**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

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**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.

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**RESOURCES:** [(All resources may be found at jameshalderman.com)](https://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)](https://jameshalderman.com/l3_puzzles_lib_page/)

5. [Videos: (L3) Light Duty Hybrid Electric](https://jameshalderman.com/l3_vid_lib_page/)

6. [Animations: (L3) Light Duty Hybrid Electric](https://jameshalderman.com/l3_anim_lib_page/)

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**ACTIVITIES:**

1. Task Sheet: High-Voltage Batteries

2. Task Sheet: High-Voltage Battery Diagnosis

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**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.

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**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:**

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