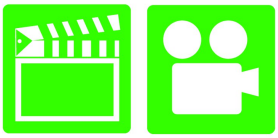
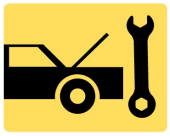
Manual Drive Train and Axles 1st Edition

Chapter 10 Drive Shafts and CV Joints Service

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of **Manual Drive Trains and Axles.** 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 the chapter learning objectives to the students. 1. Explain how to perform a U-Joint inspection. 2. List the steps necessary to replace a U-joint. 3. Explain how to perform a measurement of the working angles of a U-Joint. 4. Diagnose problems with CV joints and describe the service procedures for replacing CV joints.
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.

ICONS	Ch10 Drive Shafts and CV Joints Service
	**1. SLIDE 1 DRIVE SHAFTS & CV JOINTS SVC** 2. SLIDE 2 EXPLAIN OBJECTIVES
	**Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/** **WEB SITE IS CONSTANTLY UPDATED** **Drive Axle (41 Links)** **Drive Shaft (27 Links)**
	3. SLIDE 3 EXPLAIN Performing a U-Joint Inspection 4. SLIDE 4 EXPLAIN FIGURE 10–2 All U-joints and spline collars equipped with grease fitting should be greased 4 X a year as part of 4 regular lubrication service. 5. SLIDE 5 EXPLAIN FIGURE 10–3 Many U-joints require special grease gun tool to reach grease fittings.
	**GM SERVICE TEXT OFTEN REFERS TO DRIVESHAFT AS A "PROPELLER SHAFT."**
	**DEMONSTRATION: SHOW PROPER WAY TO GREASE A U-JOINT. EXPLAIN THAT TOO MUCH GREASE WILL OPEN OR BREAK THE SEALS, LEAVING OPENINGS WHERE DIRT AND WATER CAN ENTER THE JOINT.**
	**DISCUSSION: DISCUSS IMPORTANCE OF PERIODIC GREASING & INSPECTING OF U-JOINTS**
	**HANDS-ON-TASK: HAVE YOUR STUDENTS GREASE A U-JOINT**
	6. SLIDE 6 EXPLAIN FIGURE 10–4 Always mark the original location of U-joints before disassembly. 7. SLIDE 7 EXPLAIN FIGURE 10–5 Two types of retaining methods that are commonly used at the rear U-joint at the differential.

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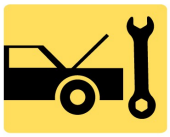
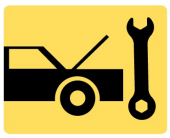
	**DISCUSSION: ASK THE STUDENTS TO DISCUSS IMPORTANCE OF MARKING U-JOINT COMPONENTS BEFORE DISASSEMBLY. ASK THE STUDENTS TO DISCUSS VARIOUS WAYS TO MARK U-JOINT ORIENTATION BEFORE DISASSEMBLY.** **WHEN CHECKING U-JOINTS IN THE VEHICLE, YOU MAY FIND IT HARD TO MOVE A WORN U-JOINT. A LITTLE PRESSURE WITH A PRYBAR CAN MAKE THE MOVEMENT MORE OBVIOUS.**
	
	8. **SLIDE 8 EXPLAIN FIGURE 10–6** The best way to check any U-joint is to remove the driveshaft from the vehicle and move each joint in all directions.
	**DEMONSTRATION: SHOW THE PROPER WAY TO REMOVE A DRIVESHAFT FROM A REAR WHEEL-DRIVE VEHICLE THAT DOESN'T CONTAIN A CENTER SUPPORT BEARING**
	**HANDS-ON-TASK: HAVE STUDENTS REMOVE A DRIVESHAFT FROM A RWD VEHICLE**
	9. **SLIDE 9 EXPLAIN** Replacing a U-Joint 10. **SLIDE 10 EXPLAIN FIGURE 10–7** Typical U-joint that uses an outside snap ring. This style of joint bolts directly to the companion flange that is attached to the pinion gear in the differential.
	**HANDS-ON-TASK: HAVE THE STUDENTS REMOVE EXTERNAL AND AN INTERNAL CLIP FROM U-JOINT**
	**IF A RETAINER CLIP IS DIFFICULT TO REMOVE, PUT PRESSURE ON JOINT TO MOVE CLIP OUT OF CONTACT WITH HOUSING.**
	**YOU CAN REMOVE NYLON RETAINERS BY CAREFULLY HEATING THE RETAINER AREA WITH TORCH. BE CAREFUL NOT TO GET BURNED BY THE SYNTHETIC MATERIAL AS IT COMES OUT**

