Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA100 – WORKPLACE SAFETY

Unit Number: PA100

Dates: Spring 2016 **Hours:** 40.00

Last Edited By: Outdoor Power Equipment Technologies (05-10-2016)

Unit Description / Objectives:

Student will know and be able to demonstrate knowledge and procedures relating to the workplace in accordance with industry standards.

Tasks:

PA101 - Interpret workplace safety and SDS sheets.

PA102 - Demonstrate how to lift and move heavy objects.

PA103 - Demonstrate how to handle and store flammable materials and toxic substances.

PA104 - Explain the purpose of OSHA and how it promotes safety on the job

PA105 - Demonstrate and explain appropriate safety precautions to take around job-site hazards.

PA106 - Demonstrate and properly wear personal protective equipment (safety goggles, hearing protection and respiratory protection.

PA107 - Describe fire prevention techniques.

PA108 - Follow safety rules for ECP (Exposure Control Procedures) for blood borne pathogens.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12

Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:

Interpret workplace safety and SDS sheets.
Explain the purpose of OSHA and how it promotes safety on the job
Describe fire prevention techniques.

Skill:

Demonstrate how to lift and move heavy objects.
Demonstrate how to handle and store flammable materials and toxic substances.
Demonstrate and explain appropriate safety precautions to take around job-site hazards.
Demonstrate and properly wear personal protective equipment (safety goggles, hearing protection and respiratory protection.
Follow safety rules for ECP (Exposure Control Procedures) for blood borne pathogens.

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)

Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Handle material in a safe and workmanlike manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Pre/Post Tests
Time Cards
Writing Activities
Video/DVD
Projects
Check Lists
Presentation
assessment
Research
Rubrics

Resources/Equipment:

Solvents and oils.
Drain pans and receptacles.
Appropriate cleaning supplies.
Manufacturers service manual
Required gaskets, seals, lubricants, replacement parts
MVACC Fire Extinguisher Safety Video
SDS sheets for program area
Personal Protective Equipment

Roth, A. C. (2012). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA200 - BASIC ELECTRICAL PRINCIPLES AND CIRCUIT TESTING.

Unit Number: PA200

Dates: Spring 2016 **Hours:** 49.00

Last Edited By: Outdoor Power Equipment Technologies (05-10-2016)

Unit Description/Objectives:

Student will know and be able to describe fundamental electrical concepts, perform calculations using Ohm's law, demonstrate proficiency with electrical test equipment, and complete basic electrical repairs.

Tasks:

PA201 - Demonstrate safe work habits when working with electrical systems.

PA202 - Demonstrate how to interpret electrical circuit and wiring diagrams while making correct electrical connections.

PA203 - Use a meter to measure resistance, continuity, amperage and voltage.

PA204 - Solve problems using Ohm's Law.

PA205 - Explain the proper procedure for battery disposal based on EPA and local ordinances and resistance.

PA206 - Describe series and parallel circuits and explain the different types of circuit failures.

PA207 - Identify terminals and connectors used in electrical systems.

PA208 - Describe and perform the diode test.

PA209 - Identify electrical wire sizes and selection based on an anticipated current load.

PA210 - Demonstrate applicable test procedures for testing series and parallel circuits.

PA211 - Check current flow in electrical systems and components

PA212 - Inspect, test and replace fusible links, fuses and circuit breakers.

PA213 - Demonstrate knowledge of American Wire Gauge (AWG) wiring codes.

PA214 - Inspect a low-oil alert system.

PA215 - Solder a current carrying wire.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
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Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

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RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:

Define the four-stroke cycle and the two-stroke cycle
List advantages and disadvantages of two cycle and four cycle engines
Review terminology and vocabulary
Discuss variation in engine design explain differences between ports and valves

Skill:

Identify engine model#, type, and code
Identify cylinder and valve arrangements
Explain the concept of valve timing

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
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Use of Calculator
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Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Handle material in a safe and work-like manner.
Use personal protective equipment.
Use hand tools in a safe manner.
Follow manufacturer's directions when using any product, tool, equipment, etc.
Ensure adequate ventilation when working in enclosed areas.
Use tools and equipment in a professional work-like manner according to OSHA standards.
Know and follow the established safety rules at all times.

Assessment:

Worksheets
Quizzes
Pre/Post Tests
Time Cards
Writing Activities
Video/DVD
Projects
Check Lists
Presentation
Research
Rubrics

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment

"Engine cycles" power point presentation by Ryan Saucier.

Various 2 and 4 - cycle engines in lab area.

ARI "Part Smart", March 2016 version DVD

Stihl read only tech files CD

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA300 - COOLING SYSTEM OPERATING PRINCIPLES, TROUBLESHOOTING AND REPAIR PROCEDURES.

Unit Number: PA300

Dates: Spring 2016 **Hours:** 48.00

Last Edited By: Outdoor Power Equipment Technologies (05-10-2016)

Unit Description/Objectives:
Student will know and be able to demonstrate knowledge of lubrication systems at the level of proficient or higher according to industry standards.

Tasks:

PA301 - Demonstrate knowledge of the concept of heat transfer and the purpose of a cooling system.

PA302 - Perform a cooling system flush and cleaning on a liquid cooled engine.

PA303 - Remove, service and replace a water pump hose and replace thermostat.

PA304 - Identify the components and function of a liquid cooled engine.

PA305 - Properly pressure-test a liquid-cooled cooling system.

PA306 - Describe major causes of liquid-cooled engine overheating.

PA307 - Inspect the cooling system for debris, leaks and damage.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
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Supporting Anchor/Standards:

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PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
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Instructional Activities:

Knowledge:

Define friction and explain how it affects the internal engine components
List the functions of lubrication oil
Explain the operation of pumps
Explain the function of filtration systems

Skill:

List common oil contaminants
Describe differences between splash lubrication systems and a pressure lubrication system
Check oil level in an engine
Identify the components and function of a crankcase ventilation breather assembly

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
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Have Student Repeat Directions

Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
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Cue for Oral Response
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Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

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Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Pre/Post Tests
Time Cards
Writing Activities
Video/DVD
Projects
Check Lists
Presentation
Research
Rubrics

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment

SGE engine measurement, cleaning, inspection video

Manufacturer's service manual

SGE engine dis assembly video

SGE engine re-assembly video

SGE job sheet #3

SGE engine disassembly checklist

SGE engine reassembly checklist

Basic hand tools.
Stationary work bench.
Drain pans and receptacles.
Appropriate cleaning supplies.
Manufacturers service manual
Required gaskets, seals, lubricants, replacement parts assessment

American Honda Motor Co. (2009). Inc., Honda University, GP Engines Training materials flash/pdf/pps.

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA400 - FUEL SYSTEM OPERATING PRINCIPLES, TROUBLESHOOTING AND REPAIR PROCEDURES

Unit Number: PA400

Dates: Spring 2016 **Hours:** 76.00

Last Edited By: Power Sports (05-10-2016)

Unit Description/Objectives:
Student will know and be able to demonstrate knowledge of and perform diagnostics and repairs of fuel systems according to industry standards.

Tasks:

PA401 - Identify the basic types of fuel systems used in power equipment.

PA402 - Identify the function of each component in the fuel system including carburetor, fuel filter, fuel pump, and electronic fuel injector.

PA403 - Identify types of carburetor designs and their functions, using proper terms.

PA404 - Use proper terms to describe the function of vacuum-feed, diaphragm, float, rotary, and slide valve carburetors.

PA405 - Identify and describe the idle fuel circuit and the main fuel circuit.

PA406 - Use proper terms to describe the "venturi" principle, and variable venturi carburetors.

PA407 - Describe fuel enrichment devices including choke types, purging systems, and primers.

PA408 - Describe the function of a fixed orifice jet, high speed nozzle, emulsion tube, and purging system.

PA409 - Identify the common types of fuel filters and describe the difference between micron and mesh.

PA410 - Explain the theory, function, and components of electronic fuel injection (EFI).

PA411 - Explain the theory, function, and components of gaseous fuels.

PA412 - Identify types and grades of gasoline used in power equipment.

PA413 - Describe how fuel additives protect power equipment placed in seasonal storage.

PA414 - Inspect, disassemble, clean, and reassemble internal carburetor parts for wear.

PA415 - Remove, service and replace a carburetor on a small gasoline engine.

PA416 - Remove, service, and replace a fuel system's air filter.

PA417 - Remove, service and replace a fuel pump.

PA418 - Adjust carburetor choke linkage.

PA419 - Adjust carburetor mixture screws per OEM specifications.

PA420 - Adjust carburetor float level, adjust carburetor metering levers, remove, replace and repair fuel lines.

PA421 - Remove and replace a fuel tank, filters, caps and lines.

PA422 - Adjust an engine's idle speed after servicing a carburetor.

PA423 - Check the fuel pump pressure.

PA424 - Pressure test the carburetor.

PA425 - Operate the engine to check for proper starting and acceleration.

PA426 - Differentiate hunting/surging symptom between the fuel system and governor system.

PA427 - Properly assemble an air intake.

PA428 - Remove and replace an intake manifold.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:

List the primary purposes of the ignition system
Describe small engine ignition advance systems
List the advantages of a solid state ignition system
Describe the operation of a battery ignition system

Skill:

Demonstrate safe work habits when working with electrical systems
Use a meter to measure resistance, continuity, amperage and voltage
Describe series and parallel circuits and explain the different types of circuit failures
Solder a current carrying wire

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time

Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Handle material in a safe and workmanlike manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Pre/Post Tests
Time Cards
Writing Activities
Video/DVD
Projects
Check Lists
Presentation
Research
Rubrics

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment

SGE Job sheet #10, "Ignition system service"
SGE engine measurement, cleaning, inspection video
Manufacturers service manual
Small gas engine equipped with breaker points
Small gas engine equipped with breaker-less ignition
DC electric starter
Automotive battery
Digital Multi meter
Battery load tester
DC alternator
Soldering equipment.

American Honda Motor Co. (2009). Inc., Honda University, GP Engines Training materials flash/pdf/pps.

Briggs and Stratton, (2009). Small Engine Care and Repair. Creative Publishing, Chanhassen, MN.
Equipment and Engine training Council (2009). EETC 4-stroke study guide. Oconomowoc, WI.

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA500 - EXHAUST SYSTEM OPERATIC

Unit Number: PA500

Dates: Spring 2016 **Hours:** 27.00

Last Edited By: Power Sports (05-10-2016)

Unit Description / Objectives:

Student will know and be able to demonstrate knowledge and service of cooling systems at the level of proficient or higher according to industry standards.

Tasks:

PA501 - Describe equipment problems that can occur from operating equipment with a removed or damaged exhaust system.

PA502 - State the danger of operating a power product in a closed area.

PA503 - Describe the purpose of an exhaust deflector and describe the purpose of a spark arrestor screen.

PA504 - Describe exhaust system nomenclature and function as well as types and terms associated with exhaust systems.

PA505 - Describe the theory and function of a single stage catalyst (catalytic converters).

PA506 - Describe the proper service cleaning procedures for exhaust ports and spark arrestor screens.

PA507 - Inspect, remove, service and replace an exhaust system.

PA508 - Diagnose, service, and replace an oxygen sensor.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

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RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

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RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:

Explain how air cooling, exhaust cooling, and water cooling work to lower engine operating temperatures
Define the basic function of a water pump
Describe outboard water circulation systems
Explain the function of a thermostat and a radiator

Skill:

Perform a cooling system flush and cleaning on a liquid cooled engine
Remove, service and replace a water pump hose and replace thermostat
Change engine coolant and clean coolant passages
Identify the components and function of a liquid cooled engine
Properly pressure-test a liquid-cooled cooling system
Describe major causes of liquid-cooled engine overheating
Describe major causes of air-cooled engine overheating
Clean the cooling fins and blower housing on an air-cooled engine

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling

Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
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Use of Highlighter/Highlighted Text
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Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
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De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Handle material in a safe and workmanlike manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Pre/Post Tests
Time Cards
Writing Activities
Video/DVD
Projects
Check Lists
Presentation
Research
Rubrics

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment
Air cooled small gas engine
Liquid cooled engine
Liquid cooled small gas or diesel engine

American Honda Motor Co. (2009). Inc., Honda University, GP Engines Training materials flash/pdf/pps.

