






















Automotive Maintenance and Light Repair, 1ST Edition












Chapter 17 Underhood Inspection













Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers Automotive Maintenance and Light Repair . 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">• 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).• Perform routine fluid and service checks.• Discuss how to protect the vehicle during service.• List the items that should be checked during a safety inspection.• Discuss the items that require routine (preventative) maintenance.• Explain how to replace a cabin and engine air filter.• Explain how to check brake fluid.
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	Ch17 Underhood Inspection
          	<p>1. SLIDE 1 CH17 Underhood Inspection</p> <p>2. SLIDES 2-4 EXPLAIN OBJECTIVES</p> <p>Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE REGULARLY UPDATED</p> <p>5. SLIDE 5 EXPLAIN Visual Inspection</p> <p>6. SLIDE 6 EXPLAIN FIGURE 17-1 Before service begins, be sure to cover the seats, floor, and steering wheel with protective coverings.</p> <p>HOLD DISCUSSION ON KEEPING INTERIOR CLEAN: DISCUSS STEPS TO PROTECT THE INTERIOR OF THE VEHICLE WHILE BEING SERVICED</p> <p>7. SLIDE 7 EXPLAIN FIGURE 17-2 An exhaust system hose should be connected to the tailpipe(s) whenever the engine is being run indoors.</p> <p>8. SLIDE 8 EXPLAIN Preventative Maintenance HOLD DISCUSSION ON IMPORTANCE OF PREVENTATIVE MAINTENANCE: DISCUSS IMPORTANCE OF PREVENTATIVE MAINTENATNCE</p> <p><u>ON-VEHCILE TASK:</u> HAVE STUDENTS DO A PRE-SERVICE WALK-AROUND ON LAB VEHICLE TO NOTICE ANY BODY DAMAGE OR MISSING PARTS. DONE AT DEALERSHIP SERVICE APPOINTMENT STUDENTS COMPLETE SAFETY INSPECTION TASK SHEET</p> <p>9. SLIDE 9 EXPLAIN Windshield Wiper & Washer Fluid Service</p> <p>10. SLIDE 10 EXPLAIN FIGURE 17-3 Installing a wiper blade insert into a wiper arm.</p>

ICONS	Ch17 Underhood Inspection
	<p><u>DEMONSTRATION</u> SHOW WIPER BLADE REPLACEMENT</p>
	<p>DO A TASK SHEET ON WIPER BLADE REPLACEMENT</p>
	<p>11. SLIDE 11 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.</p>
	<p>12. SLIDE 12 EXPLAIN Filter Replacement</p> <p>13. SLIDE 13 EXPLAIN FIGURE 17-5 cabin filter can be accessed either through the glove compartment or under the hood on most vehicles.</p>
	<p>14. SLIDE 14 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</p>
	<p>HOST DISCUSSION ON CLEAN AIR FILTERS: DISCUSS IMPORTANCE OF A CLEAN AIR FILTER FOR ENGINE OPERATION</p>
	<p><u>DEMONSTRATION: PREPARE UNLABELED CLEAR JARS OF ANTI-FREEZE, ATF, ENGINE OIL, & POWER STEERING FLUID, & GASOLINE. HAVE STUDENTS IDENTIFY THESE FLUID BY COLOR & SMELL</u></p>
	<p>15. SLIDE 15 EXPLAIN BRAKE FLUID</p> <p>16. SLIDE 16 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.</p>
	<p>17. SLIDE 17 EXPLAIN Brake Fluid info</p> <p>18. SLIDE 18 EXPLAIN FIGURE 17-8 DOT 3 brake fluid. Always use fluid from a sealed container because brake fluid absorbs moisture from the air.</p>
	<p>HAVE STUDENTS RESEARCH INTERNET TO FIND WHICH VEHICLES USE DOT 5 AND WHY</p>

