

Student Name: _____

Date: _____

PROGRAM COMPETENCY PROFILE FOR CAREER TECHNICAL EDUCATION
Career Cluster: Transportation, Distribution & Logistics

Program Name: Heavy Equipment Maintenance Technology/Technician

CIP: 470302

Effective 9/2015

National: AED Foundation Construction Equipment Technology

Safety/Administrative- Electronics/Electrical- Hydraulics/Hydrostatics- Power Trains- Diesel Engines- Air Conditioning/Heating

Competencies (statement that provides the overview and defines the instructional area) Student will:	Knowledge, Content and Skills (what a student needs to know and be able to do and upon which they will be assessed) http://www.careertech.org/career-ready-practices http://www.education.nh.gov/career/career/aaoi.htm	NHCCSS English Language Arts & Literacy=ELA Mathematics=M http://www.education.nh.gov/competencies/index.htm	Rating Scale -Sample Performance Assessments (Performance tasks the student needs to demonstrate in order to be rated proficient in meeting the competency) Student will:				
Understand the Personal and Environmental Safety practices in accordance with local, state and federal regulations	1. Identify general shop safety rules and procedures.	ELA: 2,5,6,7,8,9	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example: As the safety trainer for Caterpillar, who have to include the following topics in your presentation to new hires: <ul style="list-style-type: none"> • Standard guidelines and procedures for reducing risk and injury in the workplace (e.g., following established safety guidelines such as those set out by the Workers' Compensation Board, knowing own abilities and limits, using safety and personal protective equipment, knowing where to go to address a problem) • Primary causes of injury to young workers (e.g., inability to recognize and respond appropriately to hazards, lack of training) • Factors that contribute to making workers and workplaces physically and emotionally safe (e.g., safety training programs, team building, harassment policies) • Hand tool and equipment operations • Propose strategies to minimize workplace hazards Cont. to # 7	1	2	3	4
1	2	3	4				
	2. Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. (PPE)		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example:	1	2	3	4
1	2	3	4				

Key: Rating Scale: 1 NO EXPOSURE; 2 = NOVICE (Information was covered in class, but student cannot demonstrate skill or knowledge without significant supervision); 3 = PROFICIENT (Student regularly demonstrates the knowledge or skill); 4= MASTERY (Student demonstrates successful completion of this skill numerous times without supervision.)

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All Aspect Industry (AAI) Career Ready Practices (CRP)

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Student will:	Student will:		Student will:				
	3. Discuss and know the purpose of Material Safety Data Sheets (MSDS) and requirements to meet OSHA standards. AAI 8. Health, Safety, and Environment: Explain the health and safety laws and practices affecting the employee, the surrounding community, and the environment in this industry. CRP: Employ valid and reliable research strategies.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example:	1	2	3	4
1	2	3	4				
	4. Identify basic tools and equipment appropriate to this industry.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example:	1	2	3	4
1	2	3	4				
	5. Demonstrate the appropriate use of basic hand tools to complete work functions.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example:	1	2	3	4
1	2	3	4				
	6. Demonstrate correct operation of power tools and stationary equipment.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example:	1	2	3	4
1	2	3	4				
	7. Conduct routine inspections and maintenance of hand tools and power equipment		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example:	1	2	3	4
1	2	3	4				
	8. Perform basic mechanical skills. AAI 4. Technical & Production Skills: Identify specific production and technical skills required for this industry.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example: As a heavy equipment technician, perform a preventative maintenance inspection on a vehicle to include oil change, brake inspection and tire rotation. And note where adjustments are required. You will submit the PM checklist to your supervisor.	1	2	3	4
1	2	3	4				
	9. Identify and demonstrate basic welding and cutting tasks (Stick welder, Wire feed welder)		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example: As a heavy equipment technician you received a work order with a customer complaint of hydraulic auxiliary valves being broken off a machine while working. You will need to design and fabricate a guard to prevent this from happening in the future. Detail your repairs through a service report.	1	2	3	4
1	2	3	4				