Briggs and Stratton, (2009). Small Engine Care and Repair. Creative Publishing, Chanhassen, MN.

Equipment and Engine training Council (2009). EETC 4-stroke study guide. Oconomowoc, WI.

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA600 - MEASURING AND TRADE RELATED MATHEMATICS

Unit Number: PA600

Dates: Spring 2016 **Hours:** 34.00

Last Edited By: Power Sports (05-10-2016)

Unit Description / Objectives:
Student will know and be able to demonstrate proper use of precision measuring tools and determine the meaning of findings according to industry standards.

Tasks:

PA601 - Read a standard and a metric ruler

PA602 - Read and use a standard and metric micrometer

PA603 - Read and use a standard and metric dial indicator

PA604 - Use a standard and metric torque wrench

PA605 - Use a standard metric dial caliper.

PA606 - Calculate displacement and horse power.

PA607 - Calculate work, power, torque, area and volume.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

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INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
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PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

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RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

GEOMETRY
Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.
Standard 2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
Standard 2.3.HS.A.13 Analyze relationships between two dimensional and three dimensional objects.

Instructional Activities:

Knowledge:

Explain the importance of proper fuel-oil mixture in a two-cycle engine
Describe the purpose of fuel filters
Explain fuel pump operation
Describe the operation of a pressurized fuel system explain the importance of emission control
Name the various types of fuel that can be used in a small engine and list the practical applications of each

Skill:

Identify the function of each component in the fuel system including carburetor, fuel filter, fuel pump, and electronic fuel injector
Use proper terms to describe the function of vacuum-feed, diaphragm, float, rotary, and slide valve carburetors
Use proper terms to describe the "venturi" principle, and variable venturi carburetors
Properly handle and store flammable fuels

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
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Verbal/Gestural Redirection (prompts to remain on task)
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Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
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Have Student Repeat Directions
Wait Time
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Use of Highlighter/Highlighted Text
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Provide Frequent Breaks
Variety of Assessment Methods
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Student MUST:
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Use personal protective equipment.
Use hand tools in a safe manner.
Follow manufacturer's directions when using any product, tool, equipment, etc.
Ensure adequate ventilation when working in enclosed areas.
Use tools and equipment in a professional work-like manner according to OSHA standards.
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Resources/Equipment:

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Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment

Air cooled small gas engine with carburetor
Carburetor cleaning solution tank
SDS
Personal protective equipment

Briggs and Stratton, (2009). Small Engine Care and Repair. Creative Publishing, Chanhassen, MN.

Equipment and Engine training Council (2009). EETC 4-stroke study guide. Oconomowoc, WI.

Hand tools
Power tools and abrasives
Sealants and gaskets
Solvents and oils
Fuel system components

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA700 - IDENTIFY AND USE HAND TOOLS

Unit Number: PA700

Dates: Spring 2016 **Hours:** 20.00

Last Edited By: Power Sports (05-10-2016)

Unit Description / Objectives:
Student will know and be able to demonstrate the correct selection and use of hand and power tools according to industry standards.

Tasks:

PA701 - Identify and demonstrate the safe use of common hand tools used in the repair of outdoor power equipment.

PA702 - Identify and demonstrate the safe use of specialty tools used in the repair of outdoor power equipment.

PA703 - Identify and demonstrate the safe use of hand, electric, air and hydraulic tools.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:

Summarize basic carburetor adjustments
Explain basic procedures for inspecting, overhauling, and adjusting diaphragm and float-type carburetors
Describe testing a fuel pump for proper operation
Demonstrate troubleshooting procedures for float-type and diaphragm carburetors

Skill:

Inspect internal carburetor parts for wear.
Remove, service and replace a carburetor on a small gasoline engine.
Disassemble, clean and reassemble carburetors.
Remove, service, and replace a fuel system's air filter.
Remove, service and replace a fuel pump.
Remove and replace a fuel filter.
Adjust carburetor choke linkage.
Adjust carburetor mixture screws per OEM specifications.
Adjust carburetor float level, adjust carburetor metering levers, remove, replace and repair fuel lines.
Remove and replace a fuel tank, filters, caps and lines.
Adjust an engine's idle speed after servicing a carburetor.

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling

Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Handle material in a safe and workmanlike manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Writing Activities
Rubrics
Diagrams
Individual Projects
Check Lists
Power Point

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment
Hand tools
Small gas engine carburetor
Required gaskets and seals
MSDS
Carburetor cleaning solvent
Appropriate manufacturers technical manual

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA800 - IDENTIFY AND USE FASTENERS

Unit Number: PA800

Dates: Spring 2016 **Hours:** 12.00

Last Edited By: Power Sports (05-10-2016)

Unit Description / Objectives:

Student will know and be able to demonstrate proper identification, selection, use, and repair of fasteners according to industry standards.

Tasks:

PA801 - Identify, select and install various fasteners according to specifications.

PA802 - Replace damaged internal threads using a thread repair system.

PA803 - Repair damaged internal and external threads, using a tap and die.

PA804 - Demonstrate the use of a thread extraction tool to remove a broken fastener.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

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RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:

Describe the purpose of an exhaust deflector and describe the purpose of a spark arrestor screen.
Describe exhaust system nomenclature and function as well as types and terms associated with exhaust systems.
Describe the theory and function of a single stage catalyst (catalytic converters).
Describe the proper service cleaning procedures for exhaust ports and spark arrestor screens

Skill:

Inspect, remove, service and replace an exhaust system

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text

Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Handle material in a safe and work-like manner.
Use personal protective equipment.
Use hand tools in a safe manner.
Follow manufacturer's directions when using any product, tool, equipment, etc.
Ensure adequate ventilation when working in enclosed areas.
Use tools and equipment in a professional work-like manner according to OSHA standards.
Know and follow the established safety rules at all times.

Assessment:

Worksheets
Quizzes
Writing Activities
Rubrics
Diagrams
Individual Projects
Check Lists
Power Point

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment
Hand tools
Small gas engine with exhaust system installed

Briggs and Stratton, (2009). Small Engine Care and Repair. Creative Publishing, Chanhassen, MN.