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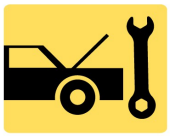
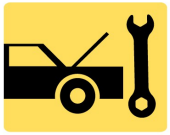
	11. **SLIDE 11 EXPLAIN FIGURE 10–8** A U-joint that is held together by nylon and usually requires that heat be applied to remove from the yoke. 12. **SLIDE 12 EXPLAIN FIGURE 10–9** Use a vise and two sockets to replace a U-joint. One socket fits over the bearing cup and the other fits on the bearing to press-fit the cups from the crosspiece. 13. **SLIDE 13 EXPLAIN FIGURE 10–10** Taping the U-joint to prevent the caps from coming off
	**DEMONSTRATION: SHOW HOW TO REMOVE A U-JOINT WITH A VISE**
	**DEMONSTRATION: SHOW HOW TO REMOVE A U-JOINT FROM A DRIVESHAFT BY USING A SPECIAL U-JOINT PRESS**
	**HANDS-ON-TASK: HAVE STUDENTS R&R A U-JOINT USING THE VISE OR PRESS METHOD**
	**WHEN REPLACING U-JOINT, GREASE ZERK FITTING SHOULD FACE THE SHAFT.**
	14. **SLIDE 14 EXPLAIN FIGURE 10–11** A special tool being used to press apart a U-joint that is retained by injected plastic. Heat from a propane torch may be necessary to soften the plastic to avoid exerting too much force on the U-joint. 15. **SLIDE 15 EXPLAIN FIGURE 10–12** Removing the worn cross from the yoke. 16. **SLIDE 16 EXPLAIN FIGURE 10–13** When installing a new U joint, position the grease fitting on the inboard side (toward the driveshaft tube) and in alignment with the grease fitting of the U-joint at the other end.
	**NOTE: PROCESS OF BALANCING A DRIVESHAFT IS NOT USED VERY MUCH TODAY BUT IT MAY HELP IN SOME VIBRATION CASES**
	**HANDS-ON-TASK HAVE STUDENTS LOCATE SERVICE INFORMATION TO BALANCE DRIVESHAFT THEN BALANCE DRIVESAFT ON A LAB VEHICLE**

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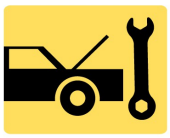
	17. **SLIDE 17 EXPLAIN** Measuring Working Angles of a U-Joint 18. **SLIDE 18 EXPLAIN FIGURE 10–15** An inclinometer with a magnetic base is being used to measure the angle of the driveshaft at the rear U-joint. 19. **SLIDE 19 EXPLAIN FIGURE 10–16** Placing a tapered metal wedge between the rear leaf spring and the rear axle pedestal to correct rear U-joint working angles.
	**DEMONSTRATION: SHOW HOW TO FIND DRIVESHAFT ANGLE.**
	**DEMONSTRATION: SHOW HOW TO USE AN INCLINOMETER TO MEASURE THE ANGLE OF DRIVESHAFT.**
	**HANDS-ON-TASK: HAVE STUDENTS PRACTICE CHECKING DRIVE SHAFT ANGLES & USE INTERNET TO RESEARCH U.S. PATENT 2,010,899**
	20. **SLIDE 2 EXPLAIN FIGURE 10–17** A transmission oil pan gasket leak allowed automatic transmission fluid (ATF) to saturate the rear transmission mount rubber, causing it to collapse. After replacing the defective mount, proper driveshaft angles were restored and the driveline vibration was corrected.
	21. **SLIDE 21 EXPLAIN** Diagnosing Problems with CV Joints and Replacing CV Joints
	22. **SLIDES 22-23 EXPLAIN** Summary