Hybrids & Alternative Fuel Vehicles 4/E

Chapter 17 Electric and Plug-in Hybrid Electric Vehicles

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of **Hybrid and Alternative Fueled Vehicles**. 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. Identify a plug-in hybrid electric vehicle (PHEV). 2. Explain how the high-voltage batteries are recharged in a PHEV and EV vehicle. 3. Discuss range anxiety. 4. Discuss the battery capacity and range correlation of an EV. 5. Describe levels of chargers used to charge a PHEV or an EV
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 Hybrids 4th Edition
Chapter Images found on Jim's web site @
www.jameshalderman.com
LINK CHP 17: Chapter Images

ICONS	Ch17 Plug-In Hybrids
	**1. SLIDE 1 CH17 Electric and Plug-in Hybrid Electric Vehicles**
	**Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/** **WEB SITE IS CONSTANTLY UPDATED** **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**
	**2. SLIDE 2 EXPLAIN FIGURE 17-1a** about the only way to tell a plug-in Prius from a regular Prius is from the badge on the sides or **3. SLIDE 3 EXPLAIN FIGURE 17-1b** by the charge port door on the passenger side at the rear**.** **4. SLIDE 4 EXPLAIN FIGURE 17-2** A Chevrolet Volt extended range electric vehicle (EREV) is also called a plug-in hybrid electric vehicle (PHEV) being chargers at a row of charging stations at the Corvette plant in Bowling Green. KY. **5. SLIDE 5 EXPLAIN FIGURE 17-3A** Charging stations that are equipped with SAE standard J1772 chargers are often found at large companies, colleges, and malls. **6. SLIDE 6 EXPLAIN FIGURE 17-3B** After connecting charging plug, a light on top of dash turns green and dash display shows estimated time when high-voltage battery will be fully charged and the estimated current range using battery power alone.
	**EXPLAIN THREE TECH TIPS**
	**7. SLIDE 7 EXPLAIN FIGURE 17–4 SAE** J 1772 plug is used on most electric and plug-in hybrid electric vehicles and is designed to work with level 1 (110–120 volt) and level 2 (220–240 volt) charging.
	**DISCUSS FREQUENTLY ASKED QUESTION**

ICONS	Ch17 Plug-In Hybrids
	8. **SLIDE 8 EXPLAIN FIGURE 17-5A** Chevrolet Volt being charged using the supplied 100-volt charger 9. **SLIDE 9 EXPLAIN FIGURE 17-5B** always lay out the entire length of the charging cord before plugging the vehicle into the outlet. If the cord is not kept straight, the current flow can not only create a coil but the flow of current can overheat the wires and in some cases can actually cause the insulation to melt. 10. **SLIDE 10 EXPLAIN FIGURE 17-6** Nissan Leaf plugged into a charging station at a college**.**
	**DISCUSSION: HAVE STUDENTS TALK ABOUT PHEV & EHEV SYSTEMS. WHAT ARE ADVANTAGES OF EHEVS?**
	**HANDS-ON TASK: IF YOU HAVE ACCESS TO A PHEV, HAVE STUDENTS IDENTIFY THE COMPONENTS OF SYSTEM**
	11. **SLIDE 11 EXPLAIN FIGURE 17-7** Tesla uses a unique plug and also supplies adapter so the vehicle owner can plug into a SAE J1772 station or a 220-volt conventional outlet (right) or even to a conventional 110-volt outlet (left) 12. **SLIDE 12 EXPLAIN FIGURE 17-8 N**issan Leaf electric vehicle charging ports located at the front of the vehicle under a hinged door for easy access.
	**DISCUSS FREQUENTLY ASKED QUESTION**
	**HAVE STUDENTS SEARCH INTERNET TO RESEARCH PHEVS FOR SALE IN US. WHAT IS COST OF THESE VEHICLES? WHAT NEW FEATURES ARE AVAILABLE AND IS THERE ANY NEWER BATTERY TECHNOLOGY AVAILABLE? HAVE STUDENTS REPORT THEIR FINDINGS TO CLASS.**