Equipment and Engine training Council (2009). EETC 4-stroke study guide. Oconomowoc, WI.

Air impact gun.
Air impact ratchet.
Rotary air tools.
Grinding tools.
Air powered cutting tools.
Stationary work bench
Electric angle grinder.
Solvents and oils.
Appropriate cleaning supplies.
Manufacturers service manual
Required gaskets, seals, lubricants, replacement parts
assessment

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA900 - DEMONSTRATE WELDING AN

Unit Number: PA900

Dates: Spring 2016 **Hours:** 14.00

Last Edited By: Power Sports (05-10-2016)

Unit Description / Objectives:

Student will know and be able to demonstrate welding and cutting techniques according to industry standards.

Tasks:

PA901 - State and follow safety rules for using an electric welder.

PA902 - Wear personal protective equipment.

PA903 - Adjust welding amperage for a specific welding repair.

PA904 - Weld a broken metal part on a piece of outdoor power equipment.

PA905 - Light and adjust the flame on a cutting torch.

PA906 - Heat and cut with an oxyacetylene torch.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

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INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

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RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

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Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:

List the reasons why small engine components must be measured carefully
Review the proper use of common hand tools and measuring equipment
Explain why quality tools and measuring instruments should be used when servicing small gas Engines.

Skill:

Read a standard and a metric ruler
Read and use a standard and metric micrometer
Read and use a standard and metric dial indicator
Use a standard and metric torque wrench
Use a standard and metric dial caliper
Calculate displacement and horse power
Calculate Work, Power, Torque, Area and Volume
Identify common hand tools used in the repair of outdoor power equipment
Identify specialty tools used in overhaul
Follow rules for hand tool safety
Follow specific rules for portable electric hand tool safety

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
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Provide Frequent Breaks
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Highly Structured Classroom
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Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
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Time out
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Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Writing Activities
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Check Lists
Power Point

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment
Micrometer
Dial caliper
Steel ruler
Dial indicator
Feeler Gage
Hand tools
Small gas engine short block
engine build sheet
SGE Job Sheet #2
Unit #900/100, job #1 learning guide.

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA1000 - 2-STROKE CYCLE ENGINE OPERATING PRINCIPLES, TROUBLESHOOTING AND REPAIR PROCEDURES

Unit Number: PA1000

Dates: Spring 2016 **Hours:** 29.00

Last Edited By: Power Sports (05-10-2016)

Unit Description/Objectives:
Student will know and be able to demonstrate 2-stroke cycle engine operating principles, troubleshooting, and repair procedures according to industry standards.

Tasks:

PA1001 - Diagnose performance problems in a 2-cycle gasoline engine

PA1002 - Explain a manufacturer's model number, serial number and engine type number for two-cycle engines.

PA1003 - Check engine for top end compression.

PA1004 - Check engine for base/ primary compression (bottom end).

PA1005 - Identify the component parts in a short block of a 2-cycle engine and explain their purposes.

PA1006 - Inspect the fuel system for proper operation.

PA1007 - Explain 2- cycle engine operating theory.

PA1008 - Perform a carburetor pressure test.

PA1009 - Inspect the ignition system for proper operation using a spark tester.

PA1010 - Identify the types of 2-stroke cycle valves.

PA1011 - Inspect the exhaust port for carbon obstructions.

PA1012 - Operate the engine to check for proper starting and power output under load.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

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INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific

content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:

Demonstrate the proper use of hand tools
Explain why quality tools should be used when servicing small gas engines

Skill:

Identify common hand tools used in the repair of outdoor power equipment
Identify specialty tools used in overhaul
Identify specialty tools used in overhaul

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)

Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Handle material in a safe and workmanlike manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Writing Activities
Rubrics
Diagrams
Individual Projects
Check Lists
Power Point

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment
Hand tools
Small gas engine short block
Engine build sheet
SGE Job Sheet #2
Unit #900/100, job #1 learning guide.

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA-1100 - 4-STROKE CYCLE ENGINE OPERATING PRINCIPLES, TROUBLESHOOTING AND REPAIR PROCEDURES

Unit Number: PA1100

Dates: Spring 2016 **Hours:** 62.00

Last Edited By: Power Sports (05-10-2016)

Unit Description/Objectives:
Student will know and be able to describe 4-stroke engine operating principles, perform diagnostics, and perform required repairs according to industry standards.

Tasks:

PA1101 - Disassemble the block.

PA1102 - Explain a manufacturer's model number, serial number and engine type number for 4-cycle engines.

PA1103 - Explain 4-cycle engine operating theory.

PA1104 - Remove, inspect and replace an oil seal.

PA1105 - Inspect balance system; inspect shaft(s) and bearings for damage and wear valve guides for wear.

PA1106 - Inspect and measure camshaft bearings for wear and damage.

PA1107 - Measure crankshaft end play and run-out, and repair crankshaft if damaged.

PA1108 - Inspect rings and valve train parts; valves, rocker arms, lifters, studs, and push rods.

PA1109 - Inspect valve guides for wear.

PA1110 - Inspect valves and valve seals; resurface or replace.

PA1111 - Replace valve stem seals.

PA1112 - Use a valve spring compressor to install valve springs.

PA1113 - Adjust valves (mechanical), and hydraulic lifters.

PA1114 - Measure cylinder bore and compare against OEM specifications

PA1115 - Ream a cylinder ridge and deglaze.

PA1116 - Perform a cylinder balance test and demonstrate understanding of findings

PA1117 - Perform a cylinder compression test.

PA1118 - Perform a cylinder leak-down test.

PA1119 - Install a new crankshaft, with bearings, if needed.

PA1120 - Install a piston using a ring compressor.

PA1121 - Install new rings; check end and side clearance.

PA1122 - Verify camshaft timing according to manufacturer's specifications.

PA1123 - Install all gaskets where needed, according to specifications.

PA1124 - Torque fasteners according to manufacturer's specifications

PA1125 - Install and adjust linkages and controls.

PA1126 - Initiate start-up procedures for test run.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

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RESEARCH GRADES 9-10-11-12
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Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

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RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:

Describe fastener grading and marking
Describe thread pitch
Identify difference between metric, SAE, and USS fasteners
Locate torque values in manufacturers service manuals

Skill:

Select correct fasteners for specific repairs.
Install selected fasteners according to specifications.
Replace damaged internal threads using a thread repair system.
Repair damaged internal threads using a tap.

Repair damaged threads, if needed, using a die.
Demonstrate use of an "Easy-out" type tool to remove broken fasteners.

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
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Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions

All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Handle material in a safe and workmanlike manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Pre/Post Tests
Time Cards
Writing Activities
Video/DVD
Projects
Check Lists
Presentation
assessment
Research
Rubrics

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment
Thread pitch gage
Basic hand tools
Grinding tools
Air powered cutting tools
Stationary work bench
Drill press
Manufacturer's service manual

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA1200 - CONDUCT AN ENGINE FAILURE ANAYLSIS

Unit Number: PA1200

Dates: Spring 2016 **Hours:** 11.00

Last Edited By: Power Sports (05-10-2016)

Unit Description / Objectives:
The student will know and be able to perform engine failure analysis for warranty purposes according to industry standards.

Tasks:

PA1201 - Classify failures into 5 major categories; electrical, fuel, ignition, lubrication, and compression.

PA1202 - Identify the effects of insufficient lubrication on engine components; piston cylinders, etc.

PA1203 - Identify and describe engine failures caused by the breakdown of fuel.

PA1204 - Identify the effects of overheating on engine component parts.

PA1205 - Define detonation, pre-ignition and effects on engine components.

PA1206 - Identify engine failure caused by lean mixture of fuel.

PA1207 - Identify the effects of over speeding on engine component parts.

PA1208 - Identify the signature "breakage" of a connecting rod on a failed engine.

PA1209 - Identify exhaust port piston scoring and large end bearings due to over speeding.

PA1210 - Identify the effects of excessing vibration on engine block and mounting base.

PA1211 - Inspect a damaged engine and identify the symptoms, types and causes of failures.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep

procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12

Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

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RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

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RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:

Identify types of metals and appropriate welding medium.
Describe proper surface preparation prior to welding.
Describe required personal protective equipment.
Score 100% on PDE arc welder safety test.

Skill:

Adjust welding amperage for a specific welding repair.
Weld a broken metal frame on a piece of outdoor equipment.

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions
Practice welding scrap metals of varying sizes and thicknesses.

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
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Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
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Frequent Review Sessions
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Books on Tape or CD
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De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
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All Vocabulary to be Defined Before Testing
Time out
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Student Self-Evaluation for Behavior
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Student must:
Handle material in a safe and workmanlike manner
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Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Pre/Post Tests
Time Cards
Writing Activities
Power Point Presentation
Projects
Check Lists
Presentation
assessment
Research
Rubrics

Resources/Equipment:

Arc welder
MIG Welder
PDE "Safety Guidelines for Technology Education & Elementary Science/Technology Education" mac arc welding safety information sheet and arc welder safety test.
Hyperlinks: http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA1300 - SERVICE ELECTRICAL AND

Unit Number: PA1300

Dates: Spring 2016 **Hours:** 40.00

Last Edited By: Power Sports (05-10-2016)

Unit Description / Objectives:

Student will know and be able to perform manual and electrical starting system service and repairs according to industry standards.

Tasks:

PA1301 - Identify and describe the parts of a recoil starting system.

PA1302 - Disassemble starter housing.

PA1303 - Replace a starter spring.

PA1304 - Replace a manual starter rope.

PA1305 - Troubleshoot a starting / safety interlock circuit.

PA1306 - Remove, service and replace a Direct Current starter.

PA1307 - Remove, service and replace and Alternating Current starter.

PA1308 - Identify and describe the components of a DC starting system.

PA1309 - Perform a 12-volt DC starter motor current draw test.

PA1310 - Remove, test and replace a starter relay or solenoid.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

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INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

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RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:

List the three systems required for basic engine operation.
Identify possible failures in the three basic systems and their relationship to engine performance.
Define scavenging.
Describe cross-scavenging and loop-scavenging.
Differentiate between "Check", "Inspect", and "Service".
Describe systematic troubleshooting.

Skill:

Diagnose performance problems in a 2-cycle gasoline engine
Check engine for top end compression.
Check engine for base/ primary compression (bottom end).
Inspect the fuel system for proper operation.
Perform a carburetor pressure test.
Inspect the ignition system for proper operation and perform a 3-point spark test.
Inspect the exhaust port for carbon obstructions.
Check crankcase integrity with a pressure/vacuum pump.
Operate the engine to check for proper starting and power output under load.

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes

Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Handle material in a safe and workmanlike manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Pre/Post Tests
Time Cards
Writing Activities
Video/DVD
Projects
Check Lists
Presentation
assessment
Research
Rubrics

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment

SGE Job sheet #8, "2-cycle engine reassembly"
SGE Job sheet #9, "General engine troubleshooting"
SGE Job sheet #10, "Ignition system service"
SGE Job sheet #11, "Fuel system service"
"Small engines.com", URL - http://small-engines.com/index.html
Strap wrench.
Flywheel holder.
Spark tester.
Solvents and oils.
Overhead gantry crane.
Drain pans and receptacles.
Appropriate cleaning supplies.
Manufacturers service manual
Required gaskets, seals, lubricants, replacement parts
Cylinder honing hand tools.
Cylinder boring machine.
Cylinder honing machine.
Hydraulic lifting tables.
Stationary work bench.
Hydraulic floor jack.
Hydraulic motorcycle/atv jack

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA1400 -IGNITION SYSTEM OPERATING PRINCIPLES, FAILURE DIAGNOSIS AND REPAIR PROCEDURES.

Unit Number: PA1400

Dates: Spring 2016 **Hours:** 78.00

Last Edited By: Power Sports (05-10-2016)

Unit Description/Objectives:
Student will know and be able to perform the proper diagnostics, inspections, services, and repairs of ignition systems and accurately describe ignition operating theory according to industry standards.

