**Automotive Electrical and Engine Performance - 9th edition**

**Ch38: Fuel-Injection System Diagnosis and Service**

**Lesson Plan**

**CHAPTER SUMMARY:**

1. Fuel Injection System Diagnosis, Testing for an Injector Pulse, and Checking Fuel Injector Resistance

2. Pressure Drop Balance Test, Injector Voltage-Drop Tests, and Scope Testing Fuel Injectors

3. Fuel-Injection Service

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**OBJECTIVES:**

1. Explain fuel-injection system diagnosis including scan tool diagnosis.

2. Describe how to test for an injector pulse.

3. Describe how to check fuel-injection resistance.

4. Describe the pressure-drop balance test.

5. Describe injection voltage-drop tests.

6. Describe scope-testing fuel injectors.

7. Describe how to service the fuel-injection system. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**RESOURCES:** (All resources may be found at jameshalderman.com)

1. Task Sheet: Fuel Injector Balance Test

2. Task Sheet: Fuel-Injection System Diagnosis

3. Task Sheet: Injector Resistance Testing

4. Task Sheet: Injector Voltage Waveform Test

5. Crossword Puzzle and Word Search

6. Videos: (A8) Engine Performance Videos

7. Animations: (A8) Engine Performance Animations

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**ACTIVITIES:**

1. Task Sheet: Fuel Injector Balance Test

2. Task Sheet: Fuel-Injection System Diagnosis

3. Task Sheet: Injector Resistance Testing

4. Task Sheet: Injector Voltage Waveform Test

5. Task Sheet: Electronic Throttle Control System ID

6. Chapter PowerPoint

7. Crossword Puzzle and Word Search

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**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.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Automotive Electrical and Engine Performance - 9th edition**

**Ch38: Fuel-Injection System Diagnosis and Service**

**Lesson Plan**

**CLASS DISCUSSION:**

1. Review and group discussion chapter Frequently Asked Questions and Tech Tips sections.

2. Ten (10) question end of Chapter Quiz.

3. Five (5) end of chapter Review Question for class discussion.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**NOTES AND EVALUATION:**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_