

Automotive Technology 6th Edition

Chapter 10 Power Tools & Shop Equipment

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This Automotive Technology 6th text provides complete coverage of automotive components, operation, design, and troubleshooting. It correlates material to task lists specified by ASE and ASEEducation (NATEF) and emphasizes a problem-solving approach. Chapter features include Tech Tips, Frequently Asked Questions, Case Studies, Videos, Animations, and ASEEducation (NATEF) Task Sheets.
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 as listed: <ol style="list-style-type: none"> 1. Describe the purpose of the air compressor, and other air and electrically operated tools. 2. Compare the different types of trouble lights. 3. Describe the purpose and function of the bench/pedestal grinder and a bench vise. 4. Discuss the purpose and function of hydraulic presses, portable crane and chain hoist, and engine stands. 5. Discuss the care and maintenance of shop equipment.
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 the 6th Edition Chapter Images found on Jim's web site @ www.jameshalderman.com

DOWNLOAD Chapter 10 Chapter Images: From

<http://www.jameshalderman.com/>

[automotive_principles.html](#)NOTE: You can use Chapter Images or possibly Power Point files:

ICONS

C10 POWER TOOLS & SHOP EQUIPMENT



1. SLIDE 1 Ch 10 Power Tools & Shop Equipment

Check for **ADDITIONAL VIDEOS & ANIMATIONS**
@ <http://www.jameshalderman.com/>
WEB SITE IS CONSTANTLY UPDATED

[http://www.jameshalderman.com/
automotive_principles.html](http://www.jameshalderman.com/automotive_principles.html)

DOWNLOAD

Crossword Puzzle (Microsoft Word) (PDF)

Word Search Puzzle (Microsoft Word) (PDF)

2. **SLIDE 2 EXPLAIN** Figure 10-1 typical shop compressor. It is usually placed out of the way, yet accessible to provide for maintenance to the unit.
3. **SLIDE 3 EXPLAIN** Figure 10-2 Always use an air nozzle that is OSHA approved. The openings in the side are used to allow air to escape if the nozzle tip were to become clogged.

Shop Air VIDEO:

<http://www.youtube.com/watch?v=D5EvLuIWall>

DEMONSTRATION: Show shop's air compressor & discuss how it works. What types of power tools can be used with the air compressor? What are some other applications?

SAFETY Review safety procedures for using an air compressor & power tools associated with it. Air tools are powerful & can cause injury if not used properly

ICONS

C10 POWER TOOLS & SHOP EQUIPMENT



SAFETY Never point an air blow gun at yourself or anyone else.



NEVER use compressed air to spin a bearing or a gear to make a whistling sound



4. **SLIDE 4 EXPLAIN** Figure 10-3 1/2 in. drive impact wrench

5. **SLIDE 5 EXPLAIN** Figure 10-4 impact wrench features a variable torque setting using a rotary knob. Direction of rotation changed by pressing button

6. **SLIDE 6 EXPLAIN** Figure 10-5 typical battery-powered 3/8 in. drive impact wrench.

7. **SLIDE 7 EXPLAIN** Figure 10-6 black impact socket. Always use impact-type sockets whenever using an impact wrench to avoid the possibility of shattering the socket, which can cause personal injury.



8. **SLIDE 8 EXPLAIN** Figure 10-7 air ratchet is a very useful tool that allows fast removal and installation of fasteners, especially in areas that are difficult to reach or do not have room enough to move a hand ratchet wrench.

ICONS

C10 POWER TOOLS & SHOP EQUIPMENT



DISCUSS CASE STUDY: Case of Rusty Air Impact Wrenches: In one busy shop, it was noticed by several technicians that water was being pumped through air compressor lines and out of vents of air impact wrenches whenever they were used. It is normal for moisture in air to condense in the air storage tank of an air compressor. One of routine service procedures is to drain water from air compressor. The water had been drained regularly from air compressor at rear of the shop, but problem continued. Then someone remembered that there was a second air compressor mounted over parts department. No one could remember ever draining tank from that compressor. After that tank was drained, problem of water in lines was solved. **Summary: Complaint—Water was found in air lines in shop.**

Cause—Water was found in second Compressor above parts department.
Correction—service manager assigned a person to drain water from both compressors everyday. The water problem was solved.