Tasks:

PA1401 - Identify, remove, service and replace battery ignition system components

PA1402 - Identify, remove, service and replace electronic ignition system components.

PA1403 - Remove, test and replace a coil or electronic ignition.

PA1404 - Check and set ignition timing.

PA1405 - Check engine RPM.

PA1406 - Test an ignition system using a spark tester.

PA1407 - Inspect the engine for a partially-sheared flywheel key.

PA1408 - Remove, inspect and replace points and condenser.

PA1409 - Remove, replace, and test an ignition armature assembly (ignition coil, ignition).

PA1410 - Test and replace high tension lead(s).

PA1411 - Test the solid-state transistor-controlled discharge system.

PA1412 - Test a capacitive discharge ignition system.

PA1413 - Demonstrate timing procedure for an engine with ignition points.

PA1414 - Demonstrate timing procedures on an engine with a solid state/ electronic ignition system.

PA1415 - Measure primary and secondary resistance.

PA1416 - Check/replace an engine ignition kill switch.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:

List the three systems required for basic engine operation.
Identify possible failures in the three basic systems and their relationship to engine performance.
Differentiate between "Check", "Inspect", and "Service".
Describe systematic troubleshooting.

Skill:

Check the fuel pump pressure.
Pressure test the carburetor.
Operate the engine to check for proper starting and acceleration.
Differentiate hunting/surging symptom between the fuel system and governor system.
Perform a cylinder balance test and demonstrate understanding of findings
Perform a cylinder compression test.
Perform a cylinder leak-down test.
Perform an engine crankcase vacuum test.
Perform an oil pressure test.
Test an ignition system using a spark tester.
Inspect the engine for a partially-sheared flywheel key.
Remove, inspect and replace points and condenser.
Remove and replace an ignition armature (ignition coil, ignition).
Test and replace ignition armature assembly.
Test and replace high tension lead(s).
Test the solid-state transistor-controlled discharge system.
Test a capacitive ignition system.
Demonstrate timing procedure for an engine with ignition points.
Demonstrate timing procedures on an engine with a solid state/ electronic ignition system.
Measure primary and secondary resistance.
Check/replace an engine ignition kill switch.
Inspect the cooling system.
Check for damage to the cooling fins or fan.
Identify debris clogging cooling air fins.
Identify the proper order of assembling an air intake system.
Remove and replace an intake manifold

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement

Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Handle material in a safe and workmanlike manner
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Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Pre/Post Tests
Time Cards
Writing Activities
Video/DVD
Projects
Check Lists
Presentation
assessment
Research
Rubrics

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment
SGE Job sheet #7, "4-cycle engine reassembly"
SGE Job sheet #9, "General engine troubleshooting"
SGE Job sheet #10, "Ignition system service"
SGE Job sheet #11, "Fuel system service"
"Small engines.com", URL - http://small-engines.com/index.html
Briggs and Stratton "The Power Channel" Failure analysis course @
http://www.thepowerportal.com/nA/English/PowerChannel/Courses/FailureAnalysis.htm.

Basic hand tools.
Cylinder compression tester
Cylinder leak-down tester
Spark tester
Crankcase vacuum tester
Precision measuring tools
Manufacturer's service manual

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA1500 - CHARGING SYSTEM OPERATING PRINCIPLES, FAILURE DIAGNOSIS AND REPAIR PROCEDURES.

Unit Number: PA1500

Dates: Spring 2016 **Hours:** 65.00

Last Edited By: Power Sports (05-10-2016)

Unit Description/Objectives:
Student will know and be able to describe charging system operating principles, perform diagnostics, and make required repairs according to industry standards.

Tasks:

PA1501 - Explain storage battery theory and perform maintenance.

PA1502 - Identify types of charging systems including an under flywheel alternator and a belt drive alternator.

PA1503 - Perform a current drain test using a DC shunt or its equivalent.

PA1504 - Troubleshoot a charging circuit.

PA1505 - Test a charging system.

PA1506 - Test a voltage regulator.

PA1507 - Test an alternator's output.

PA1508 - Remove and replace an alternator, a voltage rectifier, and a diode.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:

Explain simple engine operation.
Describe four-stoke cycle engine operation and explain the purpose of each stroke.
List the qualities of gasoline that make it an efficient fuel for small engines.
Explain why gasoline is atomized in the small engine.
Identify the basic components of a small engine and describe the function of each part.
Describe the procedure for removing an engine from an implement
List the steps involved in disassembling and engine
Explain the procedures involved in re boring a cylinder Describe piston and piston ring construction
Explain the purpose of ring end gap
Summarize the function of the crankshaft
Describe the proper procedures for valve reconditioning

Skill:

Inspect the engine for signs of trouble before removal.
Remove store and label external parts.
Remove flywheel and related parts.
Disassemble internal parts, including rotating and reciprocating groups, making critical measurements when required.
Given an engine, required tools and applicable service manual, you will be able to:
• Disassemble the engine to the part-level.
• Adjust the valve clearance in accordance with the service manual.
• Adjust the ignition coil installation gap in accordance with the service manual.
• Replace the limiter cap and pilot screw in the carburetor.
• Tighten the bolts securing the connecting rod cap, flywheel and case cover to the torques specified in the service manual.
Given an engine, required tools and the service manual, you will be able to:
Perform the following inspections and judge if the parts in question are usable.
• Check the piston ring groove for carbon deposit.
• Check if the piston rings fit to the piston operate smoothly.
• Measure piston ring end gaps.
• Measure cylinder I.D.
• Measure piston skirt O.D.
• Measure connecting rod big end I.D.
• Measure crankshaft bearing O.D.

