
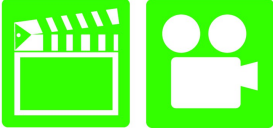









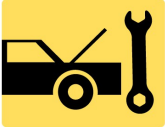


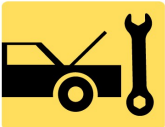





# Automotive Maintenance and Light Repair, 1<sup>ST</sup> Edition








## Chapter 44 SCAN TOOLS & DIAGNOSTIC Procedures

### Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers <b>Automotive Maintenance and Light Repair</b> . 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. <ul style="list-style-type: none"><li>— Prepare for the ASE computerized engine controls diagnosis (A8) certification test content area “E.”</li><li>— List the steps of the diagnostic process.</li><li>— List six items to check as part of a thorough visual inspection.</li><li>— Discuss the type of scan tools that are used to assess vehicle components.</li></ul>
Establish the Mood or Climate	Provide a <i>WELCOME</i> , 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.

ICONS	Ch44 SCAN TOOLS & Diagnostic Procedures
	<p><b>1. SLIDE 1 CH44 SCAN TOOLS &amp; Diagnostic Procedures</b></p>
	<p><b>2. SLIDES 2 EXPLAIN OBJECTIVES</b></p> <p>Check for <b>ADDITIONAL VIDEOS &amp; ANIMATIONS</b>  @ <a href="http://www.jameshalderman.com/">http://www.jameshalderman.com/</a>  <b>WEB SITE REGULARLY UPDATED</b></p>
	<p><b>VIDEO: 1 MINUTE SCAN DATA CHECKING</b>  <b><a href="http://www.myautomotivelab.com">WWW.MYAUTOMOTIVELAB.COM</a></b>  <small><a href="http://media.pearsoncmg.com/ph/chet/chet_myLABS/akamai/template/video640x480.php?title=checking%20scan%20data&amp;clip=pandc/chet/2012/automotive/5_gas_analysis/checksd.mov&amp;caption=chet/chet_myLABS/akamai/2012/automotive/5_gas_analysis/xml/checksd.xml">HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=CHECKING%20SCAN%20DATA&amp;CLIP=PANDC/CHET/2012/AUTOMOTIVE/5_GAS_ANALYSIS/CHECKSD.MOV&amp;CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/5_GAS_ANALYSIS/XML/CHECKSD.XML</a></small></p>
	<p><b>3. SLIDE 3 EXPLAIN Scan Tools</b></p>
	<p><b>4. SLIDE 4 EXPLAIN Figure 44-1 TECH 2 scan tool is the factory scan tool used on General Motors vehicles.</b></p> <p><b>5. SLIDE 5 EXPLAIN Scan Tools</b></p> <p><b>6. SLIDE 6 EXPLAIN FIGURE 44-2 OTC Genisys being used to troubleshoot a vehicle. This scan tool can be used on most makes and models of vehicles and is capable of diagnosing other computer systems in the vehicles such as the antilock braking system (ABS) and airbag systems.</b></p>
 <p>QUESTION</p>	<p><b>DISCUSSION: DISCUSS SCAN TOOLS. HOW DO OEM SCAN TOOLS DIFFER FROM GENERIC SCAN TOOLS? WHAT ARE ADVANTAGES &amp; DISADVANTAGES OF BOTH TYPES OF TOOLS? FIGURES 44-1 &amp; 2</b></p>
	<p><b>DEMONSTRATION: CONNECT BOTH OEM &amp; GENERIC SCAN TOOLS TO A VEHICLE ALLOW STUDENTS TO SEE INFORMATION AVAILABLE WITH EACH TOOL. DEMONSTRATE BIDIRECTIONAL CAPABILITIES BY INCREASING OR DECREASING IDLE SPEEDS, FOR EXAMPLE.</b></p>
	<p><b>7. SLIDE 7 EXPLAIN FIGURE 44-3 A typical malfunction indicator lamp (MIL) often labeled “check engine” or “service engine soon” (SES).</b></p> <p><b>8. SLIDES 8-9 EXPLAIN How To Use A Scan Tool</b></p>

