

**NORTH MONTCO TECHNICAL CAREER CENTER  
1265 SUMNEYTOWN PIKE, LANSDALE, PA 19446**

**Performance Evaluation/Assessment**

**Automotive Technology**

**NATEF Engine Repair**

**Standardized Integration Module (SIM)**

**Task 4: Lubrication and Cooling Systems Diagnosis and Repair**

**Hours: 30**

**Date: 9/01/2008**

**Exit Outcome/Terminal Performance Objective:**

- Demonstrate the ability to perform engine lubrication and cooling systems diagnosis, determine and make needed repairs.

**Enabling Objectives:**

- Explains basic engine lubrication and cooling systems theory.
- Explains basic engine lubrication and cooling systems operation.
- Explains steps to diagnose engine lubrication and cooling systems problems.
- Identifies basic engine lubrication and cooling systems components.
- Performs basic engine lubrication and cooling systems diagnosis.
- Performs basic engine lubrication and cooling systems repairs.
- Locate correct diagnostic, repair, service & maintenance information using ShopKey.

**Mastery:** All hands-on tasks must be completed to 100% accuracy and to industry standards.

To achieve Mastery of this task, the student must:

1. Participate in a lecture, view either the PowerPoint presentation or video of the material.
2. Participate in a demonstration of the task.
3. Participate in a guided application of the task.
4. Practice the task without the instructor.
5. Complete task to 100% accuracy.
6. Demonstrate or practice the task with another student.

**PA Academic Standards/Assessment Anchors/Eligible Content  
Science**

*PA Academic Standard:*

3.7.10.B Apply process knowledge and organize scientific and technological phenomena in varied ways.

*Assessment Anchor:*

S11.A.2.2 Evaluate appropriate technologies for a specific purpose, or describe the information the instrument can provide.

*Eligible Content:*

S11.A.2.2.1 Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations (e.g., to compare properties of materials, water quality).

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**Math**

*PA Academic Standard:*

2.2.11. A Develop and use computation concepts, operations and procedures with real numbers in problem-solving situations.

2.3.11.A Select and use appropriate units and tools to measure to the degree of accuracy required in particular measurement situations.

*Assessment Anchor:*

M11.B.2.2 Use and/or develop procedures to determine or describe measures of perimeter, circumference, area, surface area and/or volume. (May require conversions within the same system).

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*Eligible Content:*

M11.B.2.2.1 Calculate the surface area of prisms, cylinders, cones, pyramids and/or spheres. Formulas are provided on the reference sheet.

M11.B.2.2.2 Calculate the volume of prisms, cylinders, cones, pyramids and/or spheres. Formulas are provided on the reference sheet.

M11.B.2.2.3 Estimate area, perimeter or circumference of an irregular figure.

M11.B.2.2.4 Find the measurement of a missing length given the perimeter, circumference, area or volume.

**Language Arts**

*PA Academic Standard:*

1.1.11.C Use knowledge of root words and words from literary works to recognize and understand the meaning of new words during reading.

1.2.11.A Read and understand essential content of informational texts and documents in all academic areas.

*Assessment Anchor:*

R11.A.1.2 Identify and apply word recognition skills.

R11.A.1.3 Make inferences, draw conclusions, and make generalizations based on text.

*Eligible Content:*

R11.A.1.2.1 Identify how the meaning of a word is changed when an affix is added; identify the meaning of a word from the text with an affix.

R11.A.1.2.2 Define and/or apply how the meaning of words or phrases changes when using context clues given in explanatory sentences.

**Social Studies**

*PA Academic Standard:*

8.1.12.D Synthesize historical research.

**Career Education & Work**

*PA Academic Standard:*

13.1.11.A Relate careers to individual interests, abilities & aptitudes.

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**SAFETY NOTICE:** In addition to following all North Montco Technical Career Center Automotive Technology Program Safety and MSDS Policies, refer to the specific vehicle's manufacturer's shop manual for complete safety details when performing these tasks.

**NOTE: *Safety is not an option!*** Although this information is very thorough, it is general and does not fully cover all safety rules, procedures and hazards.

**Performance Evaluation**

<b>PERFORMANCE CRITERIA</b>	<b>Needs Practice</b>	<b>Satisfactory</b>
Safety glasses must be worn at all times! Read all safety materials provided and observe all safety precautions demonstrated by your instructor.		
Perform oil pressure tests; determine necessary action. P-1		
Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform necessary action. P-2		
Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; determine necessary action. P-1		
Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment. P-1		
Inspect and replace engine cooling and heater system hoses. P-1		
Inspect, test, and replace thermostat and gasket/seal. P-1		
Test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required. P-1		
Inspect, remove and replace water pump. P-2.		
Remove and replace radiator. P-2.		
Inspect, and test fans(s) (electrical or mechanical), fan clutch, fan shroud, and air dams. P-1		
Inspect auxiliary coolers; determine necessary action. P-3		
Inspect, test, and replace oil temperature and pressure switches and sensors. P-2		
Perform oil and filter change. P-1		
Identify causes of engine overheating. P-1		
Complete an Outline, Reading Grid, Summary and "Last-Word" Worksheet Packet for Chapters 1-10 & 80, 11, 12, 13, 14, 15, 16, 39, 40, 41, 42, 48, 49, 50, 51 and 52 from <i>Modern Automotive Technology</i> .		

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Score a 80% or better on <i>Modern Automotive Technology</i> chapter tests 1-10 & 80		
Score a 80% or better on <i>Modern Automotive Technology</i> chapter tests 11, 12, 13, 14, 15, 16, 39, 40, 41, 42, 48, 49, 50, 51 and 52		
Score 80% or better on Math Intro Lessons 1-5 & Math Lessons 1, 4, 7, 8, 9, 10, 11 and 12 and 13 Homework Sheets.		
Score 80% or better on ASE Practice Test 1		
Earn a passing grade on the AYES Engine Performance Exit Exam A-8		

**NOTES:**