# Automotive Electrical & Engine Performance 8/E

# Chapter 2 Environmental and Hazardous Materials

## Opening Your Class

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| **KEY ELEMENT** | **EXAMPLES** |
| **Introduce Content** | This Automotive Electrical & Engine Performance 8th edition provides complete coverage of automotive areas pertaining vehicle electrical systems and engine performance. It correlates material to task lists specified by ASE and ASEEducation (NATEF) and emphasizes a problem-solving approach. Chapter features include Tech Tips, Frequently Asked Questions, Case Studies, Videos, and Animations that are listed in this Lesson Plan. This Lesson Plan also references ASEEducation (NATEF) Task Sheets available from Jim’s web site. |
| **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. Identify hazardous waste materials in accordance with state and federal regulations, and follow proper safety precautions while handling hazardous materials.  2. Define the Occupational Safety and Health Act (OSHA).  3. Explain the term safety data sheets (SDS).  4. 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. |

# NOTE: This lesson plan is based on Automotive Electrical & Engine Performance 8th Edition Chapter Images found on Jim’s web site @ [www.jameshalderman.com](http://www.jameshalderman.com)

# DOWNLOAD Chapter 02 Chapter Images: From

[**http://www.jameshalderman.com/books\_a8.html#anchor2**](http://www.jameshalderman.com/books_a8.html#anchor2) **:**

| ICONS | **Ch02 Environmental & Hazardous Materials** |
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| Explain | 1. SLIDE 1 ENVIRONMENTAL & HAZMAT |
| AnimationVideo | **Check for ADDITIONAL VIDEOS & ANIMATIONS @** [**http://www.jameshalderman.com/**](http://www.jameshalderman.com/)  **WEB SITE IS CONSTANTLY UPDATED** |
| Video | **V**[**ideos**](http://www.jameshalderman.com/links/book_fuel_and_emission_3/vid/ch2/video_frame.html) |
| InstructorNotesDiscussion | At the beginning of this class, you can download the crossword puzzle & Word Search from Jim’s web site to familiarize your class with terms in this chapter & then discuss them, see below: |
| AssessmentIcon | <http://www.jameshalderman.com/books_a8.html#anchor2>  **DOWNLOAD**  **Crossword Puzzle (Microsoft Word) (PDF)**  **Word Search Puzzle (Microsoft Word) (PDF** |
| Frequently Asked Quest ICONDiscussion | DISCUSS FREQUENTLY ASKED QUESTION: |
| Tech Tip | EXPLAIN TECH TIP: |
| Repair Vehicle | Research on Internet EPA’s list of Hazardous Materials. Students use Internet & go on the EPA Web Site |
|  | WARNING: Hazardous waste disposal laws include serious penalties for anyone responsible for breaking these laws. |
| Discussion | Discuss which of these is found in an Automotive Shop or School Lab  Host Discussion on Hazardous materials found in LAB |
| Explain | **2. SLIDE 2 EXPLAIN FIGURE 2–1** Safety data sheets (SDS), formerly known as material safety data sheets (MSDS) should be readily available for use by anyone in area who may come into contact with hazardous materials. |
| Demo | SHOW & EXPLAIN SDS Sheet: Show an example of SDS sheet & explain it different sections |
| Repair Vehicle | Complete TASK SHEET on SDS |
| Explain | **3. SLIDE 3 EXPLAIN FIGURE 2–2** Tag that identifies the electrical power has been removed and service work is being done.  **4. SLIDE 4 EXPLAIN FIGURE 2–3** All brakes should be moistened with water or solvent to help prevent brake dust from becoming airborne. |
|  | WARNING Never use compressed air to blow brake dust. The fine talc-like brake dust can create a health hazard even if  asbestos is not present or is present in dust rather than fiber form. |
| Demo | DEMOnstration: SHOW students WET-DOWN procedure for brakes like Figure 2-3 |
| Demo | DEMOnstration: SHOW students how to dispose of Brake Fluid  DEMOnstration: show corrosiveness of brake fluid by pouring on painted object |
| Explain | **5. SLIDE 5 EXPLAIN FIGURE 2.4** A typical aboveground oil storage tank. |
| Demo | DEMOnstration: Cut top off old Oil Filter. Show filtering element & all of particles it has filtered. this is reason why you have to drain filter before disposAL |
|  | WARNING Hand Safety: technicians should wash their hands with soap & water after handling engine oil, differential oil, or transmission fluids or wear protective rubber gloves. Another safety hint is that the service technician should not wear watches, rings, or other jewelry that could come in contact with electrical or moving parts of a vehicle. SEE FIGURE 2-5 |
| Explain | **6. SLIDE 6 EXPLAIN FIGURE 2-5** Washing hands and removing jewelry are two important safety habits all service technicians should practice. |
| Frequently Asked Quest ICONDiscussion | DISCUSS FREQUENTLY ASKED QUESTION:  *How can you tell if a solvent is hazardous?* If a solvent or any of ingredients of a product contains “fluor” or “chlor,” then it is likely to be hazardous. Check instructions on label or SDS for proper use and disposal procedures. |
| Discussion | Hold discussion on solvents used in shop. Ask studetns to discuss common solvents used in the shop |
| Explain | **7. SLIDE 7 EXPLAIN FIGURE 2.6** Typical fireproof flammable storage cabinet  **8. SLIDE 8 EXPLAIN FIGURE 2.7** Using a water-based cleaning system helps reduce the hazards from using strong chemicals. |
| Explain | **9. SLIDE 9 EXPLAIN FIGURE 2.8** 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. |
| Explain | **10. SLIDE 10 EXPLAIN FIGURE 2.9** This red gasoline container holds about 30 gallons of gasoline and is used to fill vehicles used for training |
| Repair Vehicle | Have students research Internet for what is done with recycled automotive tires |
| Explain | **11. SLIDE 11 EXPLAIN FIGURE 2.10** Air-conditioning refrigerant oil must be kept separated from other oils because it contains traces of refrigerant and must be treated as hazardous waste. |
| Tech Tip | EXPLAIN TECH TIP: *REMOVE COMPONENTS THAT CONTAIN MERCURY:* Some vehicles have a placard near driver’s side door that lists components that contain the heavy metal, mercury. Mercury can be absorbed through skin and is a heavy metal that, once absorbed by the body, does not leave. ● SEE FIGURE 2–11. These components should be removed from vehicle before rest of body is sent to be recycled to help prevent releasing mercury into the environment. |
| Explain | **12. SLIDE 12 EXPLAIN FIGURE 2-11** Placard near driver’s door, including what devices in the vehicle contain mercury.  **13. SLIDE 13 EXPLAIN FIGURE 2.12** OSHA global hazardous materials labels. |
| Tech Tip | EXPLAIN TECH TIP: *WHAT EVERY TECHNICIAN SHOULD KNOW:* OSHA has adopted new hazardous chemical labeling requirements making it agree with global labeling standards established by UN. As a result, workers will have better information available on safe handling and use of hazardous chemicals, allowing them to avoid injuries & possible illnesses related to exposures to hazardous chemicals. ● SEE FIGURE 2–12. |
| Discussion | Host DISCUSSION ON the different REFRIGERANTS & Refrigerant OILS |
| Explain | **13. SLIDE 13 EXPLAIN FIGURE 2-12** OSHA global hazardous materials labels. |
| Repair Vehicle | Have students do Internet Search for public & private organizations that help recycle used automotive batteries. |
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|  | discuss chart 2-1 Typical waste materials generated at auto repair shops and typical category (hazardous or nonhazardous) by disposal method. |
| Repair Vehicle | Have students research Internet for what is done with recycled automotive tires |