ICONS	Ch44 SCAN TOOLS & Diagnostic Procedures
	<p>10. SLIDE 10 EXPLAIN FIGURE 44-4 Connecting a scan tool to the data link connector (DLC) located under the dash on this vehicle.</p>
	<p><b>HANDS-ON TASK: HAVE THE STUDENTS LOCATE DIAGNOSTIC LINK CONNECTOR (DLC) ON THEIR OWN VEHICLES USING COMPONENT LOCATOR. HAVE THEM RETRIEVE DTCS USING SCAN TOOL OR ON OLDER VEHICLES, FLASH CODE RETRIEVAL</b></p>
	<p><b>PROCEDURE &amp; OEM SERVICE INFO FIGURE 44-4</b></p>
	<p><b><u>DEMONSTRATION: DISCONNECT CRITICAL SENSORS, LIKE CRANK SENSOR AND AIRFLOW SENSOR, ON A RUNNING ENGINE TO DEMONSTRATE ENGINE STALLING. RESTART ENGINE &amp; DISCONNECT SENSORS SUCH AS AN OXYGEN SENSOR AND COOLANT TEMPERATURE SENSOR TO DEMONSTRATE ENGINE OPERATION WITHOUT THIS DATA.</u></b></p>
	<p><b>HANDS-ON TASK: HAVE THE STUDENTS CONNECT AN OEM SCAN TOOL TO A RUNNING VEHICLE AND RECORD ALL DATASTREAM PARAMETERS AVAILABLE.</b></p>
	<p><b>DISCUSSION: DISCUSS DATA PARAMETERS. WHAT DATA PARAMETERS ARE NECESSARY FOR ENGINE OPERATION? WHAT DATA PARAMETERS ARE CONSIDERED FUEL TRIM SENSORS OR MONITORS FOR EMISSIONS SYSTEMS?</b></p>
	<p><b>VIDEO: 2 MIN CATALYST MONITORING @ IDLE <a href="http://www.myautomotivelab.com">WWW.MYAUTOMOTIVELAB.COM</a></b></p>
	<p><b>VIDEO: 2 MIN OBD II ON GM VEHICLES <a href="http://www.myautomotivelab.com">WWW.MYAUTOMOTIVELAB.COM</a></b></p>
	<p><b>Meter Usage Measure Frequency Hz</b></p>
	<p><b>Meter Usage Measure Ohms</b></p>
	<p><b>O2 Sensor Volt Check</b></p>
	<p><b>Output Driver Control</b></p>
	<p><b>Positive Crankcase Ventilation (PCV)</b></p>

ICONS	Ch44 SCAN TOOLS & Diagnostic Procedures
	<p><b><u>Potentiometer</u></b>  <b><u>Quick Check Injector</u></b>  <b><u>Quick Check Injector Volts</u></b>  <b><u>Secondary Air Injection</u></b>  <b><u>Scope Display Dual Trace</u></b>  <b><u>Test Engine Coolant Temperature ECT Sensor</u></b>  <b><u>Test Injector Resistance</u></b></p>
	<p>11. SLIDES 11-12 EXPLAIN How To Use A Scan Tool  13. SLIDES 13-14 EXPLAIN Diagnostic Procedure</p>
	<p>15. SLIDE 15 EXPLAIN FIGURE 44-5 This is what was found when removing an air filter from a vehicle that had a lack-of-power concern. Obviously, the nuts were deposited by squirrels or some other animal, blocking a lot of the airflow into the engine</p>
	<p>16. SLIDE 16 EXPLAIN FIGURE 44-6 OBD-II DTC identification format</p>
	<p>17. SLIDE 17 EXPLAIN FIGURE 44-7 After checking for stored diagnostic trouble codes (DTCs), technician checks service information for any technical service bulletins that may relate to the vehicle being serviced.</p>
	<p><b>DEMONSTRATION: CREATE A DTC ON AN OBD-I VEHICLE BY DISCONNECTING A SENSOR, SUCH AS THE ENGINE COOLANT TEMPERATURE SENSOR. CREATE OPPOSITE DTC BY SHORTING THE CONNECTOR TERMINALS WITH A JUMPER WIRE.</b></p>
	<p><b><u>HANDS-ON TASK: BASED ON ABOVE DEMO, HAVE STUDENTS RETRIEVE THE DTCS AND HAVE THE STUDENTS RESEARCH THE DTC CODE DEFINITIONS.</u></b></p>
	<p><b><u>NATEF MLR TASK A8B1 RETRIEVE AND RECORD DIAGNOSTIC TROUBLE CODES, OBD MONITOR STATUS, AND FREEZE FRAME DATA; CLEAR CODES WHEN APPLICABLE.</u></b></p>