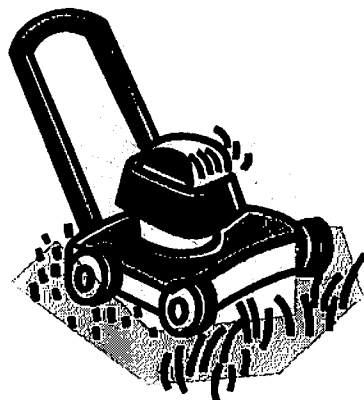
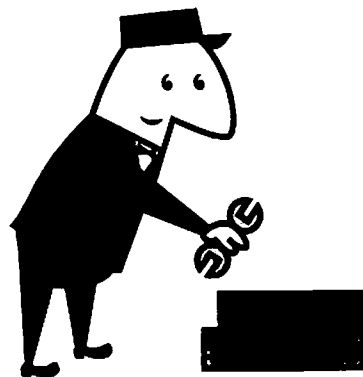


# **Lewis & Clark Career Center**

## **Curriculum Guide**

### **Power Equipment Technology**



# **Curriculum Guide For Power Equipment Technology**

**Course Rationale, Course Description, Units of Study**

**Competencies**

**Crosswalk to Show Me Standards**

**Articulation Agreements**

**Employer Survey / Advisory Board Minutes**

**Instructional Methods**

**Integrated Lesson Sample**

**Work Experience Program**

**SkillsUSA Officers**

**Teacher Certification**

**School and Program Policies and Procedures**

**Inventory**

**Program Enrollment Data**

**Placement Data**

**Program Evaluation**

**Program Brochures/Enrollment Packet**

**Miscellaneous**

## **POWER EQUIPMENT TECHNOLOGY**

1 and/or 2 year program; 3 units of credit per year

This program prepares juniors and/or seniors to diagnose and repair two- and four-cycle engines on such equipment as lawn mowers, chainsaws, roto tillers, edgers and trimmers. Power equipment instruction ranges from home-use equipment to commercial equipment.

Students will learn to adjust, clean, lubricate and when necessary replace worn or defective parts such as spark plugs, ignition parts, valves and carburetors. Other skills taught include wheel alignment, deck repair, blade balancing, blade and chain sharpening, battery testing and electrical repair. Troubleshooting and problem solving on all types of equipment are stressed.

Good reading skills are required, as students will need to be able to refer to service manuals for detailed directions.

# LEWIS & CLARK CAREER CENTER

## POWER EQUIPMENT TECHNOLOGY UNITS OF STUDY

- Safety
- Tools
- Career Opportunities
- Fasteners, Sealants and Gaskets
- Parts Identification
- Engine Identification
- Small Engine Theory and History
- Basic Principles of a 4 Stroke Cycle Engine
- Electronics
  - a. Ignition Systems
  - b. Charging Systems
  - c. General Wiring
- Fuel Systems
- Starters
  - a. Manual
  - b. Electric
- Emissions Systems
- Engine Overhaul
- Two Cycle Engine Theory and Overhaul
- Hydraulic Theory
- Transmissions and Drives
- Trouble Shooting
- Employability Skills
- SkillsUSA
- **Articulated with Construction Craft Laborer Apprenticeship**

**Power Equipment Technology Classroom and Shop Rules and Regulations 2008-2009**

**Classroom Behavior**

Students will be in the classroom setting in their assigned set before the second bell rings. Students will have all necessary classroom materials with them before the second bell rings.

**Necessary Classroom materials**

3 ring binder  
Lined note book paper  
Pen or pencil  
Textbook(s)  
Handouts  
Homework

*With accordance to the St. Charles School District code of conduct all cell Phones must be turned off at all times while the student is on campus.*

**Students will be prepared for shop work each day.**

**Necessary shop materials**

Dark blue work pants (no jeans or shorts)  
Black Tee shirt with sleeves and a front pocket  
Leather work boots  
Safety Glasses (clear or yellow lens only)

*Note: No Jewelry in the shop area, all personal items should be lock in the Locker provided to each student. Long hair with have to be put up In a pony tail or under a hat.*

*\*Student will not be allowed to work in the shop without the proper shop attire.*

*\*Students not working in the shop do not receive daily points on shop days.*

**Student Grades:**

**Power Equipment Technology grading System**

Daily Grades	25% (Employability Skills)
Exams	20%
Written work	20%
Shop projects	35%

*Note: Students must pass the safety exam with 100% in order to Work in the shop.*

**Classroom daily grades are broken down as follows:**

Behavior	5pts
Participation	5pts
Appearance/Punctuality	5pts
Class preparations	5pts
Textbook(s)	
Notebook	
Pen or pencil	
Handouts	
Lined notebook paper	
3 ring binder	

**Shop daily grades are broken down as follows:**

Behavior	5pts
Work ethics	5pts
Preparation/Appearance	5pts
Application of skills	5pts

*Note: Much of this is determined by how well the student  
Completes the Power Equipment Technology  
Competency list.*

**Exams:** Written and hands on exams are conducted on a regular basis to Allow the students to demonstrate their proficiency with the subject material. ( The instructor does use a pretest, mid term and Final as needed to fulfill competency requirements)

**Written Work:** Written work is given on a regular basis, both from the textbook and from other sources. Students are given a specific amount of time to complete the work.

**Shop projects:** Many different types of projects must be complete by the student to master the competency list. Students must demonstrate skills And knowledge in order to complete hands on tasks.

**Lockers:** Students will obey all code of conduct regulations in accordance with lockers.

*Students are reminded that it is their responsibility to lock personal belongs.*

### **Progress Reports**

Progress reports will be sent home around the following dates:

September	12th
November	14th
February	6th
April	6th

### **Quarterly grade reports**

October	10th
December	19th
March	6th
May	To be announced

# LEWIS AND CLARK CAREER CENTER



## SMALL ENGINE TECHNICIAN

**STUDENT:** \_\_\_\_\_

**ID NO:** \_\_\_\_\_

**Rating Scale:**

3	Mastered
2	Requires Supervision
1	Not Mastered
N	No Exposure

3	2	1	N	A. BASIC PERSONAL SAFETY
				1. Demonstrate safe work habits by using approved eye, ear, and skin protection (S01)
				2. Demonstrate safe handling of hazardous materials (S02)
				3. Read and interpret MSDS and other safety publications (S03)
				4. Identify governmental regulations (EPA, DNR, ANSI) (S04)
				5. Recognize industry accepted procedures for using proper safety devices, including lock out/tag and blocking devices (S05)
				6. Use basic personal safety practices (no jewelry, loose clothing, long hair tied back) (S06)
				7. Demonstrate proper lifting practices (So7)
				Other:

3	2	1	N	B. LAB AND TOOL SAFETY
				1. Demonstrate the safe use of lifting and hoisting devices (T01)
				2. Maintain a clean and safe work area (T02)
				3. Demonstrate the safe and proper user of hand tools (T03)
				4. Demonstrate the safe and proper use of power tools (T04)
				5. Identify the proper use of fire extinguishers (T05)
				6. Recognize standard emergency evacuation procedures (T06)
				7. Identify fire hazards (T07)
				8. Identify spill containment (T08)
				9. Demonstrate safe use of cleaning equipment and chemicals (T09)
				Other:

3	2	1	N	C. LAB PROCEDURES
				1. Demonstrate good customer relations skills (A06)
				2. Document service work and supplies on work orders (A07)
				3. Read and interpret service and parts manuals (A08)
				4. Use basic computer skills (A09)
				5. Demonstrate proper use of labor time guides, flat rate time, and billing efficiency (A10)
				6. Explain warranty claim process (A11)
				7. Estimate repair vs. replacement costs (labor, parts) (A12)
				Other:

3	2	1	N	D. TOOLS AND EQUIPMENT
				1. Identify industry-related hand tools (B01)
				2. Demonstrate the proper use of hand tools (B02)
				3. Identify precision measuring tools and equipment (B03)
				4. Demonstrate the proper use and care of precision measuring tools and equipment (B04)
				5. Identify industry-related power tools (B05)
				6. Demonstrate the proper use and care of industry-related power tools (B06)
				7. Identify and use tools to restore threads on fasteners (B09)
				8. Identify diagnostic tools (B10)
				9. Demonstrate the proper use and care of diagnostic tools (B11)
				Other:

**Lewis and Clark Career Center  
Small Engine Technician Competencies**



<b>3</b>	<b>2</b>	<b>1</b>	<b>N</b>	<b>E. FASTENERS</b>
				1. Identify and select industry-related fasteners (C01)
				2. Measure bolts and threads (SAE grade and metric) (C02)
				3. Determine proper torque value for fasteners (C03)
				4. Demonstrate proper torquing technique for fasteners (C04)
				5. Identify and select proper gaskets and sealant (C05)
				Other:

<b>3</b>	<b>2</b>	<b>1</b>	<b>N</b>	<b>F. ENGINE/PRODUCT IDENTIFICATION</b>
				1. Identify the manufacturer, model, and serial number, and type (U01)
				2. Identify emission compliance engines (U02)
				3. Identify safety compliance parts (U03)
				Other:

<b>3</b>	<b>2</b>	<b>1</b>	<b>N</b>	<b>G. FOUR-STROKE CYCLE ENGINES</b>
				1. Describe the operation cycle of the four-stroke cycle engines (N02)
				2. Disassemble a four-stroke cycle engine (N03)
				3. Inspect and service a cylinder (N04)
				4. Inspect and service the pistons, rings, and connection rod (N05)
				5. Inspect and service a crankshaft assembly (N06)
				6. Inspect and service a valve train assembly (N07)
				7. Reassemble a four-stroke engine (N08)
				8. Identify the differences between L-head and over head valve trains (N09)
				9. Test compression (N10)
				Other:

<b>3</b>	<b>2</b>	<b>1</b>	<b>N</b>	<b>H. TWO-STROKE CYCLE ENGINES</b>
				1. Describe the operating cycle of the two-stroke cycle engine (O02)
				2. Disassemble a two-stroke cycle engine (O03)
				3. Inspect and service a cylinder (O04)
				4. Inspect and service the pistons, rings, and connecting rod (O05)
				5. Inspect and service a crankshaft assembly(O06)
				6. Check and replace reed valves (O07)
				7. Reassemble two-stroke cycle engines (O08)
				8. Test compression (O09)
				Other:

<b>3</b>	<b>2</b>	<b>1</b>	<b>N</b>	<b>I. EMISSIONS</b>
				1. List types of emissions (V01)
				2. Describe the consequences of noncompliance with emissions standards (V02)
				3. Comply with manufacturer's emissions standards (V03)
				Other:

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
<p>A.1: Demonstrate proficiency in general safety practices</p>	<p>CA.1: speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)            CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)            CA.6: participating in formal and informal presentations and discussions of issues and ideas            HP.6: consumer health issues (such as the effects of mass media and technologies on safety and health)</p>	<p>1.2: Conduct research to answer questions and evaluate information and ideas            1.4: Use technological tools and other resources to locate, select and organize information            1.7: Evaluate the accuracy of information and the reliability of its sources            1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers            2.7: Use technological tools to exchange information and ideas            3.1: Identify problems and define their scope and elements            3.3: Develop and apply strategies based on one's own experience in preventing or solving problems            3.6: Examine problems and proposed solutions from multiple perspectives            3.7: Evaluate the extent to which a strategy addresses the problem            4.5: Develop, monitor and revise plans of action to meet deadlines and accomplish goals            4.7: Identify and apply practices that preserve and enhance the safety and health of self and others</p>
<p>A.2: Use proper techniques in the care and use of tools and equipment</p>	<p>CA.1: speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)            CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)            CA.6: participating in formal and informal presentations and discussions of issues and ideas            HP.6: consumer health issues (such as the effects of mass media and technologies on safety and health)            SC.8: impact of science, technology and human activity on resources and the environment</p>	<p>1.2: Conduct research to answer questions and evaluate information and ideas            1.4: Use technological tools and other resources to locate, select and organize information            1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers            2.7: Use technological tools to exchange information and ideas            3.1: Identify problems and define their scope and elements            3.6: Examine problems and proposed solutions from multiple perspectives            4.5: Develop, monitor and revise plans of action to meet deadlines and accomplish goals            4.7: Identify and apply practices that preserve and enhance the safety and health of self and others</p>

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
A.3: Demonstrate ability to work accurately with precision tools and instruments	<p>CA.1: speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)</p> <p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.6: participating in formal and informal presentations and discussions of issues and ideas</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p> <p>SC.8: impact of science, technology and human activity on resources and the environment</p>	<p>1.2: Conduct research to answer questions and evaluate information and ideas</p> <p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.1: Plan and make written, oral and visual presentations for a variety of purposes and audiences</p> <p>2.2: Review and revise communications to improve accuracy and clarity</p> <p>2.3: Exchange information, questions and ideas while recognizing the perspectives of others</p> <p>2.6: Apply communication techniques to the job search and to the workplace</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>3.3: Develop and apply strategies based on one's own experience in preventing or solving problems</p> <p>3.6: Examine problems and proposed solutions from multiple perspectives</p> <p>3.7: Evaluate the extent to which a strategy addresses the problem</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>

A.4: Demonstrate ability to use service manuals, part catalogs and price lists	<p>CA.1: speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)</p> <p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.4: writing formally (such as reports, narratives, essays) and informally (such as outlines, notes)</p> <p>CA.6: participating in formal and informal presentations and discussions of issues and ideas</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p> <p>MA.3: data analysis, probability and statistics</p>	<p>1.1: Develop questions and ideas to initiate and refine research</p> <p>1.3: Design and conduct field and laboratory investigations to study nature and society</p> <p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.5: Comprehend and evaluate written, visual and oral presentations and works</p> <p>1.7: Evaluate the accuracy of information and the reliability of its sources</p> <p>1.8: Organize data, information and ideas into useful forms (including charts, graphs, outlines) for analysis or presentation</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.5: Perform or produce works in the fine and practical arts</p> <p>2.6: Apply communication techniques to the job search and to the workplace</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>3.6: Examine problems and proposed solutions from multiple perspectives</p> <p>3.8: Assess costs, benefits and other consequences of proposed solutions</p>
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Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
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4.4: Recognize and practice honesty and integrity in academic work and in the workplace

<p>A.5: Perform tasks within assigned time limits</p>	<p>CA.1: speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)            CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)            CA.4: writing formally (such as reports, narratives, essays) and informally (such as outlines, notes)            CA.6: participating in formal and informal presentations and discussions of issues and ideas            HP.6: consumer health issues (such as the effects of mass media and technologies on safety and health)            MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations            MA.3: data analysis, probability and statistics            SC.8: impact of science, technology and human activity on resources and the environment</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information            1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers            3.6: Examine problems and proposed solutions from multiple perspectives            4.3: Analyze the duties and responsibilities of individuals in societies            4.5: Develop, monitor and revise plans of action to meet deadlines and accomplish goals            4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>B.1: Identify common hand tools</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)            CA.4: writing formally (such as reports, narratives, essays) and informally (such as outlines, notes)            CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.2: Conduct research to answer questions and evaluate information and ideas            1.3: Design and conduct field and laboratory investigations to study nature and society            1.4: Use technological tools and other resources to locate, select and organize information            1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers            2.7: Use technological tools to exchange information and ideas</p>
<p>B.2: Demonstrate the proper use and care of hand tools</p>	<p>CA.1: speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)</p>	<p>1.2: Conduct research to answer questions and evaluate information and ideas            1.4: Use technological tools and other resources to locate, select and organize information</p>

<p><b>KEY:</b> * = may use all "to do" statements            98 = same Frameworks as previous competency</p>	<p># = same Frameworks as previous competency            99 = "to know" statements may not be applicable</p>
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Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.6: participating in formal and informal presentations and discussions of issues and ideas</p> <p>HP.6: consumer health issues (such as the effects of mass media and technologies on safety and health)</p> <p>SC.8: impact of science, technology and human activity on resources and the environment</p>	<p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>3.1: Identify problems and define their scope and elements</p> <p>3.6: Examine problems and proposed solutions from multiple perspectives</p> <p>4.5: Develop, monitor and revise plans of action to meet deadlines and accomplish goals</p> <p>4.7: Identify and apply practices that preserve and enhance the safety and health of self and others</p>
<p>B.3: Identify precision measuring tools and equipment</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.4: writing formally (such as reports, narratives, essays) and informally (such as outlines, notes)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.2: Conduct research to answer questions and evaluate information and ideas</p> <p>1.3: Design and conduct field and laboratory investigations to study nature and society</p> <p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p>
<p>B.4: Demonstrate the proper use and care of precision measuring tools and equipment</p>	<p>CA.1: speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)</p> <p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.6: participating in formal and informal presentations and discussions of issues and ideas</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p> <p>SC.8: impact of science, technology and human activity on resources and the environment</p>	<p>1.2: Conduct research to answer questions and evaluate information and ideas</p> <p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.1: Plan and make written, oral and visual presentations for a variety of purposes and audiences</p> <p>2.2: Review and revise communications to improve accuracy and clarity</p> <p>2.3: Exchange information, questions and ideas while recognizing the perspectives of others</p> <p>2.6: Apply communication techniques to the job search and to the workplace</p> <p>2.7: Use technological tools to exchange information and ideas</p>

<p><b>KEY:</b> * = may use all "to do" statements 98 = same Frameworks as previous competency</p>	<p># = same Frameworks as previous competency 99 = "to know" statements may not be applicable</p>
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Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
		<p>3.3: Develop and apply strategies based on one's own experience in preventing or solving problems</p> <p>3.6: Examine problems and proposed solutions from multiple perspectives</p> <p>3.7: Evaluate the extent to which a strategy addresses the problem</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>B.5: Identify and use related power tools</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.4: writing formally (such as reports, narratives, essays) and informally (such as outlines, notes)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.2: Conduct research to answer questions and evaluate information and ideas</p> <p>1.3: Design and conduct field and laboratory investigations to study nature and society</p> <p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p>
<p>B.6: Demonstrate the proper use and care of related power tools</p>	<p>CA.1: speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)</p> <p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.6: participating in formal and informal presentations and discussions of issues and ideas</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p> <p>SC.8: impact of science, technology and human activity on resources and the environment</p>	<p>1.2: Conduct research to answer questions and evaluate information and ideas</p> <p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.1: Plan and make written, oral and visual presentations for a variety of purposes and audiences</p> <p>2.2: Review and revise communications to improve accuracy and clarity</p> <p>2.3: Exchange information, questions and ideas while recognizing the perspectives of others</p> <p>2.6: Apply communication techniques to the job search and to the workplace</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>3.3: Develop and apply strategies based on one's own experience in preventing or solving problems</p> <p>3.6: Examine problems and proposed solutions from multiple perspectives</p>

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
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3.7: Evaluate the extent to which a strategy addresses the problem  
 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks

B.7: Identify common cutting tools

CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)  
 CA.4: writing formally (such as reports, narratives, essays) and informally (such as outlines, notes)  
 CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)

1.2: Conduct research to answer questions and evaluate information and ideas  
 1.3: Design and conduct field and laboratory investigations to study nature and society  
 1.4: Use technological tools and other resources to locate, select and organize information  
 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers  
 2.7: Use technological tools to exchange information and ideas

B.8: Demonstrate the proper use and care of cutting tools

CA.1: speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)  
 CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)  
 CA.6: participating in formal and informal presentations and discussions of issues and ideas  
 MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations  
 SC.8: impact of science, technology and human activity on resources and the environment

1.2: Conduct research to answer questions and evaluate information and ideas  
 1.4: Use technological tools and other resources to locate, select and organize information  
 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers  
 2.1: Plan and make written, oral and visual presentations for a variety of purposes and audiences  
 2.2: Review and revise communications to improve accuracy and clarity  
 2.3: Exchange information, questions and ideas while recognizing the perspectives of others  
 2.6: Apply communication techniques to the job search and to the workplace  
 2.7: Use technological tools to exchange information and ideas  
 3.3: Develop and apply strategies based on one's own experience in preventing or solving problems  
 3.6: Examine problems and proposed solutions from multiple perspectives  
 3.7: Evaluate the extent to which a strategy addresses the problem  
 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks

<b>KEY:</b> * = may use all "to do" statements 98 = same Frameworks as previous competency	# = same Frameworks as previous competency 99 = "to know" statements may not be applicable
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Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
B.9: Identify and use tools to restore threads on fasteners	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.4: writing formally (such as reports, narratives, essays) and informally (such as outlines, notes) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.2: Conduct research to answer questions and evaluate information and ideas 1.3: Design and conduct field and laboratory investigations to study nature and society 1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas
C.1: Identify and select related fasteners	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.4: writing formally (such as reports, narratives, essays) and informally (such as outlines, notes) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions) MA.2: geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes	1.2: Conduct research to answer questions and evaluate information and ideas 1.3: Design and conduct field and laboratory investigations to study nature and society 1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas
C.2: Measuring bolts and threads, SAE grade and metric	MA.2: geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
D.1: Test, repair or replace fuel pump	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas

<b>KEY:</b> * = may use all "to do" statements 98 = same Frameworks as previous competency	# = same Frameworks as previous competency 99 = "to know" statements may not be applicable
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Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
	<p>MA.2: geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes</p>	<p>3.3: Develop and apply strategies based on one's own experience in preventing or solving problems 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>D.2: Test, repair, or replace fuel filters and strainers</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions) MA.2: geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 3.3: Develop and apply strategies based on one's own experience in preventing or solving problems 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>D.3: Remove, clean and replace fuel tank, shut-off valves, fuel lines, fuel hoses, and connections</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions) MA.2: geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>D.4: Clean, rebuild, or replace diaphragm-type carburetor</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions) MA.2: geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas</p>

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
		4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
D.5: Clean, rebuild, or replace float-type carburetor	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions) MA.2: geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
D.6: Adjust fuel mixture and check for air leaks	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
D.7: Service oil-bath air cleaner	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
D.8: Service oil-foam air cleaner	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
		2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
D.9: Service dry-element air cleaner	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
E.1: Inspect, adjust, and repair air-vane governor system	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 3.6: Examine problems and proposed solutions from multiple perspectives 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
E.2: Inspect, adjust, and repair mechanical governor system and linkages	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 3.6: Examine problems and proposed solutions from multiple perspectives 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
E.3: Adjust engine RPM's to manufacturer's specifications	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
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		<p>3.6: Examine problems and proposed solutions from multiple perspectives                      4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
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<p>F.1: Read and interpret electrical meters</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)                      CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)                      MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations                      SC.1: properties and principles of matter and energy                      SC.7: processes of scientific inquiry (such as formulating and testing hypotheses)                      SC.8: impact of science, technology and human activity on resources and the environment</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information                      1.5: Comprehend and evaluate written, visual and oral presentations and works                      1.6: Discover and evaluate patterns and relationships in information, ideas and structures                      1.7: Evaluate the accuracy of information and the reliability of its sources                      1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers                      2.7: Use technological tools to exchange information and ideas                      3.6: Examine problems and proposed solutions from multiple perspectives                      4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
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<p>F.2: Read electrical schematics</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)                      CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)                      MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations                      SC.1: properties and principles of matter and energy                      SC.7: processes of scientific inquiry (such as formulating and testing hypotheses)                      SC.8: impact of science, technology and human activity on resources and the environment</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information                      1.5: Comprehend and evaluate written, visual and oral presentations and works                      1.6: Discover and evaluate patterns and relationships in information, ideas and structures                      1.7: Evaluate the accuracy of information and the reliability of its sources                      1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers                      2.7: Use technological tools to exchange information and ideas                      3.6: Examine problems and proposed solutions from multiple perspectives                      4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
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Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
F.3: Test, service, and/or replace battery	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p> <p>SC.1: properties and principles of matter and energy</p> <p>SC.7: processes of scientific inquiry (such as formulating and testing hypotheses)</p> <p>SC.8: impact of science, technology and human activity on resources and the environment</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.5: Comprehend and evaluate written, visual and oral presentations and works</p> <p>1.6: Discover and evaluate patterns and relationships in information, ideas and structures</p> <p>1.7: Evaluate the accuracy of information and the reliability of its sources</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>3.6: Examine problems and proposed solutions from multiple perspectives</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
F.4: Test, repair, and/or replace safety interlock	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p> <p>SC.1: properties and principles of matter and energy</p> <p>SC.7: processes of scientific inquiry (such as formulating and testing hypotheses)</p> <p>SC.8: impact of science, technology and human activity on resources and the environment</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.5: Comprehend and evaluate written, visual and oral presentations and works</p> <p>1.6: Discover and evaluate patterns and relationships in information, ideas and structures</p> <p>1.7: Evaluate the accuracy of information and the reliability of its sources</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>3.6: Examine problems and proposed solutions from multiple perspectives</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
F.5: Test, repair, and/or replace charging system components	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p> <p>SC.1: properties and principles of matter and energy</p> <p>SC.7: processes of scientific inquiry (such as formulating and testing hypotheses)</p> <p>SC.8: impact of science, technology and human activity on resources and the environment</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.5: Comprehend and evaluate written, visual and oral presentations and works</p> <p>1.6: Discover and evaluate patterns and relationships in information, ideas and structures</p> <p>1.7: Evaluate the accuracy of information and the reliability of its sources</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>3.6: Examine problems and proposed solutions from multiple perspectives</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
F.6: Test and replace sending units	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p> <p>SC.1: properties and principles of matter and energy</p> <p>SC.7: processes of scientific inquiry (such as formulating and testing hypotheses)</p> <p>SC.8: impact of science, technology and human activity on resources and the environment</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.5: Comprehend and evaluate written, visual and oral presentations and works</p> <p>1.6: Discover and evaluate patterns and relationships in information, ideas and structures</p> <p>1.7: Evaluate the accuracy of information and the reliability of its sources</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>3.6: Examine problems and proposed solutions from multiple perspectives</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
G.1: Remove and service spark plug	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
G.2: Check ignition timing	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
G.3: Test and repair breaker ignition system	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
G.4: Test and repair breakerless ignition system	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
G.5: Troubleshoot ignition systems	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
H.1: Change engine oil and filter	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
H.2: Service crankcase breather	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
H.3: Inspect, repair, and/or replace pressure lubrication system	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
H.4: Inspect and replace splash lubrication components	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)	1.4: Use technological tools and other resources to locate, select and organize information

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
	CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
H.5: Locate and repair leaking gaskets and seals	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
H.6: Demonstrate the ability to mix gas and oil for a 2-stroke cycle engine	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
H.7: Select proper oil	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
I.1: Service air-cooled system	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers

<b>KEY:</b>	* = may use all "to do" statements	# = same Frameworks as previous competency
	98 = same Frameworks as previous competency	99 = "to know" statements may not be applicable

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
		2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
I.2: Service liquid-cooling system	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
I.3: Remove, inspect, repair, and/or replace water pump	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
I.4: Remove, check, and replace thermostat	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions) CA.6: participating in formal and informal presentations and discussions of issues and ideas SC.8: impact of science, technology and human activity on resources and the environment	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
I.5: Perform a pressure test on cooling system	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks

<b>KEY:</b> * = may use all "to do" statements 98 = same Frameworks as previous competency	# = same Frameworks as previous competency 99 = "to know" statements may not be applicable
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Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
I.6: Remove, check, and replace radiator	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
J.1: Service and/or replace a 2-stroke-cycle exhaust system	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
J.2: Service and/or replace a 4-stroke exhaust system	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
K.1: Remove, repair, and/or replace recoil starter	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
K.2: Remove, inspect, and replace starter clutch	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)	1.4: Use technological tools and other resources to locate, select and organize information

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
	CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
L.1: Test and repair starter solenoid	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions) SC.8: impact of science, technology and human activity on resources and the environment	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
L.2: Repair or replace starter motor	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
L.3: Repair or replace related electrical components including safety devices	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
M.1: Troubleshoot the ignition system	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)	1.4: Use technological tools and other resources to locate, select and organize information

<b>KEY:</b> * = may use all "to do" statements 99 = same Frameworks as previous competency	# = same Frameworks as previous competency 99 = "to know" statements may not be applicable
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Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
	CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
M.2: Troubleshoot the fuel system	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
M.3: Troubleshoot compression problems	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
N.1: Identify the characteristics of the 4-stroke-cycle engine	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions) MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations MA.2: geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes MA.3: data analysis, probability and statistics	1.1: Develop questions and ideas to initiate and refine research 1.3: Design and conduct field and laboratory investigations to study nature and society 1.4: Use technological tools and other resources to locate, select and organize information 1.7: Evaluate the accuracy of information and the reliability of its sources 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 3.6: Examine problems and proposed solutions from multiple perspectives 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
N.2: Describe the operating cycle of the 4-stroke-cycle engine	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p> <p>MA.2: geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes</p> <p>MA.3: data analysis, probability and statistics</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.5: Comprehend and evaluate written, visual and oral presentations and works</p> <p>1.8: Organize data, information and ideas into useful forms (including charts, graphs, outlines) for analysis or presentation</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.1: Plan and make written, oral and visual presentations for a variety of purposes and audiences</p> <p>2.5: Perform or produce works in the fine and practical arts</p> <p>2.6: Apply communication techniques to the job search and to the workplace</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>3.4: Evaluate the processes used in recognizing and solving problems</p> <p>3.6: Examine problems and proposed solutions from multiple perspectives</p>
N.3: Disassemble a 4-stroke-cycle engine	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
N.4: Inspect and service a cylinder	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p>

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
	<p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p>	<p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>N.5: Inspect and service the pistons, rings, and connecting rod</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>N.6: Inspect and service a crankshaft assembly</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>N.7: Inspect and service a valve train assembly</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p>

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
	MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations	4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
N.8: Reassemble 4-stroke-cycle engine	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions) MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
O.1: Identify the characteristics of the 2-stroke-cycle engine	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions) MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations MA.2: geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes MA.3: data analysis, probability and statistics	1.1: Develop questions and ideas to initiate and refine research 1.3: Design and conduct field and laboratory investigations to study nature and society 1.4: Use technological tools and other resources to locate, select and organize information 1.7: Evaluate the accuracy of information and the reliability of its sources 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 3.6: Examine problems and proposed solutions from multiple perspectives 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
O.2: Describe the operating cycle of the 2-stroke-cycle engine	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions) MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations	1.4: Use technological tools and other resources to locate, select and organize information 1.5: Comprehend and evaluate written, visual and oral presentations and works 1.8: Organize data, information and ideas into useful forms (including charts, graphs, outlines) for analysis or presentation 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers

<b>KEY:</b> * = may use all "to do" statements 98 = same Frameworks as previous competency	# = same Frameworks as previous competency 99 = "to know" statements may not be applicable
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Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
	<p>MA.2: geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes</p> <p>MA.3: data analysis, probability and statistics</p>	<p>2.1: Plan and make written, oral and visual presentations for a variety of purposes and audiences</p> <p>2.5: Perform or produce works in the fine and practical arts</p> <p>2.6: Apply communication techniques to the job search and to the workplace</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>3.4: Evaluate the processes used in recognizing and solving problems</p> <p>3.6: Examine problems and proposed solutions from multiple perspectives</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>O.3: Disassemble a 2-stroke-cycle engine</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>O.4: Inspect and service cylinder</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>

# Small Engines

*Cross-Reference to Show-Me Standards  
(mini report with words)*

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
O.5: Inspect and service the pistons, rings, and connecting rod	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
O.6: Inspect and service a crankshaft assembly	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
O.7: Check and replace reed valves	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p> <p>MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
O.8: Reassemble 2-stroke-cycle engine	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p>

<b>KEY:</b>	* = may use all "to do" statements	# = same Frameworks as previous competency
	98 = same Frameworks as previous competency	99 = "to know" statements may not be applicable

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
<p>P. 1: Identify the component parts of a manual transmission</p>	<p>MA. 1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation, and the application of these operations and concepts in the workplace and other situations</p> <p>CA. 3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA. 5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>P. 2: Identify the component parts of a transaxle</p>	<p>CA. 3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA. 5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>P. 3: Identify the component parts of clutch systems</p>	<p>CA. 3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA. 5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>P. 4: Identify the component parts of a hydrostatic transmission</p>	<p>CA. 3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)</p> <p>CA. 5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information</p> <p>1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers</p> <p>2.7: Use technological tools to exchange information and ideas</p> <p>4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>

**KEY:** \* = may use all "to do" statements # = same Frameworks as previous competency  
 98 = same Frameworks as previous competency 99 = "to know" statements may not be applicable

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
		<p>2.7: Use technological tools to exchange information and ideas                      4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>P.5: Identify the component parts of brake systems</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)                      CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information                      1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers                      2.7: Use technological tools to exchange information and ideas                      4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>Q.1: Adjust tension and alignment of pulleys and belts</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)                      CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)</p>	<p>1.4: Use technological tools and other resources to locate, select and organize information                      1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers                      2.7: Use technological tools to exchange information and ideas                      4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>
<p>Q.2: Sharpen and balance rotary blades</p>	<p>CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)                      CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)                      MA.1: addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations                      MA.2: geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes                      MA.3: data analysis, probability and statistics</p>	<p>1.1: Develop questions and ideas to initiate and refine research                      1.3: Design and conduct field and laboratory investigations to study nature and society                      1.4: Use technological tools and other resources to locate, select and organize information                      1.7: Evaluate the accuracy of information and the reliability of its sources                      1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers                      2.7: Use technological tools to exchange information and ideas                      3.6: Examine problems and proposed solutions from multiple perspectives                      4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks</p>

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
Q.3: Adjust and replace control cables	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
Q.4: Service decks and accessories	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
Q.5: Lubricate chassis components	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
Q.6: Inspect and adjust brakes	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks

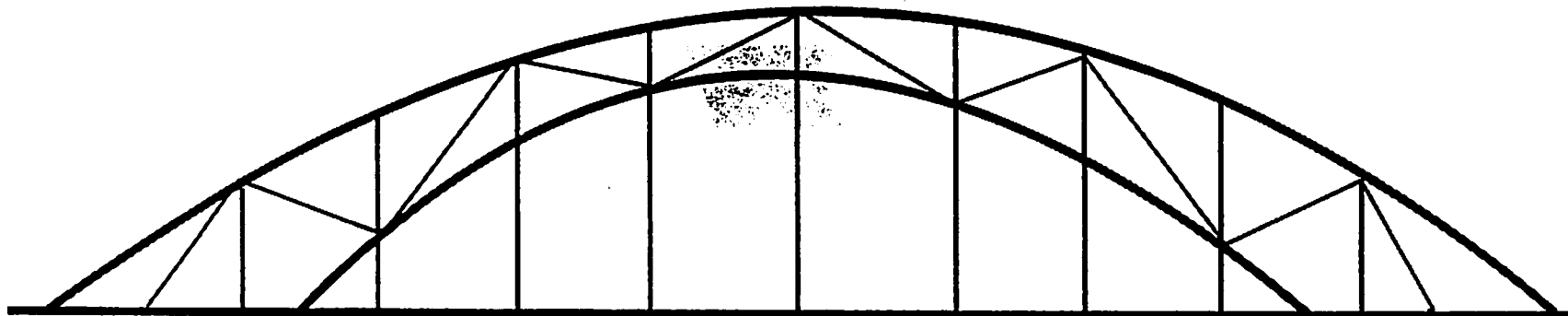
# Small Engines

*Cross-Reference to Show-Me Standards  
(mini report with words)*

Duty Band and Task Statement	Knowledge (Content)	Performance (Goals)
Q.7: Inspect and adjust clutch	CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals) CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	1.4: Use technological tools and other resources to locate, select and organize information 1.10: Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers 2.7: Use technological tools to exchange information and ideas 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
R.1: Demonstrate an understanding of VICA, its structure and activities	CA.1: speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization) CA.3: reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)	4.2: Understand and apply the rights and responsibilities of citizenship in Missouri and the United States 4.3: Analyze the duties and responsibilities of individuals in societies
R.2: Demonstrate an understanding of one's personal values		4.4: Recognize and practice honesty and integrity in academic work and in the workplace 4.5: Develop, monitor and revise plans of action to meet deadlines and accomplish goals 4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks
R.3: Perform tasks related to effective personal management skills.	CA.5: comprehending and evaluating the content and artistic aspects of oral and visual presentations (such as story-telling, debates, lectures, multi-media productions)	4.3: Analyze the duties and responsibilities of individuals in societies 4.4: Recognize and practice honesty and integrity in academic work and in the workplace
R.4: Demonstrate interpersonal skills.	CA.1: speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)	2.1: Plan and make written, oral and visual presentations for a variety of purposes and audiences 2.2: Review and revise communications to improve accuracy and clarity 2.3: Exchange information, questions and ideas while recognizing the perspectives of others 2.7: Use technological tools to exchange information and ideas
R.5: Demonstrate etiquette and courtesy		2.3: Exchange information, questions and ideas while recognizing the perspectives of others 4.4: Recognize and practice honesty and integrity in academic work and in the workplace
R.6: Demonstrate effectiveness in oral and written communication.	CA.1: speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)	2.1: Plan and make written, oral and visual presentations for a variety of purposes and audiences
R.7: Develop and maintain a code of professional ethics.		4.4: Recognize and practice honesty and integrity in academic work and in the workplace
R.8: Maintain a good professional appearance.		4.3: Analyze the duties and responsibilities of individuals in societies
R.9: perform basic tasks related to securing and terminating employment.		2.6: Apply communication techniques to the job search and to the workplace 4.8: Explore, prepare for and seek educational and job opportunities
R.10: Perform basic parliamentary procedure in a group meeting	CA.6: participating in formal and informal presentations and discussions of issues and ideas	4.6: Identify tasks that require a coordinated effort and work with others to complete those tasks

# **Performance Indicators for Small Engine Technician:**

**A Bridge to Selected Instructional Materials**



- **Missouri Competencies • EETC Competencies**
- **All Aspects of the Industry Objectives • Pre-Employment/Work Maturity Skills**
- **SCANS Competencies**

Instructional Materials Laboratory  
University of Missouri-Columbia

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## INTRODUCTION

This curriculum project includes two components. The first is an updated small engine technician competency profile and this performance indicator “bridge” document. The updated profile contains those skills needed in the field as identified and validated by industry personnel. Also, an asterisk (\*) identifies those specific skills that are core or essential, which should be interpreted as “those skills industry identifies as required for the first day on the job.” Task identifications for Missouri’s Vocational Administrative Management System (VAMS) are shown in brackets.

The Performance Indicator Chart connects small engine technology skills with leading national organizations and other important, but more general, skills needed by students. This document provides instructors and administrators with links between newly updated small engine technology competencies and (1) previous Missouri competencies, (2) competencies from the Equipment & Engine Training Council, (3) All Aspects of the Industry objectives, (4) Pre-Employment/Work Maturity Skills, and (5) SCANS competencies (addressed in National VICA’s *Total Quality Curriculum*), and (6) Missouri’s Show-Me Standards. These sets of skills are listed after the Performance Indicator Chart.

To use the Small Engine Technician Performance Indicator Chart, consider the following example. Duty bands (umbrella-like categories for competencies) are in bold type and shaded.

Missouri Competency	Previous Mo. Competencies	EETC Competencies	AAOI Objectives	Pre-Employment/ Work Maturity Skills	SCANS Competencies	Show-Me Standards	
						Knowl. (Content)	Perform. (Goals)
<b>5. Fasteners</b>							
5.2 Measure bolts and threads (SAE grade and metric) [C02]	C2		D2, E1	F4	3.1-3.3, 5.1, 5.2	MA2	1.10

The second column (Previous Mo. Competencies) is helpful for anyone with curriculum tied to the previous Missouri competency list. Competency 5.2 is a revised competency, as indicated by the competency listed in the second column. Competency 5.2 aligns with AAOI Objectives D2, E1, and so on. Shown in the last two columns are related Show-Me Standards, the academic skills in Missouri K-12 public classrooms.

This document may best be used as an initial step toward more in-depth articulation with national skill standards and Missouri Show-Me Standards. Although every attempt was made to provide a comprehensive crosswalk, local advisory council input should be solicited and used to validate to competencies/core competencies required in any given geographic location.

**SMALL ENGINE TECHNICIAN PERFORMANCE INDICATOR CHART**

NOTES: The numbers in brackets represent IDs used in computerized tracking software.  
 \* = Core competencies (essential for the first day on the job)

Missouri Competency	Previous Mo. Competencies	EETC Competencies	AAOI Objectives	Pre-Employment/ Work Maturity Skills	SCANS Competencies	Show-Me Standards	
						Knowledge (Content)	Performance (Goals)
<b>Basic Personal Safety</b>							
*1.1 Demonstrate safe work habits by using approved eye, ear, and skin protection [S01]		IC1 (B)	H1, H2, H9			HP5	1.10, 4.7
*1.2 Demonstrate safe handling of hazardous materials [S02]		IE4 (B)	A5, H1, H4		3.1	HP5, SC8, SS3	1.10, 4.2, 4.3, 4.7
1.3 Read and interpret MSDS and other safety publications [S03]		IE3 (B)	D15, H1, H3		3.1, 3.2, 3.3	HP5, SS3	1.10, 4.2, 4.3, 4.7
1.4 Identify governmental regulations (EPA, DNR, ANSII) [S04]		IE4, 5 (B)	A5, H1		3.1, 3.2, 3.3	HP5, SS3	1.10, 4.2, 4.3, 4.7
*1.5 Recognize industry accepted procedures for using proper safety devices, including lock out/tag and blocking devices [S05]		IC4 (B)	H4		4.1	HP5, HP7	1.10, 4.7
*1.6 Use basic personal safety practices (no jewelry, no loose clothing, long hair tied back) [S06]		IC1-3 (B)	H1, H2, H9			HP5	1.10, 4.7
*1.7 Demonstrate proper lifting practices [S07]		IA1 (B), IVE2 (B)	H2, H7			HP5	1.10, 4.7
<b>Cap and Tool Safety</b>							
*2.1 Demonstrate the safe use of lifting and hoisting devices [T01]		IVE2 (B)	H2, H7			HP4	1.10, 4.7
*2.2 Maintain a clean and safe work area [T02]		IB1 (B)	H2			HP5	1.10, 4.7
*2.3 Demonstrate the safe and proper use of hand tools [T03]		IA2 (B), IB2 (B)	E2, H2		5.2	HP5	1.10, 4.7

Missouri Competency	Previous Mo. Competencies	EETC Competencies	AAOI Objectives	Pre-Employment/ Work Maturity Skills	SCANS Competencies	Show-Me Standards	
						Knowledge (Content)	Performance (Goals)
<b>4.3 Tools and Equipment</b>							
*4.1 Identify industry-related hand tools [B01]	B1	IVB1 (B)	E1		5.1		1.10
*4.2 Demonstrate the proper use of hand tools [B02]	B2	IVB2 (B)	E2, E3		5.1	SC2	1.10, 2.5
*4.3 Identify precision measuring tools and equipment [B03]	B3	IVC1 (B)	E1		3.1, 5.1		1.10
*4.4 Demonstrate the proper use and care of precision measuring tools and equipment [B04]	B4	IVC3 (B)	E2, E3		3.1, 3.3, 5.1, 5.2	MA2, SC2	1.10, 2.5
*4.5 Identify industry-related power tools [B05]	B5		E1		3.1, 5.1		1.10
*4.6 Demonstrate the proper use and care of industry-related power tools [B06]	B6	IVA1 (B)	E2, E3		3.1, 5.1, 5.2	SC2	1.10, 2.5
*4.7 Identify and use tools to restore threads on fasteners [B09]	B9	IVC3 (B)	E2, E3		3.1, 5.1, 5.2	SC2	1.10, 2.5
*4.8 Identify diagnostic tools [B10]			E1		3.1, 5.1		1.10
*4.9 Demonstrate the proper use and care of diagnostic tools [B11]		VA1, 2, 6, 7, 8, 9 (L1)	E2, E3		3.1, 5.1, 5.2	SC1, SC2	1.10, 3.1, 3.4
<b>5.1 Fasteners</b>							
5.1 Identify and select industry-related fasteners [C01]	C1		E1, E2		3.1, 5.1, 5.2		1.10
5.2 Measure bolts and threads (SAE grade and metric) [C02]	C2		D2, E1		3.1, 3.2, 3.3, 5.1, 5.2	MA2	1.10
*5.3 Determine proper torque value for fasteners [C03]		IVD3 (B)	E1, E2		3.1, 3.3, 4.1	MA1	1.10
*5.4 Demonstrate proper torquing technique for fasteners [C04]		IVD4 (B)	E1		3.1, 3.3, 5.1, 5.2	SC2	

Missouri Competency	Previous Mo. Competencies	EETC Competencies	AAOI Objectives	Pre-Employment/ Work Maturity Skills	SCANS Competencies	Show-Me Standards	
						Knowledge (Content)	Performance (Goals)
*7.9 Test compression [N10]		VA6 (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2	SC1, SC2, SC7	2.5, 3.1, 3.2, 3.5
<b>8. Two-Stroke Cycle Engines</b>							
*8.1 Describe the operating cycle of the two-stroke cycle engine [O02]	O2	IB1 (L1)	E1		3.1, 3.3, 4.1	SC1, SC2	1.6
*8.2 Disassemble a two-stroke cycle engine [O03]	O3	IVA (L1)	E1, E4		4.1, 5.3	SC1, SC2	1.6, 1.10, 2.5
8.3 Inspect and service a cylinder [O04]	O4	IVA, C, N (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.3	SC1, SC2	2.5, 3.1, 3.2, 3.5
8.4 Inspect and service the pistons, rings and connecting rod [O05]	O5	IVD, J, K, M (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.3	SC1, SC2	2.5, 3.1, 3.2, 3.5
8.5 Inspect and service a crankshaft assembly [O06]	O6	IVE, F (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.3	SC1, SC2	2.5, 3.1, 3.2, 3.5
8.6 Check and replace reed valves [O07]	O7	IVL (L1)	E1, E4		3.1, 3.2, 3.3	SC1, SC2	2.5, 3.1, 3.2, 3.5
*8.7 Reassemble two-stroke cycle engines [O08]	O8		E1, E4		3.1, 3.2, 3.3, 4.1, 5.3	SC1, SC2	1.6, 1.0, 2.5
*8.8 Test compression [O09]		IIIA1, 2 (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2	SC1, SC2, SC7	2.5, 3.1, 3.2, 3.5
<b>9. Emissions</b>							
9.1 List types of emissions [V01]			E1		3.1, 3.3, 4.1		1.10
*9.2 Describe the consequences of noncompliance with emission standards [V02]			A5, H1		3.2, 3.2, 3.3, 4.1	SS3, HP6	1.10, 4.2, 4.3
9.3 Comply with manufacturer's emission standards [V03]		IE140 (L1)	A5, H1		4.1, 4.2, 5.3	SS3, HP6	1.10, 4.2, 4.3
<b>10. Troubleshooting</b>							
*10.1 Identify the system and components [M04]		VA1 (B)	D13, E1		3.1, 3.2, 3.3, 4.1		1.6

Missouri Competency	Previous Mo. Competencies	EETC Competencies	AAOI Objectives	Pre-Employment/ Work Maturity Skills	SCANS Competencies	Show-Me Standards	
						Knowledge (Content)	Performance (Goals)
<b>11. Fuel Systems</b>							
*11.1 Test, repair, or replace fuel pump [D01]	D1		D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1, SC2	2.5, 3.1, 3.2, 3.5
*11.2 Test, repair, or replace fuel filters and strainers [D02]	D2		D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1, SC2	2.5, 3.1, 3.2, 3.5
*11.3 Remove, clean, and replace fuel tank, shut-off valves, fuel lines, fuel hoses, and connections [D03]	D3	IIB6 (h, l) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1, SC2	2.5, 3.1, 3.2, 3.5
*11.4 Clean, rebuild, or replace diaphragm-type carburetor [D04]	D4	IIB6 (a-d) (L1), IIB6 (h) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1, SC2	2.5, 3.1, 3.2, 3.5
*11.5 Clean, rebuild, or replace float-type carburetor [D05]	D5	IIB6 (a-d) (L1), IIB6 (g) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1, SC2	2.5, 3.1, 3.2, 3.5
*11.6 Adjust fuel mixture and check for air leaks [D06]	D6	IIB6 (f, k) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1, SC2	2.5, 3.1, 3.2, 3.5
*11.7 Service oil-foam air cleaner [D08]	D8	IE14c (L1)	D13, E1, E4, E5		3.1, 4.1, 4.2	SC1, SC2	2.5, 3.1, 3.2, 3.5
*11.8 Service dry-element air cleaner [D09]	D9	IE14c (L1)	D13, E1, E4, E5		3.1, 4.1, 4.2	SC1, SC2	2.5, 3.1, 3.2, 3.5
*11.9 Properly dispose of contaminated fuel [D10]		IE4 (B)	A5, H1, H2		4.1	SC8, HP5, SS3	1.10, 4.2, 4.3, 4.7
*11.10 Explain the theory and function of electronic fuel injection [D11]		IE12(a) (L1)	E1, E2		3.1, 3.2, 3.3, 4.1	SC1, SC8	1.10
11.11 Identify the types and grades of gasoline used in power equipment [D12]		IIIB5(a) (L1)	E1		3.1, 3.2, 3.3, 4.1	SC1	1.10
*11.12 Describe the use of a fuel additive for storage [D13]		IIIB5(a) (L1)	E1		3.1, 3.2, 3.3, 4.1	SC1	1.10
*11.13 Identify purge/prime systems [D14]		IE9 (j, k, o) (L1)	E1		3.1, 3.2, 3.3, 4.1	SC5	1.6

Missouri Competency	Previous Mo. Competencies	EETC Competencies	AAOI Objectives	Pre-Employment/ Work Maturity Skills	SCANS Competencies	Show-Me Standards	
						Knowledge (Content)	Performance (Goals)
*13.6 Demonstrate applicable test procedures for testing series and parallel circuits [F12]		IE19(d) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 5.1, 5.2	SC1, SC7	1.10, 2.5, 3.1, 3.2, 3.5
*13.7 Check continuity in circuits and electrical system components [F13]		IE19(e) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 5.1, 5.2	SC1	1.6, 2.5, 3.1, 3.2, 3.5
*13.8 Check current flow in electrical systems and components [F14]		IE19(f) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 5.1, 5.2	SC1	1.6, 2.5, 3.1, 3.2, 3.5
*13.9 Inspect, test, and replace fusible links, fuses, and circuit breakers [F15]		IE19(g) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 5.1, 5.2	SC1, SC7	2.5, 3.1, 3.2, 3.5
*13.10 Identify terminals and connectors used in electrical systems [F16]		IE20(h) (L1)	E1		3.1, 3.2, 3.3, 4.1	SC1	1.10
13.11 Identify electrical wire sizes and selection based on anticipated current load [F17]		IE20 (i) (L1)	E1		3.1, 3.2, 3.3, 4.1	SC1	1.10
*13.12 Read and interpret electrical meters [F01]	F1	IVC3 (B)	D3, D15		3.1, 3.2, 3.3, 4.1	SC1, CA3	1.4, 1.5, 2.6
13.13 Read electrical schematics [F02]	F2	IIIA2 (B)	D3, D15		3.1, 3.2, 3.3, 4.1	SC1, CA3	1.4, 1.5, 2.6
*13.14 Test, repair, and/or replace safety interlock [F04]	F4	IE19(e) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1, SC7	2.5, 3.1, 3.2, 3.5
*13.15 Test, repair, and/or replace charging system components [F05]	F5		D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1, SC7	2.5, 3.1, 3.2, 3.5
*13.16 Test and replace fuel system, lubrication, safety, and temperature sending units [F18]		IE19 (e, f) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1, SC7	2.5, 3.1, 3.2, 3.5
*13.17 Test and replace electrical PTO clutches [F19]		IE19(e, f) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1, SC7	2.5, 3.1, 3.2, 3.5
*13.18 Explain storage battery theory and operation [F20]		IE20(a) (L1)	E1		3.1, 3.2, 3.3	SC1	1.10

Missouri Competency	Previous Mo. Competencies	EETC Competencies	AAOI Objectives	Pre-Employment/ Work Maturity Skills	SCANS Competencies	Show-Me Standards	
						Knowledge (Content)	Performance (Goals)
*14.9 Troubleshoot an Ignition system [G12]	M1		D13, E1, E3, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2, 5.3	SC1, SC2, SC5, SC7	1.6, 1.10, 3.1, 3.2, 3.5
<del>15. Lubrication Systems</del>	<del></del>	<del></del>	<del></del>	<del></del>	<del></del>	<del></del>	<del></del>
*15.1 Explain the Importance of lubrication [H08]		VIIB1 (L1)	E1		3.1, 3.2, 3.3, 4.1	SC2	1.10
*15.2 List the common oil contaminants [H09]		IIA8 (L1)	A5, H1, H2		3.1, 3.2, 3.3		1.10
*15.3 Change engine oil and filter [H01]	H1	IIB3(e) (L1)	E1		3.1, 3.2, 3.3, 4.1, 4.2		1.10
*15.4 Properly dispose of oil and oil filter [H10]		IE4 (B)	A5, H1, H2		3.1, 3.2, 3.3, 4.1, 4.2	SS3, HP5, HP6	1.10, 4.2, 4.3, 4.7
*15.5 Service crankcase breather [H02]	H2	IIB3(f) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC2	2.5, 3.1, 3.2, 3.5
*15.6 Inspect, repair, and/or replace pressure lubrication system [H03]	H3	IIB3(b) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC2	2.5, 3.1, 3.2, 3.5
15.7 Inspect and replace splash lubrication components [H04]	H4	IIB3(a) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC2	2.5, 3.1, 3.2, 3.5
*15.8 Locate and repair leaking gaskets and seals [H05]	H5		D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1	2.5, 3.1, 3.2, 3.5
*15.9 Demonstrate the ability to mix gas and oil for a two-stroke cycle engine [H06]	H6	IIB2(a) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1	SC1	2.5, 3.1, 3.2, 3.5
*15.10 Select proper oil [H07]	H7	IIA10 (L1)	E1, E2		3.1, 3.2, 3.3	SC1	1.10
*15.11 Troubleshoot a lubrication system [H11]			D13, E1, E3, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2, 5.3	SC1, SC2, SC5, SC7	1.6, 1.10, 3.1, 3.2, 3.5

Missouri Competency	Previous Mo. Competencies	EETC Competencies	AAOI Objectives	Pre-Employment/ Work Maturity Skills	SCANS Competencies	Show-Me Standards	
						Knowledge (Content)	Performance (Goals)
*16.14 Service an air-cooled system [I01]	I1	IIB4(b) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1	2.5, 3.1, 3.2, 3.5
*16.15 Service a liquid-cooled system [I02]	I2	IIB4(c)(L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1	2.5, 3.1, 3.2, 3.5
*16.16 Remove, check, and replace thermostat [I04]	I4		D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1	2.5, 3.1, 3.2, 3.5
*16.17 Remove, check, and replace radiator [I06]	I6		D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1	2.5, 3.1, 3.2, 3.5
*16.18 Troubleshoot a cooling system [I18]		IE7(m) (L1)	D13, E1, E3, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2, 5.3	SC1, SC2, SC5, SC7	1.6, 1.10, 3.1, 3.2, 3.5
<b>17. Exhaust Systems</b>							
17.1 Describe exhaust system nomenclature and function [J03]		IE15(a) (L1)	E1		3.1, 3.2, 3.3, 4.1	SC1	1.6, 1.10
17.2 Describe proper service cleaning procedures for exhaust ports and spark arrestor screens [J04]		IE15(d) (L1)	E1		3.1, 3.2, 3.3, 4.1, 4.2	SC1	1.10
*17.3 Service and/or replace a two-stroke cycle exhaust system [J01]	J1		D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1	2.5, 3.1, 3.2, 3.5
*17.4 Service and/or replace a four-stroke cycle exhaust system [J02]	J2	IVB (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1	2.5, 3.1, 3.2, 3.5
*17.5 Troubleshoot an exhaust system [J05]			D13, E1, E3, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2, 5.3	SC1, SC2, SC5, SC7	1.6, 1.10, 3.1, 3.2, 3.5
<b>18. Recoil Starting Systems</b>							
*18.1 Remove, repair, and/or replace recoil starter [K01]	K1	IIB7(a) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1, SC2	2.5, 3.1, 3.2, 3.5
*18.2 Remove, inspect, and replace starter clutch [K02]	K2	IIB7(a) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1, SC2	2.5, 3.1, 3.2, 3.5
*18.3 Demonstrate safe spring replacement procedures [K03]		IIB7(a) (L1)	D13, E1, E4, E5, H2		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	HP5	1.10, 2.5, 4.7

Missouri Competency	Previous Mo. Competencies	EETC Competencies	AAOI Objectives	Pre-Employment/ Work Maturity Skills	SCANS Competencies	Show-Me Standards	
						Knowledge (Content)	Performance (Goals)
*20.4 Describe a DC amps test [W04]		IE18(d)(L1)	E1		3.1, 3.2, 3.3, 4.1	SC1	1.10
*20.5 Describe an AC volts test [W05]		IE18(e)(L1)	E1		3.1, 3.2, 3.3, 4.1	SC1	1.10
*20.6 Explain the function of a diode [W06]		IE18(f) (L1)	E1		3.1, 3.2, 3.3, 4.1	SC1	1.10
*20.7 Describe a resistance test [W07]		IE18(g) (L1)	E1		3.1, 3.2, 3.3, 4.1	SC1	1.10
20.8 Perform current drain test using a DC shunt [W08]		IE18(h) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 5.1, 5.2	SC1, SC7	2.5, 3.1, 3.2, 3.5
*20.9 Remove and replace regulator/rectifier [W09]		IE18(i) (L1)	D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC1	2.5, 3.1, 3.2, 3.5
*20.10 Troubleshoot a charging system [W10]			D13, E1, E3, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2, 5.3	SC1, SC7	1.6, 1.10, 3.1, 3.2, 3.5
<b>21. Power Train Systems</b>							
21.1 Identify the component parts of a manual transmission [P01]	P1		E1		3.1, 3.2, 3.3, 4.1	SC2	1.10
21.2 Identify the component parts of a transaxle [P02]	P2		E1		3.1, 3.2, 3.3, 4.1	SC2	1.10
21.3 Identify the component parts of a clutch system [P03]	P3		E1		3.1, 3.2, 3.3, 4.1	SC2	1.10
21.4 Identify the component parts of a hydrostatic transmission [P04]	P4		E1		3.1, 3.2, 3.3, 4.1	SC2	1.10
*21.5 Identify the component parts of a brake [P05]	P5		E1		3.1, 3.2, 3.3, 4.1	SC2	1.10
*21.6 Isolate and troubleshoot a power train system [P06]			D13, E1, E3, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2, 5.3	SC2, SC5	1.6, 1.0, 3.1, 3.2, 3.5
<b>22. Lawn and Garden Equipment</b>							
*22.1 Adjust tension and alignment of pulleys and belts [Q01]	Q1		D13, E1, E4, E5		3.1, 3.2, 3.3, 4.1, 4.2, 5.1, 5.2	SC2	2.5, 3.1, 3.2, 3.5

Missouri Competency	Previous Mo. Competencies	EETC Competencies	AAOI Objectives	Pre-Employment/ Work Maturity Skills	SCANS Competencies	Show-Me Standards	
						Knowledge (Content)	Performance (Goals)
23.7 Identify and describe engine failures caused by phase separation of fuel [X07]		VIIB5 (L1)	D13, E1, E4, E5	A3	3.1, 3.2, 3.3, 4.1, 5.3	SC1, SC2, SC5, SC7	1.10, 3.1, 3.5
23.8 Identify the effects of overheating on engine component parts [X08]		VIIC1 (L1)	D13, E1, E4, E5	A3	3.1, 3.2, 3.3, 4.1, 5.3	SC1, SC2, SC5, SC7	1.10, 3.1, 3.5
23.9 Identify overheating effects on two-stroke cycle engines due to poor exhaust system maintenance [X09]		VIIC3 (L1)	D13, E1, E4, E5	A3	3.1, 3.2, 3.3, 4.1, 5.3	SC1, SC2, SC5, SC7	1.10, 3.1, 3.5
23.10 Define denotation, preignition, and list the effects on engine components [X10]		VIIC4 (L1)	D13, E1, E4, E5	A3	3.1, 3.2, 3.3, 4.1, 5.3	SC1, SC2, SC5, SC7	1.10, 3.1, 3.5
23.11 Identify two-stroke cycle engine failures caused by stale fuel varnish [X11]		VIIC5 (L1)	D13, E1, E4, E5	A3	3.1, 3.2, 3.3, 4.1, 5.3	SC1, SC2, SC5, SC7	1.10, 3.1, 3.5
23.12 Identify engine failure caused by lean mixture [X12]		VIIC6 (L1)	D13, E1, E4, E5	A3	3.1, 3.2, 3.3, 4.1, 5.3	SC1, SC2, SC5, SC7	1.10, 3.1, 3.5
23.13 Identify the effects of overspeeding on engine component parts [X13]		VIID1 (L1)	D13, E1, E4, E5	A3	3.1, 3.2, 3.3, 4.1, 5.3	SC1, SC2, SC5, SC7	1.10, 3.1, 3.5
23.14 Identify the signature break on a connecting rod on several engine failure examples [X14]		VIID2 (L1)	D13, E1, E4, E5	A3	3.1, 3.2, 3.3, 4.1, 5.3	SC1, SC2, SC5, SC7	1.10, 3.1, 3.5
23.15 Identify exhaust port piston scoring and large bearings due to overspeeding [X15]		VIID3 (L1)	D13, E1, E4, E5	A3	3.1, 3.2, 3.3, 4.1, 5.3	SC1, SC2, SC5, SC7	1.10, 3.1, 3.5
23.16 Identify the effects of excessive vibration on engine block and mounting base [X16]		VIII1 (L1)	D13, E1, E4, E5	A3	3.1, 3.2, 3.3, 4.1, 5.3	SC1, SC2, SC5, SC7	1.10, 3.1, 3.5

## EQUIPMENT & ENGINE TRAINING COUNCIL COMPETENCIES

*The Equipment and Engine Training Council is a professional organization focused on ensuring that there will be a continuous and highly trained pool of service technicians available in the future to meet the needs of the outdoor power equipment industry.*

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### LEVEL BASIC - POWER EQUIPMENT SAFETY FUNDAMENTALS

#### I. Shop Safety

- A. Work Habits
  - 1. Demonstrate the proper lifting and blocking of equipment
  - 2. Demonstrate safe usage of all service shop tools
- B. Working Environment
  - 1. Maintain a clean and safe work area
  - 2. Maintain clean tools and equipment
- C. Personal Safety
  - 1. Demonstrate safe work habits by wearing approved eye, hearing and skin protection
  - 2. Demonstrate safe work habits by using approved safety and personal protection equipment
  - 3. Describe personal safety practices
  - 4. Recognize industry accepted procedures for using proper safety devices, including lock out tags
- D. Emergency Awareness
  - 1. Demonstrate the use of fire extinguishers
  - 2. Recognize emergency evacuation procedures
  - 3. Apply fire safety awareness
  - 4. Describe safety precautions to prevent fires
- E. Regulations
  - 1. Recognize use of safety color codes
  - 2. Identify hazard communication labels and symbols
  - 3. Explain Material Safety Data Sheet (MSDS) purpose, use, and location
  - 4. Describe hazardous materials safe handling and disposal as required by EPA local ordinances
  - 5. Recognize and observe industry and OSHA, federal and state safety and environmental rules

