Chapter 26 Safety Belts & Airbag Systems

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class serves as an introduction to the world of automotive service. 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. 1. Prepare for ASE Electrical/Electronic Systems (A6) certification test content area "H" (Accessories Diagnosis and Repair). 2. Describe how an airbag system works. 3. List the appropriate safety precautions to be followed when working with airbag systems. 4. Explain how the passenger presence system works. 5. Discuss the purpose and function of safety belts.
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	Chapter 26 Safety Belts & Airbag Systems
	**1. SLIDE 1 CH26 SAFETY BELTS & AIRBAG SYSTEMS**
	**Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/** **WEB SITE IS UPDATED REGULARLY**
	**DEMONSTRATION: Show students different types of seat belt locking mechanisms & and how they work.**
	**2. SLIDE 2 EXPLAIN** Safety Belts **3. SLIDE 3 EXPLAIN Figure 26-1** (a) Safety belts are the primary restraint system. (b) During a collision the stretching of the safety belt slows the impact to help reduce bodily injury.
	**DISCUSSION: Discuss different types of SEAT BELTS used in automobiles. What types of retractors are used for safety belts?**
	**4. SLIDE 4 EXPLAIN Figure 26-2** Most safety belts have an inertia-type mechanism that locks the belt in the event of rapid movement
	**5. SLIDE 5 EXPLAIN Figure 26-3** typical safety belt warning light **6. SLIDE 6 EXPLAIN Figure 26-4** small explosive charge in the pretensioner forces the end of the seat belt down the tube, which removes any slack in the seat belt. **7. SLIDE 7 EXPLAIN** Safety Belts
	**DISCUSSION: Discuss advantages & and disadvantages of car with pretensioners. What safety concerns are associated with pretensioners? Discuss the dangers associated with working around seat belt pretensioners.**

ICONS	Chapter 26 Safety Belts & Airbag Systems
	**Show ANIMATION: Seat Belt Inertia Lock www.myautomotivelab.com** http://media.pearsoncmg.com/ph/chet/chet_myautomotivelab_2/animations/A7_Animation/Chapter46_Fig_46_2/index.htm
	**8. SLIDE 8 EXPLAIN** Front Airbags
	**9. SLIDE 9 EXPLAIN Figure 26-5** typical airbag system showing many of the components. SDM is the "sensing and diagnostic module" and includes the arming sensor as well as the electronics that keep checking the circuits for continuity and the capacitors that are discharged to deploy the air bags.
	10. SLIDE 10 EXPLAIN Front Airbags
	11. SLIDE 11 EXPLAIN Figure 26-6 inflator module is being removed from the airbag housing. The squib, inside the inflator module, is the heating element that ignites the pyrotechnic gas generator that rapidly produces nitrogen gas to fill the airbag
	**Airbag, Supplemental Restraint System SHOW ANIMATION** http://www.jameshalderman.com/
 	**DISCUSSION: Discuss why airbags are considered supplemental. What safety feature do they supplement?**
	**DEMONSTRATION: Show students different types of airbag inflation systems. Demonstrate & explain how to differentiate between systems**
	**12. SLIDE 12 EXPLAIN Figure 26-7** This shows a deployed side curtain airbag on a training vehicle.
	13. SLIDE 13 EXPLAIN Front Airbags
	14. SLIDE 14 EXPLAIN Figure 26-8 A sensing and diagnostic module that includes an accelerometer.
	15. SLIDE 15 EXPLAIN Front Airbags

ICONS	Chapter 26 Safety Belts & Airbag Systems
	**DISCUSSION:** discuss how airbags affect driving habits. For example, how do airbags change hand position on steering wheel?
	**DISCUSSION:** talk about using more than one impact sensor in airbag circuits. What is the squib?
	**16. SLIDE 16 EXPLAIN Figure 26-9** driver's side airbag showing two inflator connectors. One is for the lower force inflator and the other is for the higher force inflator. Either can be ignited or both at the same time if the deceleration sensor detects a severe impact.
	**DEMONSTRATION:** Show students different types of sensors & explain their operation
	**Show ANIMATION: Air Bag Impact Sensor www.myautomotivelab.com** http://media.pearsoncmg.com/ph/chet/chet_myautomotivelab_2/animations/A7_Animation/Chapter46_Fig_46_9/index.htm
	**HANDS-ON TASK:** On a Lab Vehicle, have the students locate air bag sensors and label them with masking tape
	**17. SLIDE 17 EXPLAIN Figure 26-10** The terminals used in airbag circuits are gold plated to keep them from corroding. Shorting bars are used in most airbag connectors. These spring-loaded clips short across both terminals of an airbag connector when it is disconnected to help prevent accidental deployment of the airbag

ICONS	Chapter 26 Safety Belts & Airbag Systems
	**DISCUSSION:** Discuss why gold is used in connectors found in airbag circuits. Why is it important for airbag connectors to resist corrosion? Have students explain why airbag circuits must not be serviced until a set period of time after disconnecting the battery.
	**DISCUSSION:** discuss how airbag control module performs self-test on its circuitry. What is purpose of this self-test?
	18. **SLIDE 18** EXPLAIN Airbag SELF Diagnosis 19. **SLIDE 19** EXPLAIN Occupant Detection System 20. **SLIDE 20** EXPLAIN **Figure 26-11** passenger-side airbag "on" lamp will light if a passenger is detected on the passenger seat 21. **SLIDE 21** EXPLAIN **SIDE & Side Curtain Airbags** 22. **SLIDE 22** EXPLAIN **Figure 26-12** A typical seat (side) airbag that deploys from the side of the seat
	**DEMONSTRATION:** Show students proper procedures to safely disarm airbags
	**DEMONSTRATION:** Show students how to properly handle & store non-deployed airbags.
	**Many airbag connectors have redundant locking mechanisms. Make sure to disable both locks before attempting to separate connector.**
	**Show VIDEO: 1 MINUTE Airbag Removal www.myautomotivelab.com** http://media.pearsoncmg.com/ph/chet/chet_mylabs/akamai/template/video640x480.php?title=Air%20Bag%20Removal&clip=pandc/chet/2012/automotive/Auto_Shop_Safety/Clip19AirBags1.mov&caption=chet/chet_mylabs/akamai/2012/automotive/Auto_Shop_Safety/xml/Clip19AirBags1.xml

ICONS	Chapter 26 Safety Belts & Airbag Systems
	**DEMONSTRATION:** Demonstrate & Explain all safety precautions & procedures to SAFELY DEPLOY an Air Bag
	**Airbag inflator modules can easily exceed 400°F when deployed. Let them cool before handling**
	**DISCUSSION:** Discuss why airbags must be deployed before disposal. In addition to endangering people, what other problems could be caused by disposing of airbags that have not been deployed?
	**ON-VEHICLE NATEF TASK (A6-H-6)** Disarm and enable the airbag system for vehicle service. **(P-1) Page 182**
	**DISCUSSION:** Discuss different types of seat sensors and how they work. Why is there a need to determine passenger presence?
	**DEMONSTRATION:** Show students how to decipher a blinking airbag warning light to retrieve trouble codes
	**Homework:** complete Ch26 crossword puzzle: http://www.jameshalderman.com/links/book_intro/cw/crossword_ch_26.pdf