Advanced Engine Performance Diagnosis 6/E

Chapter 30 Symptom-Based Diagnosis

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of **ADVANCED Automotive Engine Performance Diagnosis 6/E.** It correlates material to task lists specified by ASE and NATEF.
Motivate Learners	Explain how the knowledge of how something works translates into the ability to use that knowledge to figure why the engine does not work correctly and how this saves diagnosis time, which translates into more money.
State the learning objectives for the chapter or course you are about to cover and explain this is what they should be able to do as a result of attending this session or class.	Explain the chapter learning objectives to the students. 1. Prepare for ASE Engine Performance (A8) certification test content area "A" (General Engine Diagnosis) and ASE Advanced Level (L1) certification test content area "A" (General Powertrain Diagnosis). 2. List the possible causes of an engine performance problem based on its symptoms. 3. List the possible causes of a rich air–fuel mixture. 4. List the possible causes of a lean air–fuel mixture. 5. Describe what symptoms may occur if a particular sensor is defective. 6. List the possible causes of excessive HC, CO, and NOx exhaust emissions
Establish the Mood or Climate	Provide a *WELCOME,* Avoid put downs and bad jokes.
Complete Essentials	Restrooms, breaks, registration, tests, etc.
Clarify and Establish Knowledge Base	Do a round robin of the class by going around the room and having each student give their backgrounds, years of experience, family, hobbies, career goals, or anything they want to share.

NOTE: This lesson plan is based on Advanced Engine Performance Diagnosis 6/E Chapter Images found on Jim's web site @ www.jameshalderman.com
LINK CHP 30: Chapter Images

ICONS	Ch30 Symptom-Based Diagnosis
     	**1. SLIDE 1 CH30 Symptom-Based Diagnosis** **Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/** **WEB SITE REGULARLY UPDATED** **Engine Controls (284 Links)** **At the beginning of this class, you can download the crossword puzzle & Word Search from the links below to familiarize your class with the terms in this chapter & then discuss them** Crossword Puzzle (Microsoft Word) (PDF) Word Search Puzzle (Microsoft Word) (PDF) 2. **SLIDE 2 EXPLAIN FIGURE 30–1** Valve deposits on the intake valves can cause hesitation during acceleration, especially if the engine is cold 3. **SLIDE 3 EXPLAIN FIGURE 30–2** Typical throttle-position (TP) sensor 4. **SLIDE 4 EXPLAIN FIGURE 30–3** Many areas of the country use gasoline that is blended with up to 10% ethanol (ethyl alcohol). Sometimes too much alcohol can cause driveability problems. 5. **SLIDE 5 EXPLAIN FIGURE 30–4** The deposits on the back (engine) side of the throttle plate can cause rough idle or stalling due to lack of proper air flow into the engine 6. **SLIDE 6 EXPLAIN FIGURE 30–5** A vacuum gauge is an excellent and low-cost tool to use to make sure that the engine is functioning normally. 7. **SLIDE 7 EXPLAIN FIGURE 30–6** This meter indicates a cranking voltage of 10.32 volts, which is within specifications (above 9.6 volts during cranking). 8. **SLIDE 8 EXPLAIN FIGURE 30–7** This stuck-open thermostat caused engine to fail to reach normal operating temperature. As a result, fuel economy was much lower

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	than normal & it failed a state vehicle exhaust emission test due to excessive HC
	Meter Usage Measure Frequency Hz Meter Usage Measure Ohms O2 Sensor Volt Check Output Driver Control Positive Crankcase Ventilation (PCV) Potentiometer Quick Check Injector Quick Check Injector Volts Secondary Air Injection Scope Display Dual Trace Test Engine Coolant Temperature ECT Sensor Test Injector Resistance
	9. **SLIDE 9 EXPLAIN FIGURE 30–8** This corroded coil terminal on a waste spark type ignition system caused a random misfire DTC to set (P0300) and it affected both cylinders and not just the one than had corroded terminal. 10. **SLIDE 10 EXPLAIN FIGURE 27–9** This badly eroded water (coolant) pump caused the engine to overheat
	**ON-VEHICLE NATEF TASK PERFORM ACTIVE TESTS USING A SCAN TOOL**
	**ON-VEHICLE NATEF TASK RETRIEVE AND RECORD STORED OBD II DIAGNOSTIC TROUBLE CODES; CLEAR CODES.**