DEMO

DEMONSTRATION: Show students how to use an impact wrench, and discuss its applications.



HANDS-ON TASK: Have students use an impact wrench and impact sockets to remove and replace a car's tires.

ICONS

C10 POWER TOOLS & SHOP EQUIPMENT



SAFETY Remind students they should **ALWAYS** wear eye protection when using power tools and other shop equipment.



9. **SLIDE 9 EXPLAIN** Figure 10-8 This typical die grinder surface preparation kit includes the air-operated die grinder, as well as a variety of sanding discs for smoothing surfaces or removing rust.



10. **SLIDE 10 EXPLAIN** Figure 10-9 A fluorescent trouble light operates cooler and is safer to use in the shop because it is protected against accidental breakage where gasoline or other flammable liquids would happen to come in contact with the light.



WARNING: Do not use incandescent trouble lights around gasoline or other flammable liquids. Liquids can cause bulb to break and hot filament can ignite flammable liquid.

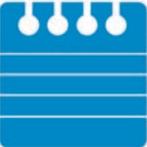
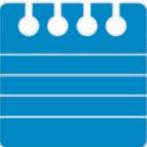


DISCUSSION: Have students talk about types of trouble lights found in shop. Why are fluorescent lights safer than incandescent lights? What are applications of various types of trouble lights?



11. **SLIDE 11 EXPLAIN** Figure 10-10 typical pedestal grinder with a wire wheel on the left side and a stone wheel on the right side. Even though this machine is equipped with guards, safety glasses or a face shield should always be worn when using a grinder or wire wheel.

ICONS	C10 POWER TOOLS & SHOP EQUIPMENT
	<p>HANDS-ON TASK: Have students use bench- or pedestal mounted grinder to clean bolt threads or sharpen a chisel. Warn students that they must wear a face shield when working with a grinder.</p>
	<p>12. SLIDE 12 EXPLAIN Figure 10-11 typical vise mounted to a workbench.</p>
	<p>DISCUSSION: Ask students to discuss how a bench vise works. What are its various uses in an automotive shop? FIGURE 10-11</p>
	<p>13. SLIDE 13 EXPLAIN Figure 10-12 hydraulic press is usually used to press bearings on and off on rear axles and transmissions</p>
	<p>Hydraulic press ANIMATION Hydraulic Press (View) (Download)</p>
	<p>DEMONSTRATION: SHOW how to use a hydraulic press, have them press bearings on & off by using a bearing splitter FIGURE 10-12</p>
	<p>HANDS-ON TASK: After showing students how to use a hydraulic press, have them press bearings on & off by using a bearing splitter FIGURE 10-12</p>

ICONS	C10 POWER TOOLS & SHOP EQUIPMENT
	<p><u>SAFETY</u> Be sure the rest and the safety shield are properly adjusted before using the bearing splitter</p>
	<p>Cover bearings with a towel or shop rag when pressing them to prevent pieces from scattering if the bearing binds or explodes</p>
	<p>14. SLIDE 14 EXPLAIN Figure 10-13 A typical portable crane used to lift and move heavy assemblies, such as engines and transmissions</p>
	<p>EXPLAIN TECH TIP: Cover Work While Pressing Whenever pressing on a bearing or other component, use an old brake drum over the shaft and the bearing. In the event the bearing shatters during the pressing operation, the brake drum will prevent the parts of the bearing from flying outward where they could cause serious personal injury.</p>
	<p>15. SLIDE 15 EXPLAIN Figure 10-14 2 engines on engine stands. The plastic bags over the engines help keep dirt from getting onto these engines and engine parts.</p>
	<p>16. SLIDE 16 EXPLAIN Figure 10-15 An engine stand that grasps the engine from the sides rather than the end.</p>
	<p>A clean shop is a safer shop and may also attract more customers.</p>

ICONS	C10 POWER TOOLS & SHOP EQUIPMENT
	<p><u>HANDS ON TASK</u> Power and Shop Equipment Safety Survey Task Sheet PG 13</p>
	<p>17. SLIDES 17-28 SETUP AND LIGHTING TORCH</p>
	<p>29. SLIDE 29-34 HEATING METAL</p>
	<p>34. SLIDE 34-40 CUTTING METAL</p>
	<p><u>HANDS ON TASK</u> Oxy-Acetylene Torch Usage Task Sheet PG 14</p>