

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

**Performance Evaluation/Assessment**

**Automotive Technology**

**NATEF Engine Repair**

**Standardized Integration Module (SIM)**

**Task 3: Engine Block Assembly Diagnosis and Repair**

**Hours: 30**

**Date: 9/01/2008**

**Exit Outcome/Terminal Performance Objective:**

- Demonstrate the ability to perform engine block diagnosis, determine and make needed repairs.

**Enabling Objectives:**

- Explains internal combustion engine theory.
- Explains basic engine block operation.
- Explains steps to diagnose engine block problems.
- Identifies basic engine block components.
- Performs basic engine block diagnosis.
- 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.		
Disassemble engine block; clean and prepare components for inspection and reassembly. P-1		
Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine necessary action. P-2		
Inspect and measure cylinder walls/sleeves for damage, wear, and ridges; determine necessary action. P-2		
Deglaze and clean cylinder walls. P-2		
Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine necessary action. P-2		
Inspect crankshaft for straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage condition; measure end play and journal wear; check crankshaft position sensor reluctor ring (where applicable); determine necessary action. P-1		
Inspect main and connecting rod bearings for damage and wear; determine necessary action. P-2		
Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; determine necessary action. P-3		
Inspect and measure piston skirts and ring lands; determine necessary action. P-2		
Remove and replace piston pin. P-3		
Determine piston-to-bore clearance. P-2		
Inspect, measure, and install piston rings. P-2		

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Inspect auxiliary shaft(s) (balance, intermediate, idler, counterbalance or silencer); inspect shaft(s) and support bearings for damage and wear; determine necessary action; reinstall and time. P-2		
Remove, inspect or replace crankshaft vibration damper (harmonic balancer). P-2		
Assemble engine block. 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> .		
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:**