

Electric & Hybrid Electric Vehicles 1st Edition

Chapter 10 – High-Voltage Batteries

Lesson Plan



CHAPTER SUMMARY:

1. Hybrid and Electric Vehicle High-Voltage Batteries and Nickel-Metal Hydride Batteries
2. Lithium-Ion High-Voltage Batteries and Designs of Lithium-Ion Cells
3. Types of Lithium-Ion Batteries, HEV/EV Electronic Cooling, and High-Voltage Battery Cooling and Heating
4. Battery Capacity Vs. Vehicle Range and High-Voltage Battery Control Components
5. Battery Management System (BMS) and Electrical Distribution System (EDS)
6. HEV High-Voltage Battery Monitor and Lithium-Ion Battery Repair
7. Alternative Out-Of-Vehicle HV Battery Service and Battery Degradation and Balancing

OBJECTIVES:



1. Prepare for ASE L3 certification test section “A” (Battery Systems).
2. Discuss hybrid and electric vehicle high-voltage batteries.
3. Describe nickel-metal hydride batteries and designs used in hybrid electric vehicles.
4. Explain the operation of lithium-ion high-voltage batteries including the various types and designs.
5. Discuss battery capacity versus vehicle range.
6. Explain the need for high-voltage battery cooling and heating.
7. Discuss battery capacity versus vehicle range.
8. Discuss the high-voltage battery control components.
9. Describe the purpose and function of the battery management system (BMS).
10. Discuss the Electrical Distribution System (EDS).
11. Explain the HEV high-voltage battery monitor.
12. Discuss the factory authorized lithium-ion battery repair procedure.
12. Describe battery degradation and balancing.

RESOURCES: ([All resources may be found at jameshalderman.com](http://www.jameshalderman.com))



1. Task Sheet: High-Voltage Batteries
2. Task Sheet: High-Voltage Battery Diagnosis
3. Chapter PowerPoint
4. [Crossword Puzzle and Word Search \(L3\)](#)
5. [Videos: \(L3\) Light Duty Hybrid Electric](#)
6. [Animations: \(L3\) Light Duty Hybrid Electric](#)

ACTIVITIES:



1. Task Sheet: High-Voltage Batteries
2. Task Sheet: High-Voltage Battery Diagnosis

ASSIGNMENTS:



1. Chapter crossword and word search puzzles from the website.
2. Complete end of chapter quiz from the textbook.
3. Complete multiple choice and short answer quizzes downloaded from the website.

CLASS DISCUSSION:



1. Review and group discussion chapter [Frequently Asked Questions](#) and [Tech Tips](#) sections.
2. Review and group discussion of the five (5) chapter [Review Questions](#).

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NOTES AND EVALUATION:

