

Automotive Engines

Chapter 2 Environmental & Hazardous Materials

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This engine systems course or class provides complete coverage of the components, operation, design, and troubleshooting. It correlates material to task lists specified by ASE and NATEF and emphasizes a problem-solving approach. Chapter features include Tech Tips, Frequently Asked Questions, Real World Fixes, Videos, Animations, and NATEF Task Sheet references.
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 as listed on the second SLIDE. <ol style="list-style-type: none">1. Prepare for the ASE assumed knowledge content required by all service technicians to adhere to environmentally appropriate actions and behavior.2. Define the Occupational Safety and Health Act (OSHA).3. Explain the term material safety data sheet (MSDS).4. Identify hazardous waste materials in accordance with state and federal regulations and follow proper safety precautions while handling hazardous waste materials.5. Define the steps required to safely handle and store automotive chemicals and waste.
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



Ch02 Health & Environment

Ch7 Health & Environmental Awareness

Check for **ADDITIONAL VIDEOS & ANIMATIONS**
@ <http://www.jameshalderman.com/>
WEB SITE REGULARLY UPDATED

2. **SLIDES 2-3 READ** CHAPTER OBJECTIVES & KEY TERMS
4. **SLIDES 4-5 EXPLAIN & READ** Slide Text on Hazardous Waste
6. **SLIDE 6 EXPLAIN:** Federal and State Laws
7. **SLIDE 7 EXPLAIN:** Federal and State Laws & **FIGURE 2-1** Material safety data sheets (MSDS) should be readily available for use by anyone in the area who may come into contact with hazardous materials

USE ANIMATION ON ANIMATION: EPA HAZARDOUS MATERIAL IDENTIFICATION GUIDE FROM [WWW.MYAUTOMOTIVELAB.COM](http://www.myautomotivelab.com)

[HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYAUTOMOTIVELAB_2/ANIMATIONS/A1_ANIMATION/CHAPTER02_FIG_02_11/INDEX.HTM](http://media.pearsoncmg.com/ph/chet/chet_myautomotivelab_2/animations/a1_animation/chapter02_fig_02_11/index.htm)

RESEARCH ON INTERNET EPA'S LIST OF HAZARDOUS MATERIALS. STUDENTS USE INTERNET & GO ON THE EPA WEB SITE












**DISCUSS WHICH OF THESE IS FOUND IN AN AUTOMOTIVE SHOP OR SCHOOL LAB
HOST DISCUSSION ON HAZARDOUS MATERIALS FOUND IN LAB**

SHOW & EXPLAIN MSDS SHEET: SHOW AN EXAMPLE OF MSDS SHEET & EXPLAIN IT DIFFERENT SECTIONS

ANIMATION: MATERIAL SAFETY DATA SHEET

[HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYAUTOMOTIVELAB_2/ANIMATIONS/A1_ANIMATION/CHAPTER02_FIG_02_1/INDEX.HTM](http://media.pearsoncmg.com/ph/chet/chet_myautomotivelab_2/animations/a1_animation/chapter02_fig_02_1/index.htm)

COMPLETE TASK SHEET 1 ON MSDS

ICONS	Ch02 Health & Environment
	<p>8. SLIDE 8 READ TEXT ON SLIDE FIGURE 2-2 All brakes should be moistened with water or solvent to help prevent brake dust from becoming airborne</p>
	<p><u>DEMONSTRATION: SHOW STUDENTS WET-DOWN PROCEDURE FOR BRAKES LIKE FIGURE 2-2</u></p>
	<p>9. SLIDE 9 READ & EXPLAIN WARNING</p>
	<p>10. SLIDE 10 READ & EXPLAIN text on slides</p>
	<p><u>DEMONSTRATION: SHOW STUDENTS HOW TO DISPOSE OF BRAKE FLUID</u></p>
	<p><u>DEMONSTRATION: SHOW CORROSIVENESS OF BRAKE FLUID BY POURING ON PAINTED OBJECT</u> <u>SHOW OPTIONAL VIDEO ON END OF DAY</u> <u>WWW.MYAUTOMOTIVELAB.COM</u> 1.37 MINUTES LONG <small>HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=END%20OF%20DAY&CLIP=PANDC/CHET/2012/AUTOMOTIVE/AUTO_SHOP_SAFETY/CLIP41SEQ1.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/AUTO_SHOP_SAFETY/XML/CLIP41SEQ1.XML</small></p>
	<p>11. SLIDE 11 READ & EXPLAIN USED OIL</p>
	<p>12. SLIDE 12 READ & EXPLAIN FIGURE 2-3 typical aboveground oil storage tank</p>
	<p>13. SLIDE 13 READ & EXPLAIN SAFETY TIP ON HAND SAFETY</p>
	<p><u>DEMONSTRATION: CUT TOP OFF OLD OIL FILTER. SHOW STUDENTS FILTERING ELEMENT & ALL OF PARTICLES IT HAS FILTERED. THIS IS REASON WHY YOU HAVE TO DRAIN FILTER BEFORE DISPOSAL</u> <u>SHOW VIDEO ON USED OIL AS HAZARDOUS WASTE</u> <u>WWW.MYAUTOMOTIVELAB.COM 2 MINUTES</u> <small>http://media.pearsoncmg.com/ph/chet/chet_my labs/akamai/template/video640x480.php?title=Motor%20Oil&clip=pandc/chet/2012/automotive/Auto_Shop_Safety/Clip11MotorOil1.mov&caption=chet/chet_my labs/akamai/2012/automotive/Auto_Shop_Safety/xml/Clip11MotorOil1.xml</small></p>
	<p>14. SLIDES 14 EXPLAIN FIGURE 2–4 Washing hands and removing jewelry are two important safety habits all service technicians should practice</p>

ICONS**Ch02 Health & Environment**

15. SLIDES 15 **EXPLAIN** SLIDE TEXT & FIGURE 2-5
Typical fireproof flammable storage cabinet.

DISCUSSION: HOLD DISCUSSION ON SOLVENTS USED IN SHOP. ASK STUDENTS TO DISCUSS COMMON SOLVENTS USED IN THE SHOP

SHOW VIDEO ON GASOLINE FROM [WWW.MYAUTOMOTIVELAB.COM](http://www.myautomotivelab.com) 1 MINUTE

[HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=GASOLINE&CLIP=PANDC/CHET/2012/AUTOMOTIVE/AUTO_SHOP_SAFETY/CLIP9GAS1.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/AUTO_SHOP_SAFETY/XML/CLIP9GAS1.XML](http://media.pearsoncmg.com/ph/chet/chet_myLABS/akamai/template/video640x480.php?title=gasoline&clip=pandc/chet/2012/automotive/auto_shop_safety/clip9gas1.mov&caption=chet/chet_myLABS/akamai/2012/automotive/auto_shop_safety/xml/clip9gas1.xml)

16. SLIDES 16 **EXPLAIN** FIGURE 2-6 Using a water-based cleaning system helps reduce the hazards from using strong chemicals

17. SLIDE 17 **EXPLAIN** FREQUENTLY ASKED QUESTION

18. SLIDE 18 **EXPLAIN** COOLANT DISPOSAL

19. SLIDE 19 **EXPLAIN** FIGURE 2-7 Used antifreeze coolant should be kept separate and stored in a leakproof container until it can be recycled or disposed of according to federal, state, and local laws. Note that the storage barrel is placed inside another container to catch any coolant that may spill out of the inside barrel.

SHOW VIDEO ON ANTI-FREEZE FROM [WWW.MYAUTOMOTIVELAB.COM](http://www.myautomotivelab.com) 1 MINUTE

[HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=ANTI%20FREEZE&CLIP=PANDC/CHET/2012/AUTOMOTIVE/AUTO_SHOP_SAFETY/CLIP10ANTIFREEZE1.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/AUTO_SHOP_SAFETY/XML/CLIP10ANTIFREEZE1.XML](http://media.pearsoncmg.com/ph/chet/chet_myLABS/akamai/template/video640x480.php?title=anti%20freeze&clip=pandc/chet/2012/automotive/auto_shop_safety/clip10antifreeze1.mov&caption=chet/chet_myLABS/akamai/2012/automotive/auto_shop_safety/xml/clip10antifreeze1.xml)

20. SLIDE 20 **EXPLAIN** Lead-Acid Battery Waste

21. SLIDE 21 **EXPLAIN** FIGURE 2-8 This red gasoline container holds about 30 gallons of gasoline and is used to fill vehicles used for training

HAVE STUDENTS DO INTERNET SEARCH FOR PUBLIC & PRIVATE ORGANIZATIONS THAT HELP RECYCLE USED AUTOMOTIVE BATTERIES.

22. SLIDES 22-23 **READ & EXPLAIN** TEXT AIRBAG HANDLING

24. SLIDE 24 **READ & EXPLAIN** TEXT ON Used Tire Disposal

HAVE STUDENTS RESEARCH INTERNET FOR WHAT IS DONE WITH RECYCLED AUTOMOTIVE TIRES

ICONS	Ch02 Health & Environment
	<p>25. SLIDE 25 EXPLAIN Air-Conditioning Refrigerant Oil Disposal</p>
	<p>26. SLIDE 26 EXPLAIN FIGURE 2–9 Air-conditioning refrigerant oil must be kept separated from other oils because it contains traces of refrigerant and must be treated as hazardous waste</p>
	<p>SHOW VIDEO ON REFRIGERANTS FROM WWW.MYAUTOMOTIVELAB.COM http://media.pearsoncmg.com/ph/chet/chet_mylibs/akamai/template/video640x480.php?title=Refrigerants&clip=pandc/chet/2012/automotive/Auto_Shop_Safety/Clip12Refrig1.mov&caption=chet/chet_mylibs/akamai/2012/automotive/Auto_Shop_Safety/xml/Clip12Refrig1.xml</p>
	<p>HOST DISCUSSION ON THE DIFFERENT REFRIGERANTS & REFRIGERANT OILS</p>
	<p>27. SLIDE 27 EXPLAIN CHART 2-1AIR-CONDITIONING REFRIGERANT OIL DISPOSAL WASTE CHART</p>
	<p>28. SLIDES 28-30 EXPLAIN TECH TIP FIGURE 2–10 Placard near driver’s door, including what devices in the vehicle contain mercury</p>
	<p>31. SLIDE 31 EXPLAIN FIGURE 2–11 The Environmental Protection Agency (EPA) Hazardous Materials Identification Guide is a standardized listing of the hazards and the protective equipment needed</p>
	<p>HANDS-ON TASK: USE VOCABULARY SCAVENGER HUNT TASK SHEET to identify HAZ-MAT that correspond with letter on task sheet & describe location of HAZ-MAT</p>
	<p>HOMEWORK (OUTSIDE WORK 1 HOUR): USING FIGURE 2-11 GIVE STUDENTS SEVERAL HAZARDOUS MATERIALS IDENTIFICATION GUIDES (HMIG) IN THE LRC. HAVE THEM LIST PRECAUTIONS & PPE NEEDED TO WORK WITH THESE MATERIALS.</p>
	<p>HOMEWORK: CHAPTER 2 CROSSWORD PUZZLE: HTTP://WWW.JAMESHALDERMAN.COM/LINKS/BOOK ENGINE THEORY SERV 7/CW/CROSSWORD CH 2.PD</p>
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