#### II. Shop Practices

- A. Maintain Records
  - 1. Document service work on work orders
  - 2. Document parts and shop supplies on shop inventory lists and work orders
  - 3. Complete various OEM warranty forms

#### III. Technical Publications

- A. Service Manuals, IPLs, Microfiche
  - 1. Describe types of service and parts manual formats and their applications
  - 2. Demonstrate the ability to use and interpret reference manuals and materials correctly
  - 3. Recognize industry specific terminology and nomenclature
  - 4. Demonstrate proper usage of labor time guides and flat rate time
  - 5. Demonstrate ability to use a diagnostic and troubleshooting manual
  - 6. Look-up parts using paper, microfiche and electronic parts and service lookup system (CD-ROM)

#### IV. Tools and Equipment

- A. Service Tools and Equipment
  - 1. Demonstrate safe and proper use of all tools
  - 2. Clean and return tools to proper storage area
- B. Hand Tools
  - 1. Identify the basic hand tools
  - 2. Demonstrate the proper use of hand tools
  - 3. Demonstrate the proper care and storage of hand tools
- C. Precision Measuring Tools
  - 1. Identify, care, and storage of measuring tools

- a) Describe engine block nomenclature and function
- b) Describe crankcase nomenclature and function
- c) Describe cylinder nomenclature and function
- d) Describe cylinder head nomenclature and function
2. Piston, Wrist Pins, Rings Components
  - a) Describe piston, wrist pins and ring types
3. Connecting Rods, Bearings, Crankshafts, Seals Components
  - a) Describe connecting rod, bearing and crankshaft nomenclature and function
  - b) Describe engine bearing types and service applications
  - c) Describe crankshaft types and service applications
  - d) Describe engine oil seal types
4. Engine Valve Train Components
  - a) Describe valve train nomenclature and function
  - b) Describe valve retainer types
  - c) Demonstrate an understanding of crankshaft angle and valve timing degrees
  - d) Describe "Valve Overlap" and its function
5. Lubrication Systems Components
  - a) Describe lubrication systems nomenclature and function
6. Ignition Systems Components
  - a) Describe the purpose of an ignition system
  - b) Describe ignition system nomenclature and function
  - c) Identify the components and function of a battery ignition system
  - d) Identify the components and function of an electronic ignition system
  - e) Identify the components and function of magnets ignition system
7. Cooling Systems Components
  - a) Understand the concepts of heat transfer
  - b) Define the purpose of a cooling system
  - c) Define the major types of cooling systems used on power equipment
  - d) Describe air-cooled system nomenclature and function
  - e) List major causes of air cooled engine overheating
  - f) Describe normal service procedures performed on an air cooled engine
- g) Describe liquid cooled system nomenclature and function
- h) List major causes of liquid cooled engine overheating
- i) Describe function of a thermostat
- j) Describe function of the water pump
- k) Describe function of anti-freeze
- l) Remove and replace water pump/fan drive belt
- m) Perform a cooling system pressure test
8. Fuel System Components (Two- and Four-Stroke)
  - a) Identify the basic types of fuel systems used in power equipment
  - b) Identify the functions of each component in the fuel system, including the following: carburetor, fuel filter, fuel pump and electronic fuel injection
9. Carburetors, Components
  - a) Identify types of carburetor designs used on small engines
  - b) Describe carburetor nomenclature and function, including: vacuum-feed carburetor, diaphragm carburetor, float type carburetors, rotary carburetors, slide valve carburetors
  - c) Identify transition circuit
  - d) Identify and describe the idle circuit
  - e) Identify and describe the main circuit
  - f) Discuss the venturi principle
  - g) Describe variable venturi carburetor and terms
  - h) Describe enrichment devices
  - i) Choke types
  - j) Purging systems
  - k) Primer types
  - l) Describe the function of a fixed orifice jet
  - m) Describe the function of a high speed nozzle
  - n) Describe the function of the emulsion tube
  - o) Describe the function of the purging system
  - p) Identify and test crankcase impulse passages
  - q) Describe the function and service of fuel tank vents and lines
10. Fuel Filters, Components
  - a) Explain the purpose of a fuel filter
  - b) Identify the common types of fuel filters
  - c) Describe the difference between micron and mesh

- c) Perform dynamic governor adjustments

## II. Maintenance

### A. Lubrication Fundamentals

1. Describe the theory of lubrication
2. Describe (generally) API oil ratings
3. Describe the meaning of SAE viscosity ratings
4. Describe the classification of 2 stroke oils
5. Describe ISO/LEG 2 stroke oil standard, A, B, C, D
6. Describe Jaso oil standard, classification PCS pcw-1, -2, -3
7. List common oil contaminants
8. Label types of oil filters used on power equipment
9. State guidelines for selecting and using oils

### B. Engine Maintenance

1. Lubrication
  - a) Classify types of lubrication systems as for either two- or four-stroke cycle engines
  - b) Identify terms associated with an engine lubrication system
  - c) List the functions of engine oil
  - d) Interpret engine oil application charts used in owners/operators manuals
2. Stroke Engine Oils
  - a) Prepare pre-mixed fuel for a two-stroke cycle engine
  - b) Describe potential problems for oil/fuel mixtures
  - c) Describe effects of using alcohol based fuels
3. Four-Stroke Lubrication
  - a) Describe splash lubrication systems
  - b) Describe pressure lubrication systems
  - c) Describe oil filtration system
  - d) Describe methods of checking oil level in an engine
  - e) Change engine oil and filter on a variety of selected equipment
  - f) List the benefits of positive crankcase ventilation
  - g) Identify the components and function of a crankcase ventilation breather assembly
  - h) Service a crankcase breather assembly
4. Cooling System
  - a) Describe proper cooling system cleaning methods

- b) Perform cooling system cleaning for air cooled engine
- c) Perform cooling system flush and cleaning of liquid cooled engine
- d) Demonstrate, remove and replace water pump
- e) Demonstrate, remove and replace thermostat

### 5. Fuel System

- a) Identify types and grades of gasoline used in power equipment
- b) Describe the use of a fuel additive for storage
- c) Describe the proper method of carburetor cleaning

### 6. Carburetors

- a) Remove and replace a carburetor on a small gasoline engine
- b) Disassemble, clean and reassemble carburetors
- c) Install a repair kit in a carburetor
- d) Inspect internal carburetor parts for wear
- e) Adjust carburetor choke linkage
- f) Adjust carburetor mixture screws per OEM specifications
- g) Adjust carburetor float level
- h) Adjust carburetor metering levers
- i) Remove, replace and repair fuel lines and hoses
- j) Remove and replace the fuel tank, filters, caps and lines
- k) Adjust the engine idle speed

### 7. Starting Systems

- a) Repair three different styles of rewind starters
- b) Perform starter drive gear replacement
- c) Can disassemble and reassemble 12 volt DC-120 volt AC starter motor

### 8. Exhaust System

- a) Describe equipment problems that can occur from operating equipment and a removed/damaged exhaust system
- b) State the danger of operating a power product in a closed area
- c) Describe the purpose of an exhaust deflector
- d) Describe the purpose of a spark arrestor screen

**E. Hands-On Performance Test**

1. Given a four-stroke cycle engine on a produce with trouble symptoms installed, the student can solve the problem with the use of the proper manual and tools

**VI. Two-and Four-Stroke Gasoline Engines Service**

**A. Disassemble engine, inspect and repair components**

1. Inspect hydraulic or mechanical lifters
2. Replace valve stem seals
3. Inspect valve guides for wear
4. Inspect valves; resurface or replace
5. Perform valve lapping operation; explain why
6. Inspect and measure cylinder bore
7. De-glaze and clean cylinder bore using a rigid hone
8. Demonstrate the proper cleaning of the engine block
9. Demonstrate understanding of OEM cylinder reuse specifications
10. Inspect and measure camshaft bearings for wear, damage
11. Inspect valve train including: valves, rocker arms, lifters, studs & push rods
12. Inspect balance system; inspect shaft(s) and support bearings for damage and wear
13. Measure and determine values for engine bearings
14. Use plastic-gage to determine bearing clearances in an engine

**B. Reassembly Procedures**

1. Install all engine components, assemblies and gaskets; torque according to manufacturer's specifications and procedures
2. Install the crankshaft with its bearings
3. Measure the crankshaft end play
4. Measure crankshaft run-out
5. Verify camshaft timing according to manufacturer's specifications and procedure
6. Adjust valves (mechanical and hydraulic lifters)
7. Assemble and test run engine

**C. After Overhaul Procedures**

1. Initial start-up procedures
2. Demonstrate static governor adjustment
3. Engine installation

4. Check top no-load speed

5. Check all safety-related devices for proper operation, correct all problems. Provide written documentation of safety device failures to customer and manufacturer.
6. From written documentation from the work order, inform the customer of problems related to maximum engine life and future methods of failure prevention.

**VII. Failure Analyses**

**A. Abrasive Ingestion**

1. Can identify the effects of abrasive ingestion on engine components
2. Can accurately identify the entrance path of abrasives on several engine failure examples

**B. Insufficient Lubrication**

1. Can identify the effect of insufficient lubrication on engine components: piston cylinders, etc.
2. Can accurately define cause of failure on several engine failure examples
3. Can accurately identify 2 stroke lubrication/fuel quality failure root cause
4. Can identify the use of incorrect/no lubricant
5. Can identify and describe engine failures caused by "phase separation" of fuel

**C. Overheating**

1. Can identify the effect of overheating on engine component parts
2. Can accurately define the root cause of failure on several engine failure examples
3. Can identify overheating effects on two-stroke engines due poor exhaust system maintenance: i.e. piston carbon scoring
4. Can define detonation, preignition and effects on engine components
5. Can identify two-stroke engine failures caused by tale fuel varnish
6. Can identify engine failure caused by lean mixture

**D. Over Speeding**

1. Can identify the effects of over speeding on engine component parts

## ALL ASPECTS OF THE INDUSTRY

Recent national legislation requires that vocational education programs provide a strong experience in "all aspects of the industry" (AAOI) for industries that students are preparing to enter. AAOI's ultimate goal is to give future workers a sense of the issues involved in the world of work. Such knowledge can empower future workers to make informed decisions about their career paths. This knowledge can also allow workers to make meaningful contributions to the industry, instead of performing mindlessly like another piece of equipment. The main areas of AAOI include:

- Planning
- Management
- Finance
- Technical and Production Skills
- Principles of Technology
- Labor and Community Issues
- Health/Safety/Environment
- Personal Conduct

### Duty Bands and Objectives

#### A. Planning

- A1 Describe why industries respond to customer wants and expectations
- A2 List differences in how companies deliver products versus delivering services
- A3 Describe ways a worker can influence company decision-making
- A4 Identify benefits in anticipating technology and market trend changes
- A5 Identify an example of how regulatory laws can impact how a business operates
- A6 Identify an example of how a political organization can impact how a company operates

#### B. Management

- B1 Identify key components of a company "mission statement"
- B2 Identify how a corporate "chain of command" works
- B3 Describe the significance of a company's "corporate culture"
- B4 Describe how a company organizes its departments

- B5 List typical ways company departments communicate
- B6 Cite examples of why a worker should adjust to different management styles
- B7 Cite an example of how companies are dependent on the national economy
- B8 Cite an example of how a company is dependent upon the local economy
- B9 Describe the importance of achieving internal and external customer satisfaction
- B10 Identify examples of how cultural diversity can affect an industry
- B11 Identify key differences in how private companies and government agencies operate
- B12 List reasons why written policies are used in industry
- B13 Identify resources available from professional organizations
- B14 Identify how roles and responsibilities in a family business are different than in larger companies
- B15 List benefits a worker can get by participating in meetings
- B16 List key differences in how a family farm operates versus how another small business operates

## **G. Community**

- G1 Describe the importance of recognizing a worker should contribute special skills through volunteer work
- G2 Identify key ways a company helps its community
- G3 Identify key ways a community helps a company
- G4 Identify an impact of buying outside the community
- G5 Describe how a company's public perception is important
- G6 Describe the importance of providing for the access needs of the physically challenged

## **H. Health, Safety and Environment**

- H1 Describe the importance of complying with federal agency regulations
- H2 Describe why it is important to avoid job-specific health threats
- H3 Read and comprehend major components of a Material Safety Data Sheet
- H4 Identify basic safety training (tornado, fire, first aid) techniques
- H5 Describe the importance of participating in preventive medicine programs
- H6 Describe the importance of handling stress effectively
- H7 Describe the importance of good workplace ergonomics
- H8 Identify any effects weather could have on an industry
- H9 Describe the importance of management's responsibility for a safe workplace

## **I. Personal Conduct**

- I1 Describe the importance of recognizing the dignity of all work
- I2 Describe the importance of producing quality and effective work
- I3 Describe the importance of being fit for duty (no drugs, no alcohol)
- I4 Describe the importance of exhibiting good attitude, enthusiasm, integrity
- I5 Describe the importance of exhibiting good grooming and appearance
- I6 Describe the importance of good personal financing

**Source:** *All Aspects of the Industry (65-9000-1)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1994.

## PRE-EMPLOYMENT/WORK MATURITY SKILLS

The following competencies from *Pre-Employment and Work-Maturity Competencies: A Guide for Practitioners* (Revised 1998) have been endorsed by three agencies: the Missouri Department of Elementary and Secondary Education, the Department of Labor and Industrial Relations, and the Department of Economic Development. The list includes seven core competencies and related employability skills. Locally developed learner outcomes may, of course, be added, and local groups are encouraged to utilize the identified state competencies for development of their own pre-employment and work maturity skills.

- A. Making Career Decisions**
  - A1. Perform self assessment
  - A2. Explore occupational information
  - A3. Perform decision-making process
- B. Using Labor Market Information**
  - B1. Identify sources of information
  - B2. Use labor market information
- C. Preparing a Resume**
  - C1. Collect resume data
  - C2. Develop a resume
- D. Completing the Job Application Process**
  - D1. Prepare letters of inquiry
  - D2. Provide accurate educational data
  - D3. Provide accurate work history data
  - D4. Provide accurate personal data
  - D5. Provide accurate reference information
  - D6. Fill out job application form
- E. Demonstrating Effective Interviewing Skills**
  - E1. Present proper appearance
  - E2. Prepare for interview
  - E3. Greet the interviewer
  - E4. Participate in the interview
  - E5. Respond to interview closure
  - E6. Prepare a letter of follow-up
- F. Demonstrating Knowledge of the Proper Work Attitudes and Behaviors**
  - F1. Be dependable
  - F2. Be punctual
  - F3. Maintain a positive attitude and behavior
  - F4. Complete tasks effectively with or without supervision
  - F5. Practice good grooming and personal hygiene
  - F6. Recognize legal issues in the workplace
- G. Demonstrating Knowledge of Effective Interpersonal Skills**
  - G1. Communicate with others
  - G2. Maintain relationships with others

## SCANS COMPETENCIES

SCANS *foundation skills* identified by the U.S. Department of Labor describe generic skills needed by nearly everyone. The SCANS *competencies*, however, are more specific in nature and are listed below. (SCANS is the acronym for the Secretary [of Labor]'s Commission on Achieving Necessary Skills.) National VICA's *Total Quality Curriculum* incorporates SCANS competencies and Total Quality Management (TQM) principles in a 17-module set of activities.

### 1. Resources

1. Allocates time
2. Allocates money
3. Allocates material and facility resources
4. Allocates human resources

### 2. Interpersonal

1. Participates as a member of a team
2. Teaches others
3. Serves clients/customers
4. Exercises leadership
5. Negotiates to arrive at a decision
6. Works with cultural diversity

### 3. Information

1. Acquires and evaluates information
2. Organizes and maintains information
3. Interprets and communicates information
4. Uses computers to process information

### 4. Systems

1. Understands systems
2. Monitors and corrects performance
3. Improves and designs systems

### 5. Technology

1. Selects technology
2. Applies technology to task
3. Maintains and troubleshoots equipment

## SHOW-ME STANDARDS

The new educational goals and standards are a result of the Outstanding Schools Act of 1993, which calls on Missouri citizens and educators to define appropriate, rigorous expectations for children's learning. Committees of teachers, citizens, parents, lawmakers and state officials have been working on the proposed goals and standards since then. The goals and standards listed below were approved as a final regulation by the Missouri State Board of Education, January 18, 1996, and are available through the Missouri Department of Elementary and Secondary Education's home page. (URL <http://dese.state.mo.us/standards/goal1.html>)

**Goal 1:** Students in Missouri public schools will acquire the knowledge and skills to *gather, analyze and apply information and ideas*.

Students will demonstrate within and integrate across all content areas the ability to

- 1.1 develop questions and ideas to initiate and refine research
- 1.2 conduct research to answer questions and evaluate information and ideas
- 1.3 design and conduct field and laboratory investigations to study nature and society
- 1.4 use technological tools and other resources to locate, select and organize information
- 1.5 comprehend and evaluate written, visual and oral presentations and works
- 1.6 discover and evaluate patterns and relationships in information, ideas and structures
- 1.7 evaluate the accuracy of information and the reliability of its sources
- 1.8 organize data, information and ideas into useful forms (including charts, graphs, outlines) for analysis or presentation
- 1.9 identify, analyze and compare the institutions, traditions and art forms of past and present societies
- 1.10 apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers

**Goal 2:** Students in Missouri public schools will acquire the knowledge and skills to *communicate effectively within and beyond the classroom*.

Students will demonstrate within and integrate across all content areas the ability to

- 2.1 plan and make written, oral and visual presentations for a variety of purposes and audiences
- 2.2 review and revise communications to improve accuracy and clarity
- 2.3 exchange information, questions and ideas while recognizing the perspectives of others
- 2.4 present perceptions and ideas regarding works of the arts, humanities and sciences
- 2.5 perform or produce works in the fine and practical arts
- 2.6 apply communication techniques to the job search and to the workplace
- 2.7 use technological tools to exchange information and ideas

**Goal 3:** Students in Missouri public schools will acquire the knowledge and skills to *recognize and solve problems*.

Students will demonstrate within and integrate across all content areas the ability to

- 3.1 identify problems and define their scope and elements
- 3.2 develop and apply strategies based on ways others have prevented or solved problems
- 3.3 develop and apply strategies based on one's own experience in preventing or solving problems
- 3.4 evaluate the processes used in recognizing and solving problems

- HP5 methods used to assess health, reduce risk factors, and avoid high risk behaviors (such as violence, tobacco, alcohol and other drug use)
- HP6 consumer health issues (such as the effects of mass media and technologies on safety and health)
- HP7 responses to emergency situations

### **Mathematics (MA)**

In Mathematics, students in Missouri public schools will acquire a solid foundation which includes knowledge of

- MA1 addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations
- MA2 geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes
- MA3 data analysis, probability and statistics
- MA4 patterns and relationships within and among functions and algebraic, geometric and trigonometric concepts
- MA5 mathematical systems (including real numbers, whole numbers, integers, fractions), geometry, and number theory (including primes, factors, multiples)
- MA6 discrete mathematics (such as graph theory, counting techniques, matrices)

### **Science (SC)**

In Science, students in Missouri public schools will acquire a solid foundation which includes knowledge of

- SC1 properties and principles of matter and energy
- SC2 properties and principles of force and motion
- SC3 characteristics and interactions of living organisms

- SC4 changes in ecosystems and interactions of organisms with their environments
- SC5 processes (such as plate movement, water cycle, air flow) and interactions of earth's biosphere, atmosphere, lithosphere and hydrosphere
- SC6 composition and structure of the universe and the motions of the objects within it
- SC7 processes of scientific inquiry (such as formulating and testing hypotheses)
- SC8 impact of science, technology and human activity on resources and the environment

### **Social Studies (SS)**

In Social Studies, students in Missouri public schools will acquire a solid foundation which includes knowledge of

- SS1 principles expressed in the documents shaping constitutional democracy in the United States
- SS2 continuity and change in the history of Missouri, the United States and the world
- SS3 principles and processes of governance systems
- SS4 economic concepts (including productivity and the market system) and principles (including the laws of supply and demand)
- SS5 the major elements of geographical study and analysis (such as location, place, movement, regions) and their relationships to changes in society and environment
- SS6 relationships of the individual and groups to institutions and cultural traditions
- SS7 the use of tools of social science inquiry (such as surveys, statistics, maps, documents)

Source: "The Show-Me Standards." Jefferson City, MO: Missouri Department of Elementary and Secondary Education, March 1996.

**St. Louis Area Construction Training  
Tech Prep Consortium**

**Construction Craft Laborers Articulation Agreement  
With Approved Missouri  
Area Vocational-Technical Schools  
(Electrical, Welding, Building Maintenance, Small Engines,  
Industrial Maintenance Programs)**

**What does this mean to you?**

**If you meet the Construction Craft Laborers articulation criteria, you can:**

- **Receive credit for 250 on the job training hours toward your journey-level card**
- **Earn up to 40 hours of training credit toward your journey-level card**

**For more information see [www.k4cybertech.net/laborersagc](http://www.k4cybertech.net/laborersagc)  
or contact:**

**Donald A. Griesenauer, Jr., Coordinator  
Construction Craft Laborer Apprenticeship Program  
35 Opportunity Road  
High Hill, Missouri. 63350  
(314) 585-2391  
e-mail: [laborers@highhill.net](mailto:laborers@highhill.net)**

**OR**

**Dr. Janis Beacham, Coordinator  
St. Louis Area Construction Training Tech Prep Consortium  
6301 Knox Industrial Drive  
St. Louis, MO 63139  
(314) 653-9012  
e-mail: [tbeachargh@aol.com](mailto:tbeachargh@aol.com)**

## Advisory Board Minutes

Power Equipment Technology

Lewis and Clark Career Center

January 15, 2008

**Members in Attendance:** Dale Smith – Instructor (Lewis and Clark Career Center)  
Martin Rawe – TPEC  
Dana (service technician) TPEC  
Steve (service writer) TPEC  
Bryan (Assistant Service Manger) TPEC  
Greg Smith – Instructor (North County Technical High School)  
Shawn Daly (Trainer) TPEC

3:00p.m. Meeting began at TPEC headquarters in Hazelwood, MO.

3:15p.m. Members began discussion of up coming East District SkillsUSA contests.

1. Date: Feb. 12, 2008
2. Dana, Steve, and Bryan will act as Judges
3. Lewis and Clark will provide a judges assistant for recorder keeping
4. Competition areas are decided
5. Snow make up day is set Feb. 14, 2008
6. Class visit to TPEC discussed
7. Donation of diesel Equipment by TPEC is Discussed
8. Next Meeting date set for Late Nov. or Early Dec. 2008

4:45p.m. Meeting adjourned

### Members not in attendance

Jack Murray  
Vic Dowden  
Roy Benning  
Lindsey Deal  
Adam Owens  
Steve Purdy  
Rick Arthur  
Jim McGovern – Chairman  
Keith Smith  
Jeff Spencer

## **Instructional Methods**

**Lecture**: Giving detailed information to the class orally, with the visual aids.

**Video**: Detail service and safety materials presented to meet specific needs.

**Demonstration**: In class disassembly and instruction on different areas that need extra focus.

**Interactive**: Working with a student or group of students to complete a specific goal or project.

**Computer**: Working with skills needed to meet job requirements – parts look up, data management, invoicing.

**Job sheets**: Required hands on work completing tasks required by the state competency list.

## Learning to use a Micrometer

### Objective:

- 4.3 Identify precision measuring tools and equipment.  
EETC IVC1(B)  
Show-me Standard Performance 1.10
- 4.4 Demonstrate the proper use and care of precision measuring tools and equipment.  
EETC IVC3(B)  
Show-me Standards Performance 1.10  
2.5  
Show-me Standards Knowledge MA2  
SC2

### Teaching Methods

Lecture  
Demonstration  
Interactive Performance

### Materials

Paper, pencil, various micrometers, and objects to be measured

### Introduction

This is a 2 to 4 day lesson on how to use and when to use a micrometer.

### Content

Various sections on what a micrometer is and how to use and maintain it.

### Evaluation

Hands on test, worksheets, individual demonstrations in front of the class.

### Assignments

4 Separate work sheets

DAY #4

## I. TAKE ROLL

A. COLLECT TOOL HANDOUT

B. ASK ABOUT PROBLEMS WITH HANDOUT

C. LAB ITEMS

1. LOCATING ENGINES

2. TOOLS.

} (NEED BOTH IN TWO CLASS PERIODS.)

D. REMINDER ON SAFTY GLASSES

## II. THE MICROMETER

A. IT IS THE MOST WIDELY USED PRECISION MEASURING TOOL.

1. THREE BASIC TYPES

a. OUTSIDE DIAMETER

b. INSIDE DIAMETER

c. DEPTH

2. HOW DOES IT WORK.

a. PRECISION THREADS INSIDE THE MICROMETER ALLOW IT TO TURN FOR VERY EXACT READINGS.

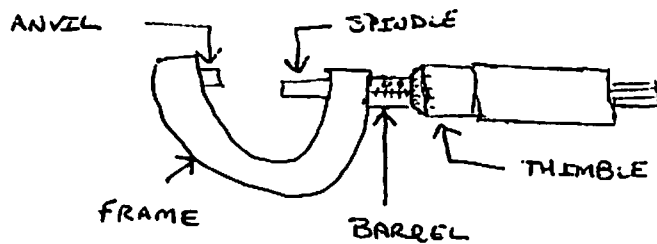
b. A MICROMETER WILL ONLY MEASURE ONE INCH AT A TIME.

c. MICROMETERS COME IN DIFFERENT SIZES (0-1"; 1"-2"; 2"-3"; ETC.)

d. MICROMETERS ALSO COME IN ADJUSTABLE OR <sup>WITH</sup> REPLACEABLE BARRELS SO THAT ONE MICROMETER CAN BE USED TO MEASURE MANY DIFFERENT THINGS. (YOU CAN STILL ONLY MEASURE ONE INCH AT ~~AT~~ <sup>AT A TIME</sup>)

( DAY # 4 CONT )

## B. THE DIFFERENT PARTS OF THE MICROMETER



( THESE ARE THE FIVE MAIN PARTS )

## C. HOW DOES A MICROMETER MEASURE?

1. A MICROMETER IS DIVIDED INTO  $\frac{1}{40}$  OF AN INCH
2. EACH TURN OF THE THIMBLE IS  $0.025$  OF AN INCH
3. A MICROMETER IS DIVIDED INTO 1000 DIFFERENT UNITS.

## D. HOW DO YOU USE A MICROMETER?

1. FIRST LOOK AT THE MICROMETER AND DETERMINE WHAT SIZE IT IS. (0-1") ETC.

2. SECOND LOOK AT THE MICROMETER AND SEE IF ANY NUMBERS ARE SHOWING ON THE BARREL

a. THESE ARE  $\left(\frac{1}{10}^{\text{th}}$  OF AN INCH)

- b. ALL THE LINES ON THE BARREL ARE DIVIDED INTO  $0.025$  OF AN INCH.

3. THIRD LOOK AT THE MICROMETER THIMBLE.

a. SEE WHAT LINE IT IS ON

b. THE LINES REPRESENT  $0.001$  OF AN INCH.

c. ~~THE~~ ONE TURN OF THE THIMBLE IS  $0.025$  OF AN INCH.

(DAY #4 CONT.)

4. IF THE THIMBLE IS NOT EXACTLY ON A LINE, THEN YOU MUST LOOK AT THE VERNIER TO GET YOUR EXACT READING.
- a. THE VERNIER SCALE IS LOCATED ON THE BARREL.
  - b. IT MEASURES DOWN TO THE 0.0001 (TEN-THOUSANDS OF AN INCH).
    1. LOOK AT THE VERNIER NUMBERS AND THE LINES ON THE THIMBLE.
    2. THE LINE ON THE THIMBLE THAT LINES UP WITH THE LINE ON THE VERNIER SCALE IS THE TEN-THOUSANDS READING.

## E. USING THE MICROMETER.

1. DO NOT COCK THE MICROMETER WHEN YOU ARE MEASURING SOMETHING.
2. KEEP THE MICROMETER CLEAN
  - a. THE SURFACE OF THE ANVIL AND THE SPINDLE MUST BE CLEAN IN ORDER TO GET AN ACCURATE READING.
  - b. USE A SHEET OF PAPER HELD TIGHT IN THE MICROMETER TO CLEAN THE SURFACES.
  - c. TRY TO KEEP WHAT YOU ARE GOING TO MEASURE AS CLEAN AS YOU CAN.
3. DO NOT USE THE MICROMETER AS A CLAMP

## F. PRACTICE WITH THE MICROMETER

1. YOU MUST USE WHAT YOU HAVE LEARNED OR YOU WILL FORGET IT.
  - a. MEASURING A PIECE OF PAPER IS A GOOD FORM OF PRACTICE.
    1. IF THE PAPER TEARS IT IS TOO TIGHT.
    2. IF IT SLIPS THROUGH THE MICROMETER EASILY IT IS TOO LOOSE.

(DAY #4 CONT.)

B. A SET OF FLAT FEELER GAUGES WITH THE NUMBERS TURNED AWAY FROM YOU IS A GOOD WAY TO PRACTICE.

G. WHEN YOU USE A MICROMETER.

1. YOU SHOULD ALWAYS MEASURE IMPORTANT THINGS TWICE

a. WHAT IS IMPORTANT - USUALLY MACHINED PARTS

b. IF YOU'RE IN DOUBT MEASURE IT TWICE TO BE SAFE.

2. YOU SHOULD ALWAYS MEASURE ROUND OBJECTS TWICE, AT 90° FROM EACH READING.



a. IF YOU HAVE A DIFFERENT READING, THEN DO SOME MORE MEASURING. IT MAY SAVE YOU TIME + MONEY.

III. HAND OUT MICROMETER WORK SHEET

A. IF STUDENTS NEED LOCKERS ASSIGN THEM.

B. REMEMBER ENGLISHS & TOOLS.

DISCUSS MICROMETER

- 1) ANVIL
- 2) SPINDLE
- 3) FRAME
- 4) THIMBLE / SLEEVE
- 5) THIMBLE

MEASUREMENT LOCK / THIMBLE SPINDLE

SIMPLE MATH PROBLEMS

ADDITION →

#1	#2	#3
.02	1.00	3.00
.65	.50	.08
+ 1.35	+ .07	+ .75
2.02	1.57	3.83

ONE STEP FORMUL ⇒

#1	#2	#3
1.00	3.00	0.00
.30	.1	.4
.025	.075	.075
.001	.006	.075
1.326	3.181	0.475

DISCUSS SNAP BALL GAGES

DEMONSTRATION →

LAST STEP

(#1)

1.00
.2
.050
.009
<u>.0002</u>
1.2592

(#2)

0.00
.3
.075
.013
<u>.0006</u>
0.3886

MICROMETER

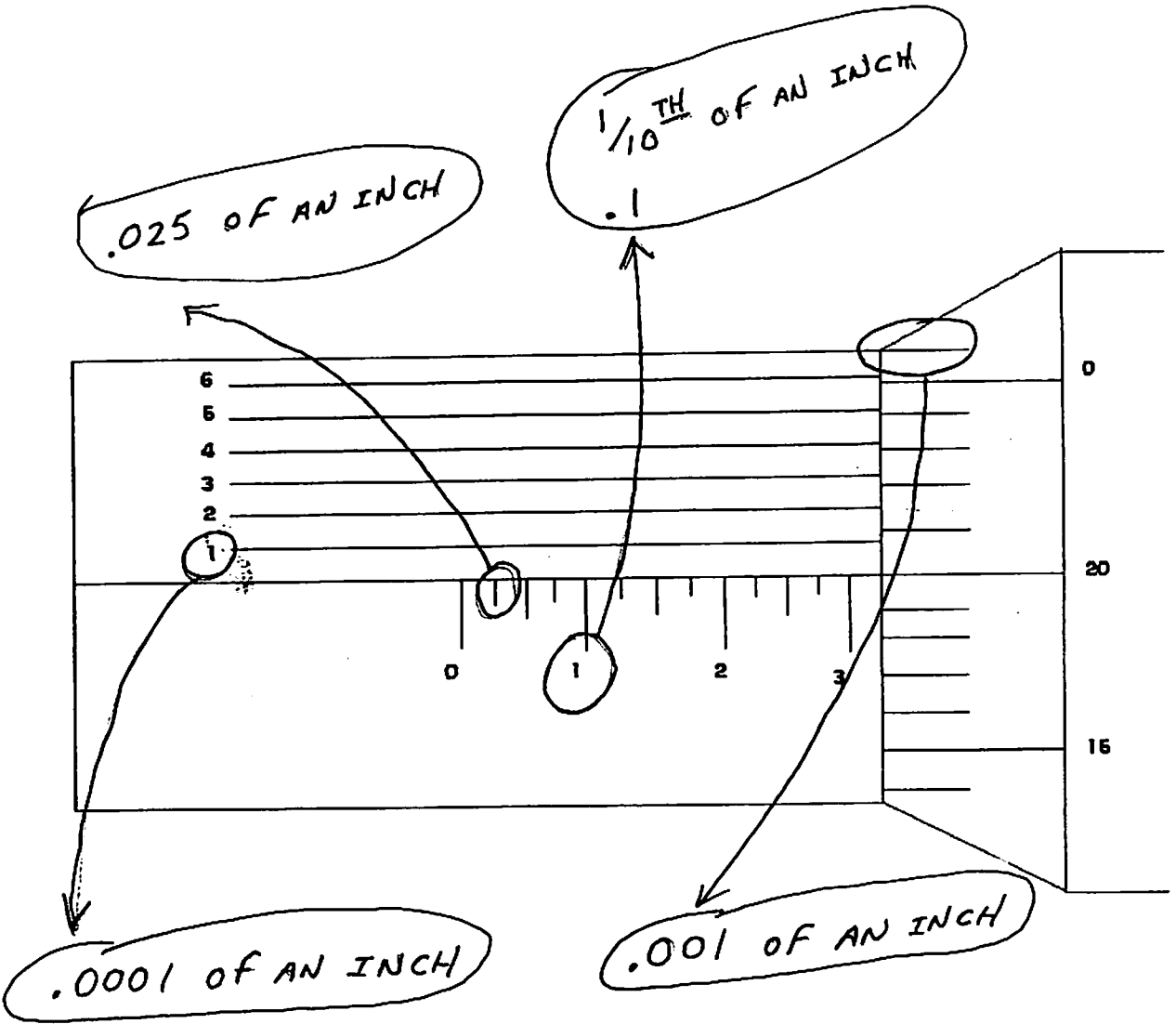
" MEASURES TO EITHER .001 ON AN INCH OR .0001 OF AN INCH."

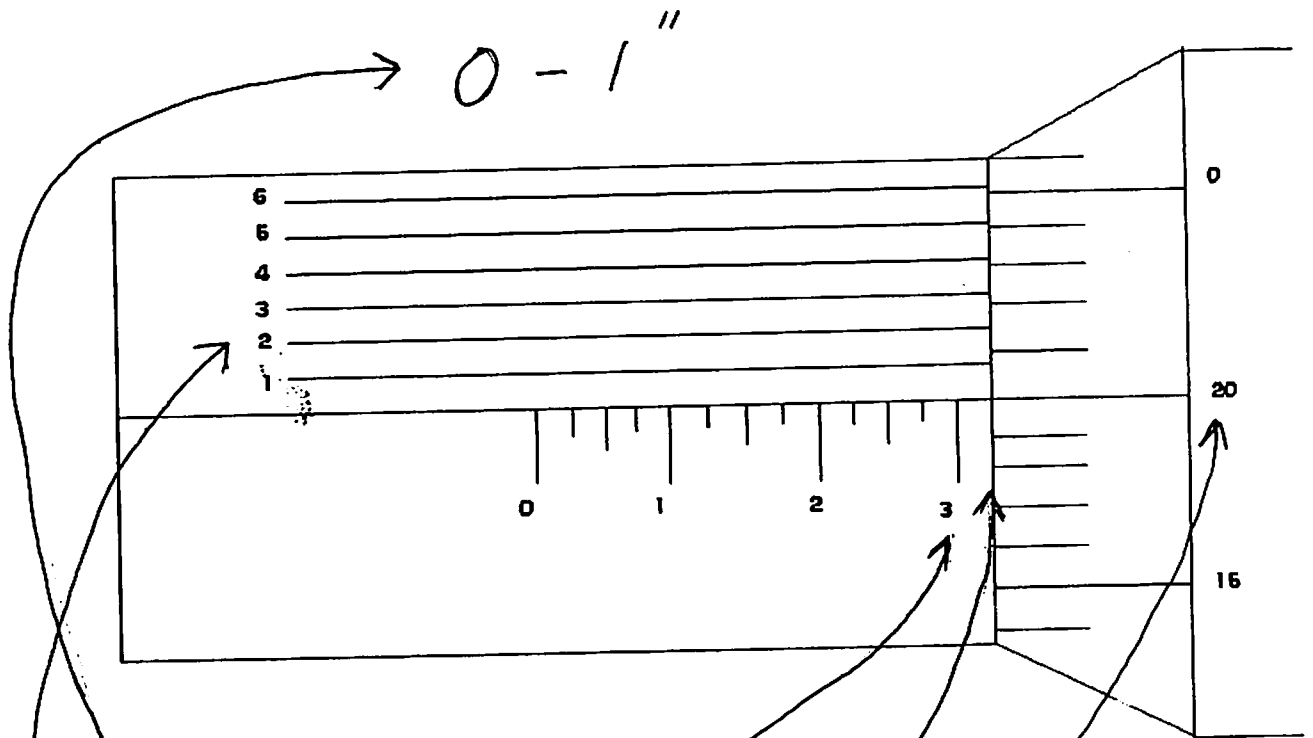
REASONS FOR ITS USE

PRECISION MEASURING TOOL  
 (ENGINE REBUILDERS)  
 ("VALVE JOBS") ETC.

1. FRAME #
2. BARREL #
3. CLOSEST HALF INCH
4. LINE ON THIMBLE
5. VERNIER SCALE READING

0-1"  
↓  
SIZE OF THE MICROMETER





#1 = 0.0

#2 = 0.3

#3 = 0.00

#4 = 0.20

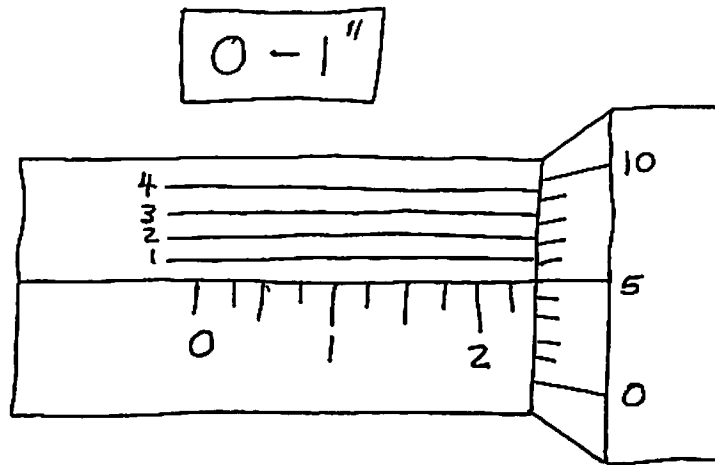
#5 = 0.00

+

---

0.320

PROBLEM #1



#1

#2

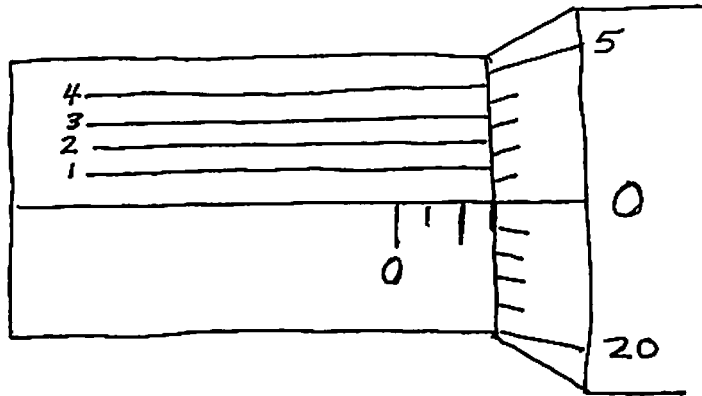
#3

#4

#5

PROBLEM # 2

0-1'



#1

#2

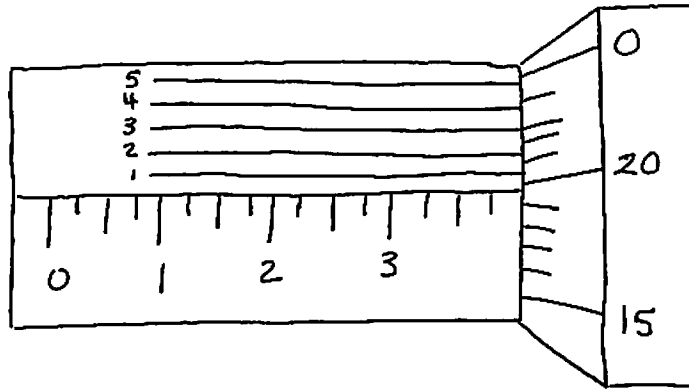
#3

#4

#5

PROBLEM # 3

1" - 2"



#1

#2

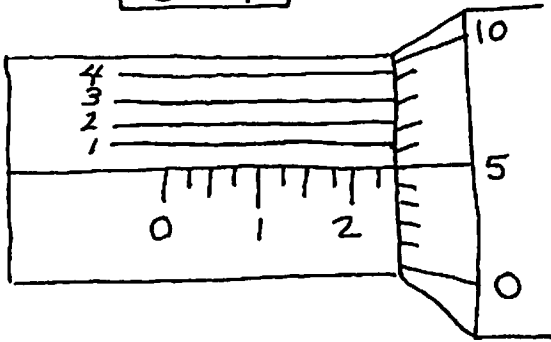
#3

#4

#5

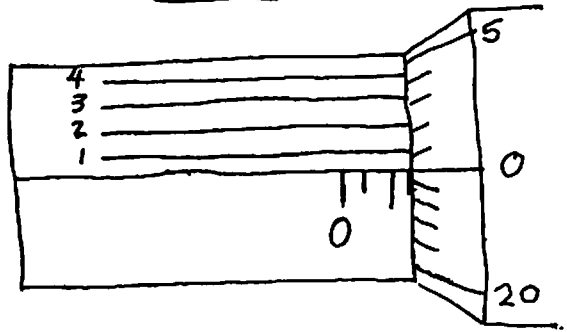
#1

0-1"



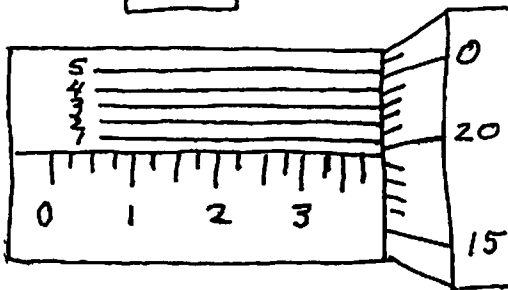
#2

0-1"

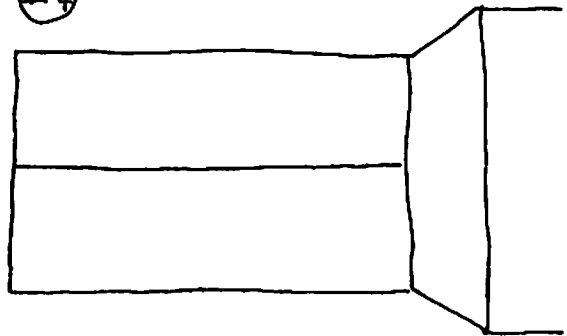


#3

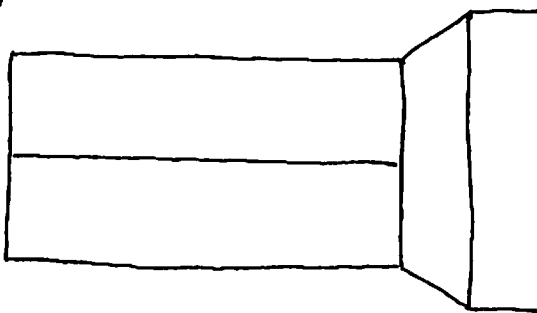
1"-2"



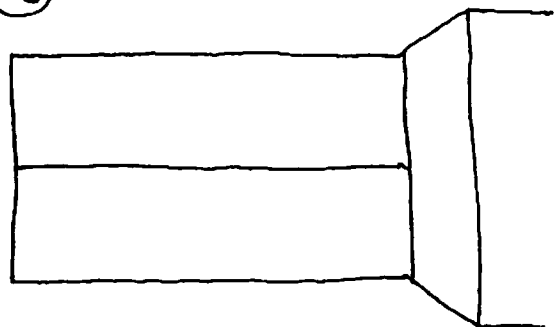
#4



#5



#6



ANSWER KEY FOR OVER HEAD

PROBLEM #1

0.230

- #1 0.00
  - #2 0.2
  - #3 0.025
  - #4 0.005
  - #5 0.0000
- 
- 0.230

PROBLEM #2

0.075

- #1 0.00
  - #2 0.00
  - #3 0.075
  - #4 0.000
  - #5 0.0000
- 
- 0.075

PROBLEM #3

- #1 1.00
  - #2 0.30
  - #3 0.075
  - #4 0.019
  - #5 0.0003
- 
- 1.3943

# LEWIS AND CLARK CAREER CENTER LAWN AND GARDEN EQUIPMENT REPAIR

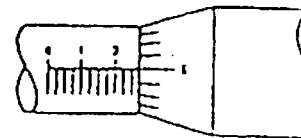
## THE MICROMETER

The micrometer is used to measure distances in thousandths of an inch. Micrometers come in different sizes. For example, a 0-1" "mike" will measure from 0 to 1 inches in thousandths of an inch; a 2-3" mike will measure from 2 to 3 inches in thousandths of an inch.

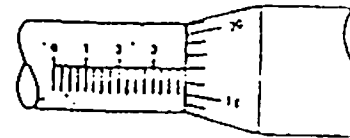
One complete turn of the thimble changes the distance between the anvil and the spindle 25 thousandths (.025). Each number on the hub is read in thousandths. Each mark on the thimble is one thousandth.

To read a mike, first note the size of the micrometer -- 1", 2", ect. Second, read the longest numbered line that is visible. Third, count .025 for each of the short marks on the hub to the right of the numbered line. Fourth, to these readings add the reading on the thimble.

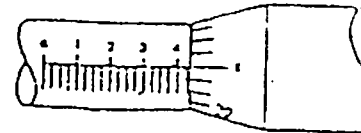
- Example A
1. 0.000 (0-1" mike)
  2. .200 largest numbered line
  3. .050 two short marks beyond numbered line
  4. .005 5 on the thimble
- .255 = distance between anvil and spindle



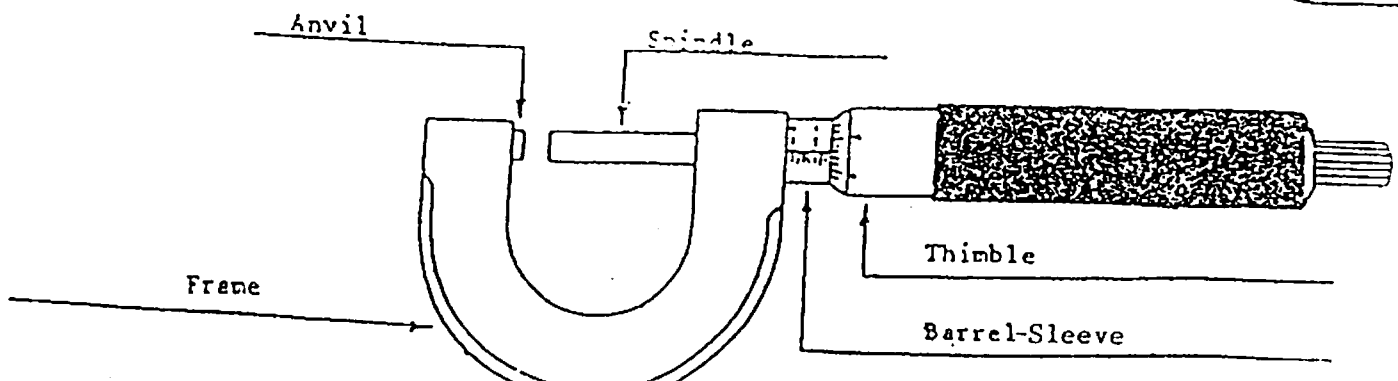
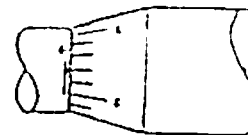
- Example B
1. 2.000 (2-3" mike)
  2. .300 largest numbered line
  3. .075 three short marks beyond numbered line
  4. .017 17 on the thimble
- 2.392 = distance between anvil and spindle



- Example C
1. 3.000
  2. .400
  3. .025
  4. .000
- 3.425 = distance between anvil and spindle



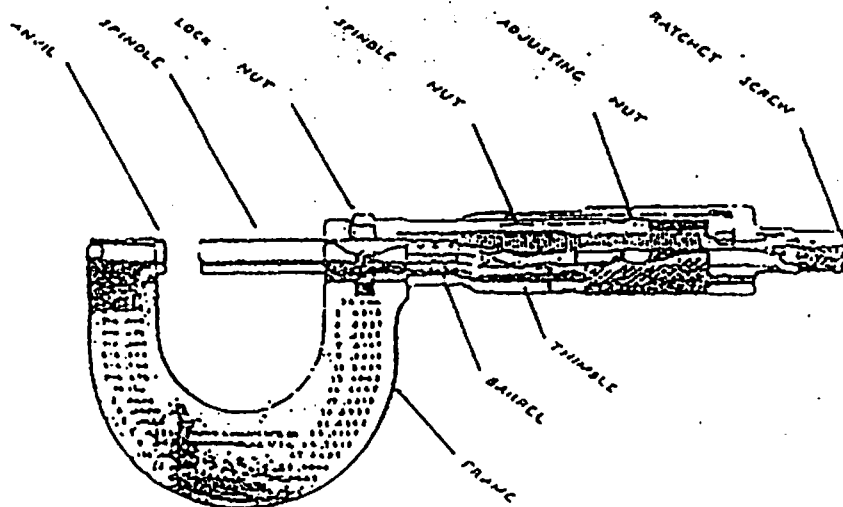
- Example D
1. .000
  2. .000
  3. .000
  4. .002
- .002 = distance between anvil and spindle



# LAWN AND GARDEN EQUIPMENT REPAIR

## Precision Measuring Tools

### A. Outside Micrometer



1. Used when measuring requires an accuracy in \_\_\_\_\_ or \_\_\_\_\_ of an inch.
2. Used for taking \_\_\_\_\_ measurements of a part.
3. Principal parts of a micrometer
  - a.
  - b.
  - c.
  - d.
  - e.
4. Each number on the barrel represents \_\_\_\_\_ of an inch.
5. Each graduation mark on the barrel represents \_\_\_\_\_ of an inch.
6. Each graduation mark on the thimble represents \_\_\_\_\_ of an inch.
7. One full turn of the thimble changes the opening between the spindle and anvil \_\_\_\_\_ of an inch.

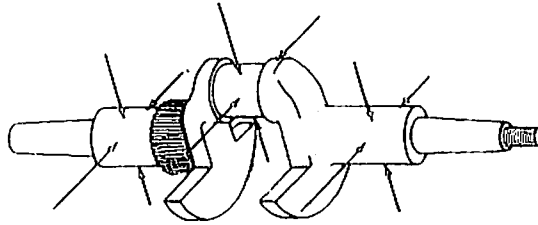
LEWIS AND CLARK CAREER CENTER  
LAWN AND GARDEN EQUIPMENT REPAIR

90000 SERIES ENGINE WORK SHEET

	READING 1	READING 2
CYLINDER BORE	_____	_____
CRANKSHAFT END PLAY	_____	_____
RING END GAPS		
#1 COMPRESSION RING	_____	_____
#2 COMPRESSION RING	_____	_____
OIL CONTROL RING	_____	_____
MAG. JOURNAL	_____	
ROD JOURNAL	_____	
PTO JOURNAL	_____	
MAG. BEARING	_____	
ROD BEARING	_____	_____
PTO BEARING	_____	
PISTON SKIRT	_____	

*Instructions:* Measure all engine parts according to manufacturer specifications.

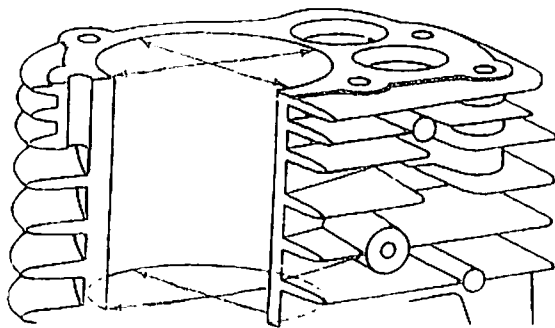
**Crankshaft:**



Magneto journal: \_\_\_\_\_ Rod Journal: \_\_\_\_\_ PTO: \_\_\_\_\_

Magneto Journal: \_\_\_\_\_ Rod Journal: \_\_\_\_\_ PTO: \_\_\_\_\_

**Cylinder Block:**



*Top of Cylinder*

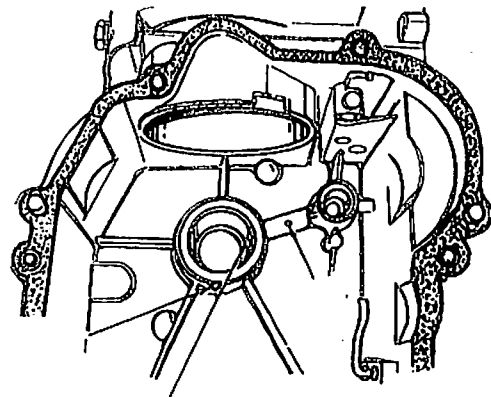
Bore (front to back): \_\_\_\_\_

Bore (side to side): \_\_\_\_\_

*Bottom of Cylinder*

Bore (front to back): \_\_\_\_\_

Bore (side to side): \_\_\_\_\_



Top Bushing: \_\_\_\_\_

Top Bushing: \_\_\_\_\_



# Lewis Clark Career Center

2005 - 2006 Placement Summary

Smith, Dale

---

Total Students:	21	
Total Placed:	20	95%
Total Placed Related:	9	43%
Positive MSIP Placement:	10	48%

---

Employed Related:	7	33%
Employed Not Related:	10	48%
Military Related:	0	0%
Military Not Related:	0	0%
Continuing Education Related:	2	10%
Continuing Education Not Related:	1	5%
Not Available:	0	0%
Not Placed:	1	5%
Status Unknown (Not Found):	0	0%

---

<i>Teacher Name</i>	<i>CIP Code</i>	<i>Number of Students</i>	<i>CENR</i>	<i>CER</i>	<i>ENR</i>	<i>ER</i>	<i>MNR</i>	<i>MR</i>
<b>SMITH</b>								
	470606							
	<b>Sum</b>	<b>14</b>	<b>4</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>1</b>	
<b>Sum</b>		<b>14</b>	<b>4</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>1</b>	



## STANDARD 2 - FACILITIES, SUPPLIES, EQUIPMENT, AND REPAIR

Self-Review Evaluation of Minimum Compliance Criteria	1	2	3	4	5	DATE
<b>2.1 Safety</b>						
Rate if Safety test(s) are required for all students (Yes/No)	X					5-29-03
Rate the degree to which all shields, guards and other safety devices are in place, operable and used. (Yes/No)	X					5-29-03
Rate the degree to which all students, instructors and visitors wear safety glasses, safety shoes and clothes when required in the lab/workshop area while class is in session (Yes/No)	X					5-29-03
Rate the degree to which all flammable liquids are safely stored in OSHA approved storage containers (Yes/No)	X					5-29-03
<b>2.2 Work Shop/Work Stations</b>						
Rate the quality of the workstations.	X					5-29-03
Rate the quality of the repair areas including dynamic testing stations	X					5-29-03
Rate the availability of the tools and equipment needed for instruction and demonstration in the lab/shop area's	X					5-29-03
Rate if the facility is identified with a OPE Certification sign (Yes/No)						5-29-03
<b>2.3 Theory/Lecture Area</b>						
Rate the size and quality of the lecture area compared to the standard student class size	X					5-29-03
Rate the demonstration capabilities of the lecture area		X				5-29-03
Rate the use of white boards for instructor notes, etc.	X					5-29-03
<b>2.4 Audio/Visual Equipment</b>						
Rate the use of appropriate types of A/V formats	X					5-29-03
<b>2.5 Hand Tools</b>						
Rate availability of hand tool sets for students comparable to the tools that will be required for employment. <u>Note</u> the school may require the student to purchase a set of tools to meet this requirement.	X					5-29-03







## STANDARD 4 - STUDENT SERVICES

Self-Review Evaluation of Minimum Compliance Criteria/Compliance	1	2	3	4	5	DATE
<b>4.1 Pre Testing</b>						
Rate if students are pre tested before entry into OPE technology program (Yes/No)		X				5-29-03
<b>4.2 Records</b>						
Rate if records of each student are maintained for future certification. Records should include test scores, OPE certification levels of achievement, as well as post-graduate employment when possible. (Yes/No)	X					5-29-03
Rate if student records are maintained for 5 years						
Rate if procedures are in place for supplying prospective employers with transcripts (Yes/No)	X					5-29-03
<b>4.3 Follow-Up Placement</b>						
Rate if each program offers some level of placement administrative support pertaining to post graduation employment opportunities and placement (Yes/No)	X					5-29-03
Rate if process is in place to provide data regarding the effectiveness and appropriateness of the training provided (industry advisory council) (Yes/No)	X					5-29-03
Rate the program for student placement in the industry		X				5-29-03
Rate if follow-up post-graduation employment information is gathered and retained (Yes/No)	X					5-29-03
Rate if active internship program for students is in place (recommended in Level 1 & 2, required in Levels 3 & 4) (Yes/No)						5-29-03
<b>Total score</b>						

### Comments

STARTING WITH THE 2003-2004 SCHOOL YEAR AN INTERSHIP PROGRAM WILL BE REQUIRED FOR ALL 2ND YEAR STUDENTS.

## STANDARD 5 - ADVISORY COMMITTEE

Self-Review Evaluation of Minimum Compliance Criteria Compliance	1	2	3	4	5	DATE
<b>5.1 Establishment of Committee</b>						
Rate if the department has in each program of instruction an active and operational advisory committee or sub-committee. (Yes/No)	X					5-29-03
Rate if the program advisory committee consists of, but not limited to, local and industry representatives and is approved by the Board of Trustees of the school or college	X					5-29-03
<b>5.2 Function of Committee</b>						
Rate the make up of the committee as pertains to the industry involvement	X					5-29-03
Rate if the program advisory committee has assisted instructors/managers in the period evaluating of the program's compliance with these program standards.	X					5-29-03
Rate if the advisory committee meets a <u>minimum</u> of once annually. (Yes/No)	X					5-29-03
Rate if the minutes from Annual Advisory Committee Meetings are available. (Yes/No)	X					5-29-03
Rate if documents indicating input and recommendations of advisory committee are available for review	X					5-29-03
Rate the process to provide data regarding the effectiveness and appropriateness of the training provided	X					5-29-03
<b>Total Score</b>						

### Shop Area

The tools and equipment on this list are used in general lab/shop work but are not generally considered to be individual hand tools. A well equipped, certified program should have all of these general tools and equipment readily available and in sufficient quantity to provide quality instruction.

#### Safety Related Items

Required	Have	Required	Have
Chemical storage cabinet	✓	First Aid cabinet, fully equipped	
Fire Extinguishers	✓	First aid blanket	
Emergency wash station with Drench shower and Eye station		MSDS Hazard Communication Kit	
Lock out tags	✓	OHSA approved fuel safety cans, red for gasoline, yellow for diesel	✓
Oily waste safety cans	✓	Eye & Ear Protection (OSHA Approved)	✓
Rubber gloves		Safety head gear (OSHA Approved)	✓

#### General Shop Related Items

Required	Have	Required	Have
Shop Benches for each group	✓	Storage for components	✓
Storage for tools	✓	Cleaning gear	✓
Wash sink for students	✓	Marking pencil (e.g. Marks a lot)	✓
Bench vices	✓	Hydraulic Floor Hoist	✓
Jack stands	✓	Tool room, enclosed	✓
Exhaust System	✓	Book cases for manuals	✓
Air Compressor and Hoses	✓	Air Pressure Regulator	✓
Air Ratchet (3/8" drive)	✓	Axle Stands (Safety Stands)	✓
Belt Tension Gauge	✓	Bench or Pedestal Grinder	✓
Creeper	✓	Drill - 3/8" variable speed, reversible	✓
Drill - 1/2" variable speed, reversible	✓	Extension Cords	✓
Floor Jack (I 1/2Ton Minimum)	✓	Hoist(s)	✓
Hot Plate or equivalent	✱	Hydraulic Press with adapters (25 Ton)	✱
Impact Socket Sets - 3/8" Drive (Standard and Metric)	✓	Impact Sockets - 1/2" Drive (7/16" - 1 1/8")	✓
Impact Sockets - 1/2" Drive (12mm - 32mm)	✓	Impact Wrench - 1/2" Drive	✓
Impact Wrench - 3/8" Drive	✓	Master Puller Set	✓
Oil Can - Pump Type		Oil Filter Wrench	✓
Oxy-Acetylene Torch	✱	Parts Cleaning Tank and Gloves (non-solvent based cleanser suggested)	✓

### Battery Service Tools

Required	Have	Required	Have
Battery charger	✓	Battery jumper cables	✓
Battery load tester		Good battery, on stand	✓
Battery Tester (refractometer)	✓	Hydrometer, temperature corrected	✓
Rubber safety gloves		Safety apron	
Safety goggles	✓	Battery carrier	
Post/clamp cleaner	✓	Side terminal cleaner	
Clamp remover	✓	Clamp spreader/cleaner	
Side terminal adapter	✓	Battery Terminal Pliers	
Battery Terminal Puller	✓	Battery Terminal Cleaner	

### Precision Measuring Tools Required Tools, 1-2 per shop

Required	Have	Required	Have
1 Vernier caliper/case	✓	Micrometer (Depth)	✓
1 6" steel ruler	✓	Feeler gauge	✓
Cylinder bore gauge	✓	Ball Gauges (Small Hole)	✓
Inside Micrometer Set 0 - 6"	✓	Dial calipers	✓
Straight edge	✓	Dial Indicator with Flex Arm and Clamp Base	✓
Plastigage for each engine	✓	Micrometers - 0-1", 1-2", 2-3", 3-4", 4-5" (Outside Type)	✓

### Live Equipment Available for Testing

May be on loan for program from local dealer, if so attach letter from local dealer regarding their support

25 RIDING MOWER (VARIOUS BRANDS)  
 125 WALK MOWERS  
 75 2-CYCLE HAND-HELD PIECES OF EQUIPMENT  
 100 VARIOUS ENGINES  
 25 VARIOUS TRANSMISSIONS  
 PLUS MISC + ODD EQUIPMENT