Introduction to Automotive Service

Chapter 17 Underhood Inspection

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 the chapter learning objectives to the students. 1. Prepare for ASE Engine Repair (A1) certification test content area "A" (General Engine Diagnosis) and content area "D" (Lubrication and Cooling Systems Diagnosis and Repair). 2. Perform routine fluid and service checks.
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	Chapter 17 Underhood Inspection
	**1. SLIDE 1 Ch17 UNDERHOOD INSPECTION**
	**Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/** **WEB SITE IS CONSTANTLY UPDATED**
	**2. SLIDE 2 EXPLAIN Visual Inspection**
	**3. SLIDE 3 EXPLAIN FIGURE 17-1** Before service begins, be sure to cover the seats, floor, and steering wheel with protective coverings.
	**HOLD DISCUSSION ON KEEPING INTERIOR CLEAN: DISCUSS STEPS TO PROTECT THE INTERIOR OF THE VEHICLE WHILE BEING SERVICED**
	**4. SLIDE 4 EXPLAIN FIGURE 17-2** An exhaust system hose should be connected to the tailpipe(s) whenever the engine is being run indoors. **5. SLIDE 5 EXPLAIN** Preventative Maintenance
	**HOLD DISCUSSION ON IMPORTANCE OF PREVENTATIVE MAINTENANCE: DISCUSS IMPORTANCE OF PREVENTATIVE MAINTENATNCE**
	**ON-VEHCILE TASK: HAVE STUDENTS DO A PRE-SERVICE WALK-AROUND ON A LAB VEHICLE TO NOTICE ANY BODY DAMAGE OR MISSING PARTS. THIS IS TYPICALLY DONE AT A DEALERSHIP SERVICE APPOINTMENT**
	**STUDENTS COMPLETE SAFETY INSPECTION TASK SHEET 1**
	**6. SLIDE 6 EXPLAIN** Windshield Wiper & Washer Fluid Service **7. SLIDE 7 READ & EXPLAIN FIGURE 17-3** Installing a wiper blade insert into a wiper arm.

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	**DEMO WIPER BLADE REPLACEMENT**
	**DO TASK SHEET 2 ON WIPER BLADE REPLACEMENT**
	**8. SLIDE 8 EXPLAIN FIGURE 17-4 (a)** windshield wiper fluid reservoir cap is usually labeled with a symbol showing a windshield washer. **(b)** use only the recommended washer fluid. Never use antifreeze in the windshield washer reservoir.
	**9. SLIDE 9 EXPLAIN Filter Replacement** **10. SLIDE 10 EXPLAIN FIGURE 17-5** cabin filter can be accessed either through the glove compartment or under the hood on most vehicles. **11. SLIDE 11 EXPLAIN FIGURE 17-6** (a) typical dirty air filter (b) Always check the inlet passage leading to the air filter for debris that can reduce airflow to the engine
	**HOST DISCUSSION ON CLEAN AIR FILTERS: DISCUSS IMPORTANCE OF A CLEAN AIR FILTER FOR ENGINE OPERATION**
	**DEMONSTRATION: PREPARE UNLABELED CLEAR JARS OF ANTI-FREEZE, ATF, ENGINE OIL, & POWER STEERING FLUID, & GASOLINE. HAVE STUDENTS IDENTIFY THESE FLUID BY COLOR & SMELL**
	**12. SLIDE 12: EXPLAIN** BRAKE FLUID **13. SLIDE 13 READ & EXPLAIN FIGURE 17-7** master cylinder with a transparent reservoir. The brake fluid level should be between the MAX and the MIN levels as marked on the reservoir. **14. SLIDE 14 READ & EXPLAIN Brake Fluid info** **15. SLIDE 15 EXPLAIN FIGURE 17-8** DOT 3 brake fluid. Always use fluid from a sealed container because brake fluid absorbs moisture from the air.

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	**HAVE STUDENTS RESEARCH INTERNET TO FIND WHICH VEHICLES USE DOT 5 AND WHY**
	**16. SLIDES 16-17 READ & EXPLAIN Brake Fluid info** **18. SLIDE 18 EXPLAIN FIGURE 17-9** Brake fluid test strips are a convenient and easy-to-use method to determine if the brake fluid needs to be replaced. **19. SLIDE 19 READ & EXPLAIN Brake Fluid info**
	**DEMONSTRATION BRAKE FLUID TEST STRIPS. DEMO BRAKE FLUID TEST STRIPS, IF YOU HAVE THEM.**
	**HOST DISCUSSION: BRAKE FLUID TYPES, DOT 3, ETC.**
	**HAVE STUDENTS DO A BRAKE FLUID INSPECTION HAVE STUDENTS USING A TASK SHEET TO DO A VISUAL INSPECTION OF BRAKE FLUID**
	**20. SLIDE 20: EXPLAIN** Engine Oil Inspection **21. SLIDE 21 EXPLAIN FIGURE 17-10** A typical oil level indicator (dipstick) **22. SLIDE 22 EXPLAIN FIGURE 17-11** oil level should be between the MAX and the MIN marks when the vehicle is on level ground and the oil has had time to drain into the oil pan
 http://media.pearsoncmg.com/ph/chet/chet_myautomotivelab_2/animations/A0_Animation/Chapter17_Fig_17_9/index.htm	**CLICK-ON OIL DIP STICK ANIMATION AT WWW.MYAUTOMOTIVELAB.COM**
	**COMPLETE OIL DIP STICK TASK SHEET**
	**23. SLIDE 23: EXPLAIN Automatic Transmission Fluid** **24. SLIDES 24-25: EXPLAIN CHARTS** **26. SLIDES 26-27: EXPLAIN** Automatic Transmission Fluid

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	28. SLIDE 28 EXPLAIN FIGURE 17-12 A typical automatic transmission dipstick **29. SLIDE 29: EXPLAIN** Automatic Transmission Fluid
	**ATF FLUID COLOR DISCUSSION** **DISCUSSION ON BROWN OR PINK COLORED AUTOMATIC TRANSMISSION FLUID**
	**HAVE STUDENTS DO A VISUAL CHECK OF AUTOMATIC TRANSMISSION FLUID AND REPORT CONDITION.**
	**30. SLIDE 30: READ & EXPLAIN** Cooling System Inspection **31. SLIDE 31 EXPLAIN FIGURE 17-13** Visually check level and color of coolant in coolant recovery or surge tank.
	**HAVE STUDENTS DO A VISUAL CHECK OF COOLANT AND REPORT CONDITION: HAVE STUDENTS DO A VISUAL INSPECTION OF COOLANT**
	**32. SLIDE 32 EXPLAIN FIGURE 17-14 (a)** refractometer is used to measure the freezing point of coolant. A drop of coolant is added to a viewing screen, lid is closed, and then held up to the light to view display on tool. **33. SLIDES 33 EXPLAIN** Cooling System Inspection **34. SLIDES 34 EXPLAIN** Hose Inspection & Accessory Drive Belt Inspection **35. SLIDE 35 EXPLAIN FIGURE 17-14 (b)** use of tests strips is a convenient and cost-effective method to check coolant condition and freezing temperature.
	**DEMONSTRATE REFRACTOMETER OR TEST STRIPS**
	**HOLD DISCUSSION ON RECYCLING ANTI-FREEZE**
	**HAVE STUDENTS DO NATEF TASK SHEET ON FLUIDS CHECK**

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	**36. SLIDE 36 EXPLAIN FIGURE 17-15** Using hand-operated pressure tester. Do not exceed the pressure rating of the radiator cap when pressurizing the system. This vehicle had a leaking upper radiator that only leaked when the system was pressurized
	**DEMO COOLING SYSTEM PRESSURE TEST.** **DEMO how to pressure test a cooling system**
	**HAVE STUDENTS DO NATEF TASK SHEET ON COOLING SYSTEM PRESSURE TEST**
	**37. SLIDE 37 EXPLAIN FIGURE 17-16** Hose clamps come in a variety of shapes and designs **38. SLIDE 38 EXPLAIN FIGURE 17-17** special tool is useful when installing a new accessory drive belt. The long-handled wrench fits in a hole of the belt tensioner **39. SLIDE 39 EXPLAIN FIGURE 17-18** typical worn serpentine accessory drive belt. Newer belts made from ethylene propylene diene monomer (EPDM) do not crack like older belts that were made from neoprene rubber **40. SLIDE 40 EXPLAIN FIGURE 17-19** belt tension gauge displays the belt tension in pounds of force. **41. SLIDE 41 EXPLAIN FIGURE 17-20** Typical marks on an accessory drive belt tensioner
	**HAVE STUDENTS DO NATEF TASK SHEET ON CHECKING BELT TENSION**
	**42. SLIDE 42: EXPLAIN POWER STEERING FLUID** **43. SLIDE 43 EXPLAIN FIGURE 17-21** A water spray bottle is an excellent diagnostic tool to help determine if the noise is due to an accessory drive belt. If the noise goes away when the belt is sprayed with a mist of water, then the belt is the cause. **44. SLIDE 44 EXPLAIN FIGURE 17-22** Most vehicles use a combination filler cap and level indicator (dipstick) that shows the level of power steering fluid in the reservoir.

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	HAVE STUDENTS DO A VISUAL CHECK OF POWER STEERING FLUID AND REPORT CONDITION
	HOMEWORK: COMPLETE CROSSWORD PUZZLE @ http://www.jameshalderman.com/links/book_intro/cw/crossword_ch_17.pdf
	HOMEWORK: RESEARCH INTERNET FOR LOCAL, STATE, AND FEDERAL LAWS REGARDING RECYCLING OF COOLANT. INSTRUCTOR DETERMINES HOW STUDENTS SHOULD REPORT WHAT THEY FOUND. STUDENTS CAN WORK IN TEAMS ON THIS WORK