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Student will:	Student will:		Student will:				
	10. Demonstrate the ability to retrieve specifications, part numbers, bulletins, schematics, produce reports, and similar types of information using Manufacturers' software and/or internet based resources. AAI 5. Underlying Principles of Technology: Explain through discussion the technological systems used within this industry. CRP: Use technology to enhance productivity.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> <p>For example: As a shop foreman, you have witness a recent increase in specific engine component failure. Use Caterpillar SIS WEB to research tech service bulletins and check for an updated part number for the component in question. This will be posted so technicians are aware of this issue.</p>	1	2	3	4
1	2	3	4				
Understand the procedures and techniques of Diesel Engine Systems in order to repair and maintain proper operation of powered trucks and equipment	11. Diagnose and repair engine block.	ELA: 2, 3, 4, 6, 9 M: 1	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> <p>For example: As a technician in a heavy equipment service department you are given a work order for a piece of construction equipment. The customer is requesting that the engine be overhauled due to a combination of low power, hard starting, excessive leaks, and excessive smoking. As the technician assigned to the machine, with the aid of the service/parts manuals and online service information, perform necessary diagnostic checks and precision measurements to complete a parts order to overhaul the engine, if necessary, for a customer quote. Make sure to properly document all diagnostic tests and measurements by completing an engine measurement sheet and service report. Cont. to #19</p>	1	2	3	4
	1	2	3	4			
	12. Diagnose and repair lubrication system.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> <p>For example:</p>	1	2	3	4
	1	2	3	4			
13. Diagnose and repair cooling system.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
1	2	3	4				
14. Diagnose and repair air induction and exhaust systems		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
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Student will:	Student will:	Student will:				
	15. Diagnose and repair fuel system.	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 20px; text-align: center;">1</td> <td style="width: 20px; text-align: center;">2</td> <td style="width: 20px; text-align: center;">3</td> <td style="width: 20px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4			
	16. Diagnose and repair mechanical fuel injection.	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 20px; text-align: center;">1</td> <td style="width: 20px; text-align: center;">2</td> <td style="width: 20px; text-align: center;">3</td> <td style="width: 20px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4			
	17. Diagnose and repair electronic fuel management system.	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 20px; text-align: center;">1</td> <td style="width: 20px; text-align: center;">2</td> <td style="width: 20px; text-align: center;">3</td> <td style="width: 20px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4			
	18. Inspect and adjust engine brakes.	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 20px; text-align: center;">1</td> <td style="width: 20px; text-align: center;">2</td> <td style="width: 20px; text-align: center;">3</td> <td style="width: 20px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
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	19. Diagnose and repair mechanical fuel injection.	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 20px; text-align: center;">1</td> <td style="width: 20px; text-align: center;">2</td> <td style="width: 20px; text-align: center;">3</td> <td style="width: 20px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4			
	20 Identify explain diagnose and repair clutch or torque converter	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 20px; text-align: center;">1</td> <td style="width: 20px; text-align: center;">2</td> <td style="width: 20px; text-align: center;">3</td> <td style="width: 20px; text-align: center;">4</td> </tr> </table> <p>For example: As a service writer for a repair shop a customer comes to you with questions on a repair bill involving a clutch or torque converter. You must be able to show the customer examples of a clutch or torque converter and a detailed explanation of how they work.</p>	1	2	3	4
1	2	3	4			
Understand the procedures and techniques of Power Train Systems in order to repair and maintain proper operation of heavy equipment	21 Identify and explain, diagnose and repair transmissions. -standard -automatic -power shift	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 20px; text-align: center;">1</td> <td style="width: 20px; text-align: center;">2</td> <td style="width: 20px; text-align: center;">3</td> <td style="width: 20px; text-align: center;">4</td> </tr> </table> <p>For example: As a technician in a heavy equipment service department you are given a work order for a piece of construction equipment. The customer complaint is that the transmission is having shifting issues. Use available service manuals and online service portal to look up and perform diagnostic test on the transmission in order to make a repair quote for the customer.</p>	1	2	3	4
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Student will:	Student will:		Student will:				
