### Introduction to Automotive Service

#### Chapter 34 Scan Tools & Diagnostic Procedures

#### Opening Your Class

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<th>KEY ELEMENT</th>
<th>EXAMPLES</th>
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<td>Introduce Content</td>
<td>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.</td>
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<tr>
<td>Motivate Learners</td>
<td>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.</td>
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| 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.  
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. |
<p>| 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. |</p>
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<th>ICONS</th>
<th>Ch34 Scan Tools &amp; Diagnostic Procedures</th>
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1. **SLIDE 1 CH34 SCAN TOOLS & DIAGNOSTIC PROCEDURES**

Check for ADDITIONAL VIDEOS & ANIMATIONS @ [http://www.jameshalderman.com/](http://www.jameshalderman.com/)  
WEB SITE IS UPDATED REGULARLY

**VIDEO LINKS:**  
**Engine Controls (284 Links)**  
**Fuel and Air (133 Links)**

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.

Show **VIDEO: 1 MINUTE SCAN DATA CHECKING** [www.myautomotivelab.com](http://www.myautomotivelab.com)

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.

**DISCUSSION:** Have the students talk about scan tools. How do OEM scan tools differ from generic scan tools? What are advantages & disadvantages of both types of tools?

**DEMONSTRATION:** Connect both OEM & generic scan tools to a vehicle and allow students to see information available with each tool. Demonstrate bidirectional capabilities by increasing or decreasing idle speeds, for example.

6. **SLIDE 6 EXPLAIN** FIGURE 34-3 Typical malfunction indicator lamp (MIL) often labeled “check engine” or “service engine soon” (SES).
7. SLIDES 7-8 EXPLAIN How To Use Scan Tool

9. SLIDE 9 EXPLAIN FIGURE 34-4 Connecting a scan tool to the data link connector (DLC) located under the dash on this vehicle.

10. SLIDES 10-11 EXPLAIN How To Use Scan Tool

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.

HANDS-ON TASK: Have the students connect an OEM scan tool to a running vehicle and record all datastream parameters available.

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?

Show VIDEO: 2 MINUTES CATALYST MONITORING @ IDLE (Ch88)
www.myautomotivelab.com

12. SLIDE 12 EXPLAIN Diagnostic Procedure

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

DISCUSSION: Have the students discuss the eight-step diagnosis procedure. Why is it important to begin diagnosis with verification of complaint?
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.

**DEMONSTRATION:** 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.

**DISCUSSION:** Have the students discuss how a road test with customer might help with problem diagnosis. What are examples of conditions that might help duplicate a concern?

**DEMONSTRATION:** show how to perform a thorough VISUAL INSPECTION, 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.

14. **SLIDE 14** EXPLAIN FIGURE 34-6 OBD-II DTC identification format.

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.

**HANDS-ON TASK:** Have the students research the DTC from above demonstration 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.
Show VIDEO: 2 MINUTES OBD II on GM VEHICLES www.myautomotivelab.com

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.

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.

HANDS-ON TASK: Based on above DEMO, Have students retrieve the DTCs and have the students research the DTC code definitions.

Homework: complete Ch34 crossword puzzle: