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

Performance Evaluation/Assessment

Automotive Technology

NATEF Heating & Air Conditioning

Standardized Integration Module (SIM)

Task 1: A/C System Diagnosis and Repair
Hours: 19
Date: 9/01/2008

Exit Outcome/Terminal Performance Objective:

- Demonstrate the ability to perform automotive air conditioning system diagnosis and repair.

Enabling Objectives:

- Explains basic automotive air conditioning theory.
- Explains basic automotive air conditioning operation/functionality.
- Explains steps to diagnose an automotive air conditioning system.
- Identifies basic automotive air conditioning system components.
- Performs basic automotive air conditioning system diagnostics.
- Performs basic automotive air conditioning system 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.
7. Obtain MACS or ASE Section 609 Refrigerant Recycling and Recovery Certification.

PA Academic Standards/Assessment Anchors/Eligible Content
Science
PA Academic Standard:
3.1.10.A Apply patterns as repeated processes or recurring elements in science and technology.
3.4.10.B Analyze energy sources and transfers of heat.
Assessment Anchor:
S11.A.3.1 Analyze the parts of a simple system, their roles, and their relationships to the system as a whole.
S11.C.2.1 Analyze energy sources and transfer of energy, or conversion of energy.

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Eligible Content:
S11.A.3.1.1 Apply systems analysis, showing relationships (e.g., flowcharts, concept maps), input and output, and measurements to explain a system and its parts.
S11.C.2.1.3 Apply the knowledge of conservation of energy to explain common systems (e.g., refrigeration, rocket propulsion, heat pump).

Math
PA Academic Standard:
2.2.11.E Recognize that the degree of precision needed in calculating a number depends on how the results will be used and the instruments used to generate the measure.
2.6.8.A Recognize that the degree of precision needed in calculating a number depends on how the results will be used and the instruments used to generate the measure.
Assessment Anchor:
M11.D.2.2 Simplify expressions involving polynomials.
M11.E.2.1 Use measures of central tendency to describe a set of data.
Eligible Content:
M11.D.2.2.1 Add, subtract and/or multiply polynomial expressions (express answers in simplest form – nothing larger than a binomial multiplied by a trinomial).
M11.E.2.1.1 Calculate or select the appropriate measure of central tendency (mean, mode or median) of a set of data given or represented on a table, line plot or stem-and-leaf plot.
M11.A.2.1.2 Solve problems using direct and inverse proportions.

Language Arts:
PA Academic Standard:
1.1.11.G Demonstrate after reading understanding and interpretation of both fiction and nonfiction text, including public documents.
1.3.11.F Read and respond to fiction and nonfiction including poetry and drama
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.
R11.A.1.6 Identify, describe, and analyze genre of text.
Eligible Content:
R11.A.1.3.1 Make inferences and/or draw conclusions based on information from text.
R11.A.1.3.2 Cite evidence from text to support generalizations.
R11.A.1.6.1 Identify and/or analyze the author's intended purpose of text.
R11.A.1.6.2 Describe and/or analyze examples of text that support the author's intended purpose.

Social Studies:
PA Academic Standard:
7.4.12.A Analyze the impacts of physical systems on people.

Career Education & Work
PA Academic Standard:
13.1.11.C Analyze how the changing roles of individuals in the workplace relate to new opportunities within career choices.

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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

PERFORMANCE CRITERIA	Needs Practice	Satisfactory
Safety glasses must be worn at all times! Read all safety materials provided and observe all safety precautions demonstrated by your instructor.		
Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1		
Identify and interpret heating and air conditioning concern; determine necessary action. P-1		
Research applicable vehicle and service information, such as heating and air conditioning system operation, vehicle service history, service precautions, and technical service bulletins. P-1		
Locate and interpret vehicle and major component identification numbers. P-1		
Performance test A/C system; identify A/C system malfunctions. P-1		
Identify abnormal operating noises in the A/C system; determine necessary action. P-2		
Identify refrigerant type; select and connect proper gauge set; record temperature and pressure readings. P-1		
Leak test A/C system; determine necessary action. P-1		
Inspect the condition of refrigerant oil removed from the system; determine necessary action. P-2		
Determine recommended oil and oil capacity for system application. P-1		
Using scan tool, observe and record related HVAC data and trouble codes. P-1		
Complete an Outline, Reading Grid, Summary and "Last-Word" Worksheet packet for Chapters 1-10, 80, 75 and 76 from *Modern Automotive Technology.*		
Score a 80% or better on *Modern Automotive Technology* chapter tests 1-10 & 80		
Score a 80% or better on *Modern Automotive Technology* chapter tests 75 and 76		

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Score 80% or better on Math Intro Lessons 1-5 & Math Lessons 1, 2, 3, 4, and 5 Homework Sheets.		
Score 80% or better on ASE Practice Test 7		
Earn a passing grade on the AYES Electrical/Electronic Exit Exam A-6		
Obtain Section 609 Refrigerant Recycling & Recovery Certification		

NOTES: