-style-type: none"> • Identify and test an air braking system on a commercial vehicle • Understand safety hazards of commercial driving • Complete a pre-trip inspection of a commercial vehicle • Operate a commercial vehicle with a standard transmission • Safely operate a forklift • Load tie down strategies

Assessments:	<ul style="list-style-type: none"> • Summative Assessment: Knowledge Assessment • Forklift Safety Course and Test • Performance Assessment –Complete CT DMV CDL test without road test and static course
Teacher Resources:	<ul style="list-style-type: none"> ❖ <i>CT DOT Commercial Drivers Manual</i> ❖ Manipulatives and Diagrams