	22. Diagnose and repair driveshaft and universal joint.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example: As a technician in a heavy equipment service department you are given a work order for an over the road truck. The customer complaint is that there is a vibration when accelerating between certain speeds ranges. Perform the appropriate diagnostic checks and make repairs as necessary. Document all diagnostics and repairs by completing a service report.</p>	1	2	3	4
1	2	3	4				
	23. Diagnose and repair drive axle.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example: As a technician in a heavy equipment service department you are given a work order for a piece of construction equipment. The customer has two complaints. The first complaint is a loud bang when shifting between forward and reverse. The second complaint is a grinding/growling sound when turning. Operate unit to verify customer complaints then diagnose and repair any axle issues that exist. Document diagnostic checks and repairs by completing a service report.</p>	1	2	3	4
1	2	3	4				
Understand the procedures and techniques of Brake Systems in order to repair and maintain proper operation of heavy equipment	24. Diagnose and repair air brakes.	ELA 2, 3, 4, 6, 9 M: 1	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example: As a technician in a heavy equipment service department you are given a work order for a piece of construction equipment. The customer has multiple complaints. The parking brakes are not holding there is a pulsation when the brake pedal is applied, and it takes excessive effort to bring the unit to a stop the ABS light is also illuminated on the instrument panel. Perform a full brake inspection and make necessary repairs. Cont. to #32</p>	1	2	3	4
	1	2	3	4			
	25. Diagnose and repair mechanical and foundation brakes.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4				
26. Diagnose and repair parking brakes.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
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Student will:	Student will:		Student will:				
	27. Diagnose and repair hydraulic brakes.		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4				
	28. Diagnose and repair power assist units.		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
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	29. Diagnose and service air and hydraulic antilock brake systems (ABS) and automatic traction control (ATC).		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4				
Understand the procedures and techniques of Steering / Suspension Systems in order to repair and maintain proper operation of heavy equipment	30. Diagnose and repair steering systems as it pertains to on and off highway equipment	ELA: 2, 3, 4, 6, 9 M: 1	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example: As a technician in a heavy equipment service department you are given a work order for an over the road truck. The customer has multiple complaints. The truck seems to be difficult to steer, taking extra effort. There is a clunking sound when going over bumps and the truck seems to be wearing out the steering axle tires inconsistently across tread. Inspect steering and suspension of truck and make note of repairs required and adjustments made by completing a service report. Cont. to #35</p>	1	2	3	4
	1	2	3	4			
31. Diagnose and repair suspension systems.		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
1	2	3	4				
	32. Diagnose, adjust and repair wheel alignment.		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
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Student will:	Student will:		Student will:				
	33. Diagnose and repair wheels and tires. <ul style="list-style-type: none"> • Wheel bearings adjustment 		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> <p>For example: As a technician in a heavy equipment service department you are given a work order for a piece of construction equipment. The customer has two complaints. The first complaint is a loud bang when shifting between forward and reverse. The second complaint is a grinding/growling sound when turning. Operate unit to verify customer complaints then diagnose and repair any axle issues that exist. Document diagnostic checks and repairs by completing a service report.</p>	1	2	3	4
1	2	3	4				
Understand the procedures and techniques of Electronics/ Electrical Systems in order to repair and maintain proper operation of heavy equipment	34. Know Ohm's law and Kerchoff 1st and 2nd law	ELA: 2, 3, 4, 6, 9 M: 1	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> <p>For example: As a technician in a heavy equipment service department you are given a work order for a piece of construction equipment. The customer states the machine has multiple electrical issues. Multiple lights on the unit are inoperative, the alternator charge indicator isn't showing a reading, the unit has a hard time starting at times, and he has replaced the battery twice in the last 6 months. Perform appropriate diagnostic checks/repairs using available service manuals and electrical schematics. Document diagnostic tests and repairs made by completing a service report. Cont. to #49</p>	1	2	3	4
	1	2	3	4			
	35. Demonstrate ability to convert between kilo, milli, and micro units. CRP: Apply appropriate academic and technical skills.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4				
36. Identify the basic electrical/electronic symbols		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
1	2	3	4				
	37. Demonstrate the ability to trace various circuits using wiring schematics/diagrams		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> <p>For example:</p>	1	2	3	4
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All Aspect Industry (AAI) Career Ready Practices (CRP)

PROGRAM COMPETENCY PROFILE FOR CAREER TECHNICAL EDUCATION

Career Cluster: Transportation, Distribution & Logistics

Program Name: Heavy Equipment Maintenance Technology/Technician

CIP:470302

Effective 9/2015

National: AED Foundation Construction Equipment Technology

Safety/Administrative - Electronics/Electrical- Hydraulics/Hydrostatics- Power Trains- Diesel Engines- Air Conditioning/Heating

Competencies (statement that provides the overview and defines the instructional area)	Knowledge, Content and Skills (what a student needs to know and be able to do and upon which they will be assessed)	Rating Scale -Sample Performance Assessments (Performance tasks the student needs to demonstrate in order to be rated proficient in meeting the competency)				
Student will:	Student will:	Student will:				
	38. Demonstrate how to read and use schematics/ diagrams	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4			
	39. Demonstrate the ability to use schematic diagrams and follow troubleshooting flow charts in selected technical manuals CRP: Communicate clearly and effectively and with reason	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4			
	40. Diagnose general electrical systems. CRP: Utilize critical thinking to make sense of problems and persevere in solving them.	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4			
	41. Diagnose and repair battery.	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4			
	42. Diagnose and repair starting system.	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4			
	43. Diagnose and repair charging system.	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4			
	44. Diagnose and repair lighting systems.	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4			
	45. Diagnose and repair gauges and warning devices.	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4			
	46. Diagnose and repair related electrical systems.	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
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Student will:	Student will:		Student will:				
Understand the procedures and techniques of Heating, Ventilation and Air Conditioning (HVAC) in order to repair and maintain proper operation of heavy equipment	47. Discuss and use terminology and abbreviations related to AC/H	ELA 2, 3, 4, 6, 9 M: 1	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example: As a technician at a truck shop you receive a work order with a customer complaint of climate control system not functioning properly. Perform tests to check the operation/performance of the HVAC. If there is an issue, discuss possible causes. If there is no issue, discuss performance specifications with the customer. Cont. to #56</p>	1	2	3	4
	1	2	3	4			
	48. Identify, explain and diagnose service and air conditioning (A/C) system and components.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
	1	2	3	4			
	49. Diagnose, service and repair heating and engine cooling systems.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
	1	2	3	4			
	50. Diagnose service and repair operating systems and related electrical controls.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4				
51. Diagnose, service and repair operating systems and related air, vacuum and mechanical controls.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
1	2	3	4				
52. Identify and explain the use of proper tools to recover, recycle and recharge AC systems.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
1	2	3	4				
53. Discuss environmental concerns pertaining to refrigerants and the safe handling of refrigerants. CRP: Consider the environmental, social and economic impacts of decisions		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
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Student will:	Student will:		Student will:				
Understand the procedures and techniques of General Preventive Maintenance order to repair and maintain proper operation of heavy equipment	54. Discuss, explain and perform preventative engine system maintenance.	ELA: 2, 3, 4, 6, 9	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example: As a technician for a company's fleet of equipment you are assigned to perform an annual preventative maintenance inspection on a machine. Document all items inspected/serviced by completing a PM checklist. Cont. to #74</p>	1	2	3	4
	1	2	3	4			
	55. Perform preventative fuel system maintenance.		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
	1	2	3	4			
	56. Perform preventative air induction and exhaust system maintenance.		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
	1	2	3	4			
	57. Perform preventative cooling system maintenance.		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
	1	2	3	4			
58. Perform preventative lubrication system maintenance.		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
1	2	3	4				
59. Perform preventative instruments and controls maintenance.		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
1	2	3	4				
60. Perform preventative safety equipment maintenance.		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
1	2	3	4				
61. Perform preventative hardware maintenance.		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
1	2	3	4				
62. Perform preventative heating, ventilation and air conditioning (HVAC) maintenance.		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
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Student will:	Student will:		Student will:				
	63. Perform preventative battery and starting systems maintenance.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> For example:	1	2	3	4
1	2	3	4				
	64. Perform preventative charging system maintenance.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> For example:	1	2	3	4
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	65. Perform preventative lighting system maintenance.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> For example:	1	2	3	4
1	2	3	4				
	66. Perform preventative air brakes maintenance.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> For example:	1	2	3	4
1	2	3	4				
	67. Perform preventative hydraulic brakes maintenance.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> For example:	1	2	3	4
1	2	3	4				
	68. Perform preventative drive train maintenance.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> For example:	1	2	3	4
1	2	3	4				
	69. Discuss and explain preventative suspension and steering systems maintenance.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> For example:	1	2	3	4
1	2	3	4				
	70. Discuss and explain preventative frame and fifth wheel maintenance.		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> For example:	1	2	3	4
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Student will:	Student will:		Student will:				
Understand the operations and functions of Hydraulic Systems in order to understand the system failures that can arise from many points within the system	71. Know and use the terminology and abbreviations related to hydraulics	ELA :2, 3, 4, 6, 9 M: 1	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example: As a design engineer for a construction equipment manufacturer you are assigned the task of designing a hydraulic system for a piece of equipment. You must design a hydraulic schematic using proper schematic symbols and layout. Cont. to #77</p>	1	2	3	4
	1	2	3	4			
	72. Discuss and explain general system Hydraulic operations		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4
1	2	3	4				
73. Be knowledgeable in basic Hydraulic functions and circuits		<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example:</p>	1	2	3	4	
1	2	3	4				
Understand the necessary career readiness and employability skills in order to achieve success in today's workplace	74. Demonstrate personal growth, community leadership, democratic principles and social responsibility by participating in activities/events offered through student and professional organizations. CRP: Act as a responsible and contributing citizen and employee. Model integrity, ethical leadership and effective management AAI 9. Personal Work Habits: Explain the work habits an employer looks for in an employee in this industry. CRP: Plan education and career paths aligned to personal goals. Attend to personal health and financial well-being. CRP: Attend to personal health and financial well-being. CRP: Work productively in teams while using cultural global awareness. -	ELA: 2, 3, 4, 6, 9	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td style="width: 25px; text-align: center;">1</td> <td style="width: 25px; text-align: center;">2</td> <td style="width: 25px; text-align: center;">3</td> <td style="width: 25px; text-align: center;">4</td> </tr> </table> <p>For example: You have gone to your supervisor requesting a performance review do to the completion of additional trainings attended. You have completed the self-evaluation form that identifies the additional knowledge and skills, which you feel justifies why you should be promoted. A meeting will be scheduled.</p>	1	2	3	4
1	2	3	4				

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Competencies (statement that provides the overview and defines the instructional area)	Knowledge, Content and Skills (what a student needs to know and be able to do and upon which they will be assessed)		Rating Scale -Sample Performance Assessments (Performance tasks the student needs to demonstrate in order to be rated proficient in meeting the competency)				
Student will:	Student will:		Student will:				
Understand the fundamental concepts of entrepreneurship / business owner and their influence on the economy	75. Discuss and assess business creation possibilities and identify the steps in planning the business. AAI 1. Planning: Explain the key elements of a long-term plan for a successful company. AAI 2. Management: Discuss the different forms of management and ownership within this industry. AAI 3. Finance: Explain the key components of financial management of a company. AAI 6. Labor Issues: Explain the employees' and employers' rights and responsibilities in this industry. AAI 7. Community Issues: Discuss the ways a company can impact its community and the ways a community can impact a company. CRP: Demonstrate creativity and innovation.	ELA: 2, 3, 4, 6, &9	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;">2</td> <td style="width: 25%;">3</td> <td style="width: 25%;">4</td> </tr> </table> For example: You have decided that you want to start your own business. You have made an appointment to meet with a small business representative from SCORE (non-prohibit organization for entrepreneurs) to discuss the concept of being a business owner. The representative has asked you to review sites on the internet before the meeting. http://www.entrepreneur.com/personalityquiz http://www.nhsbdc.org/node/70	1	2	3	4
1	2	3	4				

Key: Rating Scale: 1 NO EXPOSURE; 2 = NOVICE (Information was covered in class, but student cannot demonstrate skill or knowledge without significant supervision); 3 = PROFICIENT (Student regularly demonstrates the knowledge or skill); 4= MASTERY (Student demonstrates successful completion of this skill numerous times without supervision.)

Common Core: E=English Language Arts (Reading, Writing, Research, Listening Speaking, Technology) M=Mathematics (Numbers Quantity, Algebra, Functions, Geometry Stat&Prob)

All Aspect Industry (AAI) Career Ready Practices (CRP)