Automotive Chassis Systems 7e
Chapter 26 Rear Suspension
Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of **Automotive Chassis Systems.** It correlates material to task lists specified by ASE and NATEF
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 learning objectives to students as listed below: 1. Describe solid rear axles 2. Distinguish between trailing arm rear suspensions and semi-trailing arm rear suspensions. 3. Distinguish between independent rear suspensions and semi-independent rear suspensions 4. Explain rear shock replacement and rear spring replacement **This chapter helps prepare for ASE Suspension and Steering (A4) certification test content area "B" (Suspension System Diagnosis and Repair).**
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 Chassis Systems 7th Edition Chapter Images found on Jim's web site @ www.jameshalderman.com

LINK CHP 26: Chapter Images

ICONS	Chapter 26 Rear Suspension
	**1. SLIDE 1 CH26 REAR SUSPENSIONS & SERVICE**
	**Check for VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/** **WEB SITE IS CONSTANTLY UPDATED** **Suspension System (55 Links)**
	**At the beginning of this class, you can download the crossword puzzle & Word Search from the links below to familiarize your class with the terms in this chapter & then discuss them**
	**Crossword Puzzle (Microsoft Word) (PDF)** **Word Search Puzzle (Microsoft Word) (PDF)**
	**2. SLIDE 2 EXPLAIN Figure 26-1** Solid axles are used on rear-wheel-drive vehicles as well as front-wheel-drive vehicles.
	3. SLIDE 3 EXPLAIN Figure 26-2 solid axle supports the springs, so the axle and suspension components are unsprung weight. When one wheel rides over a bump, the force of impact transfers through the solid axle to the opposite side, leading to unstable handling
	4. SLIDE 4 EXPLAIN Figure 26-3 When the axle housing reacts against the force of axle shaft rotation, the front of the differential tilts upward, creating axle windup.
	**DISCUSSION: Ask the students to discuss what Hotchkiss drives are and why they are called Hotchkiss drives.**
	**5. SLIDE 5 EXPLAIN Figure 26-4** typical rear-wheel-drive pickup truck rear suspension equipped with leaf springs. This type of arrangement is called a Hotchkiss drive and the drive train forces are controlled by the rear suspension components.
	6. SLIDE 6 EXPLAIN Figure 26-5 An exploded view of a beam axle with multi-leaf springs

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	**DEMONSTRATION: Show examples of leaf springs**
	**DISCUSSION: Ask the students to discuss why some rear suspensions use one set of trailing arms while other rear suspensions use two sets.**
	**ON-VEHICLE NATEF TASK: Remove, inspect, and install leaf springs, leaf spring insulators (silencers), shackles, brackets, bushings, and mounts**
	7. **SLIDE 7 EXPLAIN Figure 26-6** A trailing arm rear suspension with a solid axle used on a front-wheel-drive vehicle. 8. **SLIDE 8 EXPLAIN Figure 26-7** Camaro and Firebird rear suspension systems use a torque arm to control axle windup. If rubber torque arm bushings (cushions) are worn, a loud "bang" could be heard and felt when accelerating suddenly.
	**Broken Panhard Rod (Track Rod) will cause tires to hit wheel house when cornering: FIGURE 26-7**
	**DISCUSSION: Ask the students to discuss how the length of a Panhard Rod will affect rear axle movement: FIGURE 26-7**
	9. **SLIDE 9 EXPLAIN Figure 26-8** typical beam axle rear suspension, which uses trailing arms and coil springs along with a track rod, also called a ***Panhard rod***, to control side-to-side axle movement. 10. **SLIDE 10 EXPLAIN Figure 26-9** This Ford rear suspension uses upper & lower semi-trailing arms to mount rear axle & watts linkage to control side-to-side movement.
	**DISCUSSION: Discuss which is better: rear suspension with a trailing arm or a rear suspension with a semitrailing arm.**
	11. **SLIDE 11 EXPLAIN Figure 26-10** independent rear suspension provides a better ride because less weight is unsprung and the suspension is able to react quickly to bumps in the road without affecting the opposite side. 12. **SLIDE 12 EXPLAIN Figure 26-11** A typical

short/long-arm independent rear suspension.

13. **SLIDE 13 EXPLAIN Figure 26-12** independent rear suspension uses a MacPherson strut, two parallel lower transverse control arms, and a trailing arm.
14. **SLIDE 14 EXPLAIN Figure 26-13** toe-control rod provides an extra brace to keep the rear wheels straight ahead during braking and acceleration on this modified-strut-type independent rear suspension.
15. **SLIDE 15 EXPLAIN FIGURE 26.14** A transverse mono-type leaf spring used on rear suspension of a Corvette.

DISCUSSION: Ask the students to discuss which is better: a transverse-leaf-spring independent rear suspension that uses an H-shaped lower control arm, or a transverse-leaf spring suspension that uses two parallel lower links and a trailing arm

16. **SLIDE 16 EXPLAIN Figure 26-15** crossbeam is placed toward front of vehicle rather than the centerline of the rear wheels on a semi-independent- type rear suspension.
17. **SLIDE 17 EXPLAIN FIGURE 26–16** A semi-independent rear suspension with MacPherson struts

18. **SLIDE 18 EXPLAIN Figure 26-17** Check all rubber bushings for excessive cracking.
19. **SLIDE 19 EXPLAIN Figure 26-18** Carefully inspect bump stops for damage during visual inspection.
20. **SLIDE 20 EXPLAIN Figure 26-19** A broken spring was discovered during a routine under-vehicle visual inspection. Notice the witness marks that show that the spring coils have been hitting each other.
21. **SLIDE 21 EXPLAIN Figure 26-20** The shock absorber needs to be disconnected before removing the coil spring. Installation is the reverse of removal procedure.
22. **SLIDE 22 EXPLAIN Figure 26-21** The center bolt is used to hold the leaves of the leaf spring together. However, the hole for the center bolt also weakens the leaf spring. The crack shown is what a technician discovered when the leaf spring was removed during the diagnosis of a sagging rear suspension.
23. **SLIDE 23 EXPLAIN FIGURE 26.22** Whatever was leaking appeared to be a clear liquid but it did not smell like gasoline. What could it be from the rear of the truck?
23. **SLIDE 23 EXPLAIN FIGURE 26.23** source of the leak was discovered to be hydraulic shock fluid that had leaked

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   	from the bottom of the shock and not from around the shaft seal, which is the most likely location for shocks to leak. **DISCUSSION: Ask the students to discuss causes of leaf spring breakage other than metal fatigue, corrosion, & overloading** **DEMONSTRATION: Show the students how to use a pry bar for rear suspension servicing** **DISCUSSION: Ask the students to discuss why the tops of some rear shocks are fastened inside vehicles** **Be sure to check OEM service information before removing shock absorbers.**