ICONS	Ch17 Underhood Inspection
	<p>19. SLIDES 19-21 EXPLAIN Brake Fluid</p> <p>22. SLIDE 22 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.</p> <p>23. SLIDE 23 EXPLAIN Brake Fluid</p>
	<p>DEMONSTRATION BRAKE FLUID TEST STRIPS. DEMO BRAKE FLUID TEST STRIPS, IF YOU HAVE THEM.</p>
	<p>HOST DISCUSSION: BRAKE FLUID TYPES, DOT 3, ETC.</p>
	<p>HAVE STUDENTS DO A BRAKE FLUID INSPECTION HAVE STUDENTS USING A TASK SHEET TO DO A VISUAL INSPECTION OF BRAKE FLUID</p>
	<p>24. SLIDE 24 EXPLAIN Engine Oil Inspection</p> <p>25. SLIDE 25 EXPLAIN FIGURE 17-10 A typical oil level indicator (dipstick)</p>
	<p>26. SLIDE 26 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</p>
	<p>Oil Dip Stick ANIMATION at www.myautomotivelab.com http://media.pearsoncmg.com/ph/chet/chet_myautomotivelab_2/animations/A0_Animation/Chapter17_Fig_17_9/index.htm</p>
	<p>COMPLETE OIL DIP STICK TASK SHEET</p>
	<p>27. SLIDE 27 EXPLAIN Automatic Transmission Fluid</p> <p>28. SLIDES 28-29: EXPLAIN CHARTS</p> <p>30. SLIDES 30-31: EXPLAIN Automatic Transmission Fluid</p>
	<p>32. SLIDE 32 EXPLAIN FIGURE 17-12 A typical automatic transmission dipstick</p>
	<p>ATF FLUID COLOR DISCUSSION DISCUSSION ON BROWN OR PINK COLORED AUTOMATIC TRANSMISSION FLUID</p>

ICONS	Ch17 Underhood Inspection
	<p>HAVE STUDENTS DO A VISUAL CHECK OF AUTOMATIC TRANSMISSION FLUID AND REPORT CONDITION.</p>
	<p>33. SLIDE 33: READ & EXPLAIN Cooling System Inspection</p>
	<p>34. SLIDE 34 EXPLAIN FIGURE 17-13 Visually check level and color of coolant in coolant recovery or surge tank.</p>
	<p>HAVE STUDENTS DO A VISUAL CHECK OF COOLANT AND REPORT CONDITION: HAVE STUDENTS DO A VISUAL INSPECTION OF COOLANT</p>
	<p>35. SLIDE 35 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.</p>
	<p>36. SLIDE 36 EXPLAIN Hose Inspection & Accessory Drive Belt Inspection</p>
	<p>37. SLIDE 37 EXPLAIN FIGURE 17-14 (b) use of tests strips is a convenient and cost-effective method to check coolant condition and freezing temperature.</p>
	<p><u>DEMONSTRATE REFRACTOMETER OR TEST STRIPS</u></p>
	<p><u>HOLD DISCUSSION ON RECYCLING ANTI-FREEZE</u></p>
	<p>HAVE STUDENTS DO_NATEF_TASK SHEET ON FLUIDS CHECK</p>
	<p>38. SLIDE 38 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</p>
	<p><u>DEMONSTRATION COOLING SYSTEM PRESSURE TEST. DEMO HOW TO PRESSURE TEST A COOLING SYSTEM</u></p>

ICONS

Ch17 Underhood Inspection



HAVE STUDENTS DO NATEF TASK SHEET ON COOLING SYSTEM PRESSURE TEST

39. SLIDE 39 EXPLAIN FIGURE 17-16 Hose clamps come in a variety of shapes and designs
40. SLIDE 40 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
41. SLIDE 41 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
42. SLIDE 42 EXPLAIN FIGURE 17-19 belt tension gauge displays the belt tension in pounds of force.
43. SLIDE 43 EXPLAIN FIGURE 17-20 Typical marks on an accessory drive belt tensioner

HAVE STUDENTS DO NATEF TASK SHEET ON CHECKING BELT TENSION SEE 2013 NATEF TASK CORRELATION CHART

44. SLIDE 44 EXPLAIN POWER STEERING FLUID
45. SLIDE 45 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.
46. SLIDE 46 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.

HAVE STUDENTS DO A VISUAL CHECK OF POWER STEERING FLUID AND REPORT CONDITION

HOMEWORK: COMPLETE CH17 CROSSWORD PUZZLE @ [HTTP://WWW.JAMESHALDERMAN.COM](http://www.jameshalderman.com)

HOMEWORK: RESEARCH INTERNET FOR LOCAL, STATE, FEDERAL LAWS REGARDING RECYCLING OF COOLANT. INSTRUCTOR DETERMINES HOW STUDENTS SHOULD REPORT WHAT THEY FOUND.