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
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Have Student Repeat Directions
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Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
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Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing

Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Handle material in a safe and workmanlike manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Pre/Post Tests
Time Cards
Writing Activities
Video/DVD
Projects
Check Lists
Presentation
Research
Rubrics

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment
SGE engine dis assembly video
SGE engine re-assembly video
SGE engine measurement, cleaning, inspection video
SGE job sheet #3
SGE engine dis assembly checklist
SGE engine reassembly checklist
Basic hand tools.
Gear and flywheel pullers.
Valve cutting tools.
Valve seating tools.
Valve spring compressors.
Air impact gun.
Air impact ratchet.
Rotary air tools.
Grinding tools.
Air powered cutting tools.
Cylinder honing hand tools.
Cylinder boring machine.
Cylinder honing machine.
Hydraulic lifting tables.
Stationary work bench.
Hydraulic floor jack.
Hydraulic motorcycle/atv jack.
Manual lawn tractor jack.
Bench grinder.
Electric angle grinder.
Drill press.
Strap wrench.
Flywheel holder.
Spark tester.
Solvents and oils.
Overhead gantry crane.
Drain pans and receptacles.
Appropriate cleaning supplies.
Manufacturers service manual
Required gaskets, seals, lubricants, replacement parts
assessment
Viable 4-cycle engine

American Honda Motor Co. (2009). Inc., Honda University, GP Engines Training materials flash/pdf/pps.

Hyperlinks:
http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA1600 - LUBRICATION SYSTEM OPERATING PRINCIPLES, FAILURE DIAGNOSIS AND REPAIR PROCEDURES.

Unit Number: PA1600

Dates: Spring 2013 **Hours:** 13.00

Last Edited By: Power Sports (05-10-2016)

Unit Description/Objectives:
Student will know and be able to demonstrate knowledge of and perform service, diagnostics, and repairs of lubrication systems according to industry standards.

Tasks:

PA1601 - Identify types of filters used on power equipment.

PA1602 - Interpret charts that outline oil applications.

PA1603 - Change engine oil and filter on a variety of outdoor power equipment.

PA1604 - Select proper oil and grade.

PA1605 - Prepare a fuel/oil mixture for a 2-cycle engine.

PA1606 - Service a crankcase breather assembly.

PA1607 - Describe lubrication systems and their functions.

PA1608 - Describe API oil ratings and the meaning of SAE viscosity ratings.

PA1609 - Describe the standard classification of 2-cycle oils.

PA1610 - List common oil contaminants.

PA1611 - Describe differences between splash lubrication systems and a pressure lubrication system.

PA1612 - Describe the operation of an oil filtration system.

PA1613 - Describe methods of checking the oil level in an engine.

PA1614 - Explain the need for positive crank case ventilation.

PA1615 - Identify the components and function of a crankcase ventilation breather assembly

PA1616 - Perform an oil pressure test.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:

List the three systems required for basic engine operation.
Identify possible failures in the three basic systems and their relationship to engine performance.
Differentiate between "Check", "Inspect", and "Service".
Describe systematic troubleshooting.

Skill:

Classify failures into 5 major categories; electrical, fuel, ignition, lubrication, and compression.
Identify the entrance path and the effects of abrasives on several failed engines.
Identify the effects of insufficient lubrication on engine components; piston cylinders, etc.
Find the root cause of failure on a failed engine.
Identify and describe engine failures caused by the breakdown of fuel.
Identify the effects of overheating on engine component parts.
Define detonation, pre-ignition and effects on engine components.
Identify engine failure caused by lean mixture of fuel.
Identify the effects of over speeding on engine component parts.
Identify the signature "breakage" of a connecting rod on a failed engine.
Identify exhaust port piston scoring and large end bearings due to over speeding.
Identify the effects of excessive vibration on engine block and mounting base.
Inspect a damaged engine and identify the symptoms, types and causes of failures.

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions

Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Handle material in a safe and workmanlike manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Pre/Post Tests
Time Cards
Writing Activities
Video/DVD
Projects
Check Lists
Presentation
assessment
Research
Rubrics

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

SGE Job sheet #7, "4-cycle engine reassembly"
SGE Job sheet #8, "2-cycle engine reassembly"
SGE Job sheet #9, "General engine troubleshooting"
SGE Job sheet #10, "Ignition system service"
SGE Job sheet #11, "Fuel system service"
"Small engines.com", URL - http://small-engines.com/index.html
Briggs and Stratton "The Power Channel" Failure analysis course @ http://www.thepowerportal.com/nA/English/PowerChannel/Courses/FailureAnalysis.htm.
Any Manufacturer's service manual specific to a particular engine.
Clevite 77 form# CL77-3-402 "Engine Bearing failure analysis guide". @ http://engineparts.com/publications/CL77-3-402.pdf.

American Honda Motor Co. (2009). Inc., Honda University, GP Engines Training materials flash/pdf/pps.
Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA1700 - GOVERNOR SYSTEM OPERATING PRINCIPLES, FAILURE DIAGNOSIS AND REPAIR PROCEDURES.

Unit Number: PA1700

Dates: Spring 2016 **Hours:** 15.00

Last Edited By: Power Sports (05-10-2016)

Unit Description/Objectives:
Student will know and be able to inspect, service, repair, and perform diagnostics on governor systems according to industry standards.

Tasks:

PA1701 - Perform static and dynamic governor adjustments.

PA1702 - Remove, service, and replace pneumatic and mechanical governor.

PA1703 - Check top no-load speed object governor as needed.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:

Describe the function of a manual starting system.
Describe the various types of manual starting systems.
Identify specifications in the appropriate service manual.
Use industry terminology.

Skill:

Identify and describe the parts of a recoil starting system.
Disassemble starter housing.
Replace a starter spring.
Replace a manual starter rope.
Troubleshoot a starting / safety interlock circuit.

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
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Use of Calculator
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Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
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Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)

Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

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Student must:
Handle material in a safe and workmanlike manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

- Worksheets
- Quizzes
- Pre/Post Tests
- Time Cards
- Writing Activities
- Video/DVD
- Projects
- Check Lists
- Presentation
- assessment
- Research
- Rubrics

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Honda University "Training Materials Flash/PDF" CD.

Appropriate service manual

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA1800 - BRAKE SYSTEM OPERATING PRINCIPLES, FAILURE DIAGNOSIS AND REPAIR PROCEDURES

Unit Number: PA1800

Dates: Spring 2016 **Hours:** 60.00

Last Edited By: Power Sports (05-10-2016)

Unit Description/Objectives:
Student will know and be able to inspect, service, repair, and replace an electric starter and electric starter components and supporting systems according to industry standards.

Tasks:

PA1801 - Inspect, remove, service and repair mechanical brake systems.

PA1802 - Inspect, remove, service and repair hydraulic brake systems.

PA1803 - Inspect, remove service and repair drum and disc brakes.

PA1804 - Demonstrate knowledge of the hydraulic theory

PA1805 - Change hydraulic fluid.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12

Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

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RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:

Vocabulary.
Describe basic units of electrical measurement.
Apply Ohm's law.
Describe the function of an electric starting system.
Identify the two types of electrical starting systems.
Define polarity.
Identify specifications in the appropriate service manual.

Skill:

Remove, service and replace a Direct Current starter.
Remove, service and replace and Alternating Current starter.
Identify and describe the components of a DC starting system.
Perform a 12-volt DC starter motor current draw test.
Remove, test and replace a starter relay or solenoid.
Identify, remove, service and replace battery ignition system components
Identify, remove, service and replace electronic ignition system components.

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
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Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
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Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
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Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
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Wait Time
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Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

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Student must:
Handle material in a safe and workmanlike manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Pre/Post Tests
Time Cards
Writing Activities
Video/DVD
Projects
Check Lists
Presentation
assessment
Research
Rubrics

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment
Honda university "Training Materials Flash/PDF" CD.
Briggs and Stratton "The Power Channel" electrical systems instructional video's @

http://www.thepowerportal.com/nA/English/PowerChannel/FindaVideo.htm?FB_Values=!!&F1_ajaxEnabled=1&F1_DocID=36421&F1_keywordFilter=&F1_PageNum=1&.

Appropriate service manual.
Electric starters.
Solenoids.
Electric start equipped engines.

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA1900 - CLUTCH AND DRIVE SYSTEM OPERATING PRINCIPLES, FAILURE DIAGNOSIS AND REPAIR PROCEDURES.

Unit Number: PA1900 **Hours:** 39.00

Dates: Spring 2016

Last Edited By: Power Sports (05-10-2016)

Unit Description / Objectives:
Student will know and be able to inspect, service, repair, and perform diagnostics on clutch and drive systems according to industry standards.

Tasks:

PA1901 - Inspect, service or replace belts and tensioning devices.

PA1902 - Inspect, service or replace centrifugal clutches.

PA1903 - Inspect, service or replace clutch discs.

PA1904 - Inspect, service or replace sprockets and chains.

PA1905 - Inspect, service or replace an electric power take-off.

PA1906 - Inspect, service or replace universal joints.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

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INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:

Describe the function of a manual starting system.
Describe the various types of manual starting systems.
Identify specifications in the appropriate service manual.
Use industry terminology.

Skill:

Identify, remove, service and replace battery ignition system components
Identify, remove, service and replace electronic ignition system components.
Remove, test and replace a coil or electronic ignition.
Check and set ignition timing.
Check engine RPM.

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Use of Daily Planner/Assignment Book (monitor use of)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks

Variety of Assessment Methods
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
All Vocabulary to be Defined Before Testing
Time out
Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Handle material in a safe and workmanlike manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work-like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Worksheets
Quizzes
Pre/Post Tests
Time Cards
Writing Activities
Video/DVD
Projects
Check Lists
Presentation
assessment
Research
Rubrics

Resources/Equipment:

Roth, A. C. (2012). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Personal Protective Equipment
Honda university "Training Materials Flash/PDF" CD
Hyperlinks:
http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995

Monroe Career & Technical Institute
Course: Outdoor Power Equipment Technologies

Unit Name: PA2000 - PARTS MANAGEMENT, INVOICING AND RECORDKEEPING

Unit Number: PA2000

Dates: Spring 2016 **Hours:** 10.00

Last Edited By: Power Sports (05-10-2016)

Unit Description / Objectives:
Student will know and be able to manage parts, keep inventory, and keep service records according to industry standards.

Tasks:

PA2001 - Interpret illustrations, graphs, diagrams, and tables in repair manuals.

PA2002 - Use reference materials, service manuals, and parts tables to find parts.

PA2003 - Take inventory of parts in stock.

PA2004 - Determine parts and specifications using a computerized or microfiche parts reference database.

PA2005 - Complete a service order form.

PA2006 - Interpret time and flat rate information.

PA2007 - Order materials and supplies from a catalog.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

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Instructional Activities:

Knowledge:

List the three systems required for basic engine operation.
Identify possible failures in the three basic systems and their relationship to engine performance.
Differentiate between "Check", "Inspect", and "Service".
Describe systematic troubleshooting.

Skill:

Explain storage battery theory and perform maintenance.
Identify types of charging systems including an under flywheel alternator and a belt drive alternator.
Perform a current drain test using a DC shunt or its equivalent.
Troubleshoot a charging circuit.
Test a charging system.
Test a voltage regulator.
Test an alternator's output.
Remove, service and replace an alternator, a voltage rectifier and a diode.

Remediation:

Review with teacher assistance
Individual or group tutoring
Study guides
Extended time

Enrichment:

Work on live work projects to enhance skill
Participate in classroom leadership activities and competitions

Special Adaptations:

Extended Time (assignments and/or testing)
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Presentation
assessment
Research
Rubrics

Resources/Equipment:

Roth, A. C. (2009). Small gas engines. Tinley Park, Illinois: Goodheart-Willcox.

Radcliffe, Bruce (2010) Small Engines. Milwaukee, WI

Honda University "Training Materials Flash/PDF" CD.

Briggs and Stratton "The Power Channel" electrical systems instructional video's @

http://www.thepowerportal.com/nA/English/PowerChannel/FindaVideo.htm?FB_Values=!!&F1_ajaxEnabled=1&F1_DocID=36421&F1_keywordFilter=&F1_PageNum=1&.

Appropriate manufacturers service manual.

American Honda Motor Co. (2009). Inc., Honda University, GP Engines Training materials flash/pdf/pps.

Hyperlinks:

http://www.thepowerportal.com/Login.htm
www.stihlvotech.com/
https://www.meritorbullpen.com/
www.pennzoilinformationprogram.com/
https://trucklitecollc.mindflash.com/PublicCoursePage.aspx?c=801602995