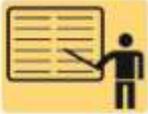


Introduction to Automotive Service

Chapter 34 Scan Tools & Diagnostic Procedures

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class serves as an introduction to the world of automotive service. 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 learning objectives to students as listed on NEXT SLIDE. <ol style="list-style-type: none"> 1. Prepare for the ASE computerized engine controls diagnosis (A8) certification test content area "E". 2. List the steps of the diagnostic process. 3. List six items to check as part of a thorough visual inspection. 4. Discuss the types of scan tools that are used to assess vehicle components.
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.

ICONS	Ch34 Scan Tools & Diagnostic Procedures
	<p>1. SLIDE 1 CH34 SCAN TOOLS & DIAGNOSTIC PROCEDURES</p>
	<p>Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE IS UPDATED REGULARLY</p>
	<p>VIDEO LINKS: <u>Engine Controls (284 Links)</u> <u>Fuel and Air (133 Links)</u></p>
	<p>2. SLIDE 2 EXPLAIN SCAN TOOLS 3. SLIDE 3 EXPLAIN Figure 34-1 TECH 2 scan tool is the factory scan tool used on General Motors vehicles.</p>
	<p>Show VIDEO: 1 MINUTE SCAN DATA CHECKING www.myautomotivelab.com http://media.pearsoncmg.com/ph/chet/chet_mylibs/akamai/template/video640x480.php?title=Checking%20Scan%20Data&clip=pandc/chet/2012/automotive/5_Gas_Analysis/CheckSD.mov&caption=chet/chet_mylibs/akamai/2012/automotive/5_Gas_Analysis/xml/CheckSD.xml</p>
	<p>4. SLIDE 4 EXPLAIN Scan Tools 5. SLIDE 5 EXPLAIN FIGURE 34-2 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.</p>
	<p><u>DISCUSSION:</u> Have the students talk about scan tools. How do <u>OEM scan tools</u> differ from generic scan tools? What are advantages & disadvantages of both types of tools?</p>
	<p><u>DEMONSTRATION:</u> Connect both <u>OEM & generic scan tools</u> to a vehicle and allow students to see information available with each tool. Demonstrate bidirectional capabilities by increasing or decreasing idle speeds, for example.</p>
	<p>6. SLIDE 6 EXPLAIN FIGURE 34-3 Typical malfunction indicator lamp (MIL) often labeled “check engine” or “service engine soon” (SES).</p>

ICONS	Ch34 Scan Tools & Diagnostic Procedures
	<p>7. SLIDES 7-8 EXPLAIN How To Use Scan Tool</p> <p>9. SLIDE 9 EXPLAIN FIGURE 34-4 Connecting a scan tool to the data link connector (DLC) located under the dash on this vehicle.</p> <p>10. SLIDES 10-11 EXPLAIN How To Use Scan Tool</p>
	<p><u>DEMONSTRATION: Disconnect critical sensors, like crank sensor and airflow sensor, on a running engine to demonstrate engine stalling. Restart engine & disconnect sensors such as an oxygen sensor and coolant temperature sensor to demonstrate engine operation without this data.</u></p>
	<p><u>HANDS-ON TASK: Have the students connect an OEM scan tool to a running vehicle and record all datastream parameters available.</u></p>
	<p><u>DISCUSSION: Have the students discuss data parameters. What data parameters are necessary for engine operation? What data parameters are considered fuel trim sensors or monitors for emissions systems?</u></p>
	<p><u>Show VIDEO: 2 MINUTES CATALYST MONITORING @ IDLE (Ch88)</u> <u>www.myautomotivelab.com</u></p>
	<p>12. SLIDE 12 EXPLAIN Diagnostic Procedure</p> <p>13. SLIDE 13 EXPLAIN FIGURE 34-5 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><u>DISCUSSION: Have the students discuss the eight-step diagnosis procedure. Why is it important to begin diagnosis with verification of complaint?</u></p>

ICONS	Ch34 Scan Tools & Diagnostic Procedures
	<p>Intermittent problems can be difficult to diagnose. It is important to gather as much information as possible for accurate diagnosis. Find out temperatures, speeds, or operating conditions when problems occur. Try to duplicate operating conditions & cause problem to occur.</p>
	<p><u>DEMONSTRATION:</u> give students copies of a diagnosis worksheet like example on have students complete worksheet using problem they may be experiencing, or may have experienced in past with their own cars.</p>
	<p><u>DISCUSSION:</u> Have the students discuss how a road test with customer might help with problem diagnosis. What are examples of <u>conditions that might help duplicate a concern?</u></p>
	<p><u>DEMONSTRATION:</u> show how to perform a thorough <u>VISUAL INSPECTION</u>, starting with basic fluid level checks. Raise & support vehicle, and continue with a thorough undercar inspection by checking items such as suspension, & brake & exhaust components and systems.</p>
	<p>14. SLIDE 14 EXPLAIN FIGURE 34-6 OBD-II DTC identification format.</p> <p>15. SLIDE 15 EXPLAIN FIGURE 34-7 After checking for stored diagnostic trouble codes (DTCs), the wise technician checks service information for any technical service bulletins that may relate to the vehicle being serviced.</p>
	<p><u>HANDS-ON TASK:</u> Have the students research the <u>DTC</u> from above <u>demonstration</u> using OEM service information. The students should understand the conditions that were met for the DTC to set. Then have students use OEM service information to find preferred method to erase DTC.</p>

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	<p>Show VIDEO: 2 MINUTES OBD II on GM VEHICLES www.myautomotivelab.com http://media.pearsoncmg.com/ph/chet/chet_mylibs/akamai/template/video640x480.php?title=Spark%20Plug%20and%20wires&clip=pandc/chet/2012/automotive/Auto_Shop_Safety/Clip17SparkPlugs1.mov&caption=chet/chet_mylibs/akamai/2012/automotive/Auto_Shop_Safety/xml/Clip17SparkPlugs1.xml</p>
	<p>HANDS-ON TASK: Have the students locate the Diagnostic Link Connector (DLC) on their own vehicles using component locator. Have them retrieve DTCs using a SCAN TOOL or on older vehicles, the flash code retrieval procedure and OEM service information.</p>
	<p>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.</p>
	<p>HANDS-ON TASK: Based on above DEMO, Have students retrieve the DTCs and have the students <u>research the DTC code definitions.</u></p>
	<p>Homework: complete Ch34 crossword puzzle: http://www.jameshalderman.com/links/book_intro/cw/crossword_ch_34.pdf</p>