

Time Hrs	<u>Day 1</u> Learning Tasks	Current Instructor Activities	<u>Student Essential Skills Based Activities</u>	References and Resources	Evaluation: Written Practical
2.5 1.8 2.0		<ul style="list-style-type: none"> • Chapters 1 & 2 (7:00 a.m. – 9:30 a.m.) • Chapters 3 & 4 (9:45 a.m. – 11:30 a.m.) • Chapters 5 & 6 (12:00 p.m. – 2:00 p.m.) <p><u>Assign Homework:</u> Assignments Chapters 1 & 2 Assignments Chapters 3 & 4 Assignments Chapters 5 & 6</p> <p><u>Note:</u> Course assignments were n/a for review.</p>	<p>See #1 & #2 ES Activities below and on pages 2 and 3.</p>	<ul style="list-style-type: none"> • U.A. Use and Care of Tools Manual • Various Tool Examples to Show Students • Classroom Laptops 	

ES Activities #1 and #2

Students are assigned ES Activities #1 & #2 at the beginning of Day 1: before or after the instructor reviews the main chapter concepts.

Students are given class time on Day 1 to work on these 2 ES group projects, using their U.A. *Use and Care of Tools* Manual and classroom laptops.

Existing curriculum schedules could be adjusted to include student oral presentations as follows:

- 8 student pair 2-3 minute presentations on #1 ES Assignment (Tools/Tool Companies) given on Days 4, 5, and 6 (2 per day).
- 4 student group 5-minute presentations on #2 ES Assignment (Job Site Signage) are given on Days 3, 4, 5 and 6 (1 per day).

Day 1 ES Activities continued

#1: Comparisons of Tool Companies and their Tools

Purposes:

1. to gain experience using credible piping tool/equipment websites, through online research of two companies that manufacture these tools/equipment
2. to increase knowledge about tools and specifications, by comparing a similar tool/piece of equipment made by two companies using Instructor-generated criteria
3. to gain experience arranging a professional meeting with a piping professional, for the purpose of securing information about tool or equipment quality
4. to reinforce the importance of research and industry contacts in the maintenance of current Piping information and practices.

Method: 8 Pairs of Students choose a **pair of tool companies** (e.g. Snap On and an equivalent company, etc.) from an instructor-generated list of company pairs (e.g. Snap On and an equivalent company), which can be derived from the *Acknowledgements* section of their “Use and Care of Tools” manual (pgs. ii and iii). During the next four days of lessons, 2 pairs present their findings (below) to their classmates in two ~2-3 minute oral presentations, based on their on-line research and in-person interviews with tool company representatives and/or piping trade personnel. Student pairs also provide their fellow students with this point-form and/or tabled information:

1. Company names and profile information (on-line info about company history, location, owners, # of employees, # of outlets, and # of reps, etc.)
2. Each company’s manufacturing focus, including any specialty tools
3. The use and care of one tool or piece of equipment manufactured by both companies (e.g. a specific type of electric drill, etc.)
4. Comparisons of both tools or pieces of equipment manufactured by the two companies, based on relevant specification criteria (including cost), and assessed by a credible industry resource (to be approved by the instructor)
5. Recommendation to use or purchase one or both of the tool (or equipment) choices.

All 9 Essential Skills Used:

- A: Reading Text
- B: Document Use
- C: Writing
- E: Oral Communication
- F: Thinking Skills
- G: Working with Others
- H: Computer Use
- I: Continuous Learning

Day 1 ES Activities *continued*

#2: Job Site Signage and Safety

Purposes:

1. to reinforce understanding of job site safety signage
2. to review the differences between various job site safety signage
3. to give students practice in clearly explaining job site protocols to co-workers.

Method: 4 Student teams of 4 students design job sites and draft clearly labelled drawings/schematics illustrating imaginary but realistic job site areas designated by these job site signs: **!Danger**, **!Warning**, and **!Caution**. (The size and type of job site, the numbers of each sign, and the labelling detail on the graphic can all be specified by the instructor.)

Using the whiteboard and a marker, a plastic overhead, or PowerPoint slides to illustrate their schematic(s), each team (and each member on each team) thoroughly reviews all of the job site areas on their schematic and the relevant safety signage, including the rationale for the choice and placement of each sign in context with specific hazards.

During this **realistic job-site tour**, the students on the presentation teams imagine that they are job-site supervisors, who are responsible for job site safety. Their fellow students imagine that they are either piping personnel and/or a variety of personnel representing different trades. The latter could ask questions in context with their specific roles on the job site. In addition, the instructor can ask relevant question to test/reinforce the accuracy and understanding of key safety concepts.

6 of 9 Essential Skills Used:

- A: Reading Text
- C: Writing
- E: Oral Communication
- F: Thinking Skills
- G: Working with Others
- I: Continuous Learning

Time Hrs	<u>DAY 2</u> Learning Tasks	Instructor Activities	<u>Student Essential Skills Based Activities</u>	References and Resources	Evaluation: Written Practical
2.5 1.8 2.0	<p>Review Answers to Chapters 1 – 6 Assignments (7:00 a.m. – 9:30 a.m.)</p> <p>Review Chapters 7, 8 & 9 Tools Manual (9:45 a.m. – 11:30 a.m.)</p> <ul style="list-style-type: none"> • Relate back to pgs. 25, 26 & 27 in UA Mathematics Manual (Pipe Measurements) <p>Review Chapters 10 & 11 Tools (12:00 p.m. – 2:00 p.m.)</p> <ul style="list-style-type: none"> • Relate to U.A. Math pgs. 28, 29 & 30 <p><u>Assign Homework:</u> Assignments Chapters 7 – 11 Do a refresh on Math relating to pipe measurements, using Skill Plan or U.A. Math</p>		<p>See ES Activities #3 and #4 detailed below and on pages 5 and 6</p>	<ul style="list-style-type: none"> • U.A. Use and Care of Tools Manual • U.A. Math • Tools on hand to physically involve the students • Classroom Laptops 	

ES Activities #3 and #4

Students are assigned both ES Activities (#3 & #4) at the beginning of Day 2, after the instructor begins reviewing the answers to Chapter 1-6 Assignments. Alternately, to free up more time for ES activities, the assignment answers could be posted online, or printed out for student pairs (or larger groups) to refer to, while the instructor reviews the most difficult Q/As and students check their own answers for accuracy.

Students are given class time on Day 2 to work on these two ES group projects, using their U.A. *Use and Care of Tools* Manual and classroom laptops.

ES activities #3 and #4 are completed as follows:

- Activity #3 is completed as a word-processed fact sheet that includes a set of very basic instructions.
- Activity #4 is completed during class, with students in pairs sitting back-to-back, simulating phone conversation.

3. Understanding Through Writing: Rewriting Textbook Information into a Clear and Concise Fact Sheet with Instructions

Purposes:

1. to gain experience writing instructions, by rewriting textbook information into a set of *Operating Instructions for Pipe Cutter Use and Care*
2. to reinforce various rationale, including user safety, tool accuracy, tool choices, etc. for choosing specific pipe cutters for specific situations
3. to stress the importance of reading, writing, and editing clear, concise, accurate, and thorough instructions for job site use.

Method: The writing context here is that they are leaving a set of instructions for their apprentice, who is relatively inexperienced with the use and choice of pipe cutters. Student groups (pairs, trios, or groups of 4) **read and rewrite the descriptions and instructions** on pages 109 – 112, in Chapter 10 of the U.A. “Use and Care of Tools” Manual. Using a title, headings, short sentences and paragraphs (borrowed from the textbook), and tabled information, students word process a concise, but accurate and thorough, fact sheet titled “Pipe Cutting Preparation and Choices “:

- the calculations to be done before cutting pipe (pgs. 109-110)
- the rationale for using pipe cutters instead of hacksaws (pg. 110)
- the uses of 6 pipe cutters, using the information in Figure 10-3 on pg. 111, and the text on pg. 112
- the uses of 5 different cutter wheels, using the information in Figure 10-5 on pg. 112, and the text on pg. 113
- a concise, accurate and thorough set of instructions for a one-wheel cutter, which includes any user safety, and tool care and maintenance factors.

The U.A. Tool Manual’s instructions for various tools can be used as guidelines for formatting the one-wheel cutter instructions. For example, Chapter 14 (pgs. 213-278) has many good examples of instructions, such as those for special pipe and tube tools, for a plastic pipe shut-off tool, and for plastic pipe joiners.

Alternately: Students could write instructions that are more job-site and specification-specific, for the next piping expert at the job-site or an apprentice. The course instructor could devise the specifics and also incorporate any relevant math skills.

Essential Skills Used:

- A: Reading Text
- B: Document Use
- C: Writing
- E: Oral Communication
- F: Thinking Skills
- H: Computer Use
- I: Continuous Learning

#4. Conflict Avoidance and Resolution Practice (Tool and Job Site Cleanliness)

Purposes:

- to practice verbal conflict avoidance and resolution skills, and reinforce their importance on job sites
- to reinforce the importance of job-site cleanliness, client-centered service, and tool care and maintenance.

Sample Scenario for Students: You are a site foreman on a worksite. You are currently working with other trades workers and your new apprentice at a residential job site. You are onsite to do a variety of renovations, which include radiant-heat flooring, two bathrooms, two kitchens, and a sprinkler system for the client’s rental suite. The company you work for has been slow lately; the HST and the end of the client tax break for substantial renovations haven’t helped. So this contract is very welcome! You had to leave the job site an hour early yesterday (Friday), to pick up materials to ensure an early start on Monday. You asked your new apprentice to pack up all of your tools and clean up the job site. You arrived back at the job site in time to pick up your packed tool boxes from your apprentice, but you didn’t make time to inspect the job site. It’s now Saturday, and you’ve been awakened by an early morning phone call from the client who tells you that a) your wrench and hammer were left outside at the job site, and b) the job site was left covered with debris and plumbing material packaging. You apologize and assure the client that these problems will not occur again. You immediately inspect your tools and discover that your tape was rewound in its case when it was splattered with mud; your brand new vice-grip pliers are damaged; and your hacksaw blade is broken. You’ve made point-form notes about all of these errors and the reasons why they can’t happen again. You decide to phone your apprentice on Monday morning and call him into the office.

Method: Students work in pairs, sitting back-to-back on chairs, imagining that they’re speaking on the phone. Each student practices being the piping contractor and the apprentice. The piping contractor is managing his/her anger, frustration, fear, and disappointment. S/he uses a combination of open questions (in case the apprentice is not responsible for some problems) and note-taking, to manage his/her emotions and maximize his/her listening skills. The apprentice gives justifiable/logical reasons for some of the problems, but only after overcoming some resistance to being criticized and admitting fault.

7 Essential Skills Used:

- A: Reading Text
- B: Document Use
- C: Writing
- E: Oral Communication
- F: Thinking Skills
- G: Working with Others
- I: Continuous Learning

Time	<u>Day 3</u>		<u>Student Essential Skills</u>		Evaluation:
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Essential Skills for Piping Project

Lesson Plans with Integrated Essential Skills for “Use and Care of Tools” Curriculum

Hrs	Learning Tasks	Instructor Activities	Based Activities	References and Resources	Written Practical
2.5	Answer Assignments for Chapters 7 – 11 (7:00 a.m. – 9:30 a.m.)		<p>ES Skills were not developed for Day 3 as classroom time is limited because of</p> <ol style="list-style-type: none"> Shop and classroom demonstrations of tools and equipment. Student presentations on ES Activities #1 and #2. The 12-Chapter Review, preparing students for their Exam. The need for students to study also limits their available homework time. 	<ul style="list-style-type: none"> U.A. Use and Care of Tools Manual <p>Note: Ensure that students have safety equipment</p> <ul style="list-style-type: none"> Shop Demos: Reamers and Cutters & Ridged 300-6SR Class Demonstrations 	
1.8	Chapter 12 in Tools Manual (9:45 a.m. – 11:30 a.m.) <ul style="list-style-type: none"> Students observe physical demonstrations in the shop 				
2.0	Chapter 12 in Tools Manual <i>continued</i> (12:00 p.m. – 2:00 p.m.) <ul style="list-style-type: none"> In-Class Review of Chapters 1 – 12 <p>Assign Homework:</p> <ul style="list-style-type: none"> Review Chapter 12 Tools Study for Tomorrow’s 25-Question Multiple Choice Exam 				

Time Hrs	Day 4 Learning Tasks	Instructor Activities	Student Essential Skills Based	References and Resources	Evaluation: Written Practical
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		<u>Activities</u>	
2.0	Review Answers to Chapter 12 Assignment (7:30 a.m. – 9:30 a.m.) Students Complete 25-Question Multiple Choice Exam		
1.8	Chapter 13 Tools (Tube Fabrication) (9:45 a.m. – 11:30 a.m.) <ul style="list-style-type: none"> Demonstration of Flaring and Tube Bending 	<p>See ES Activities #5 and #6 detailed below and on pages 9 and 10.</p>	<ul style="list-style-type: none"> U.A. Use and Care of Tools Manual Shop U.S. Soldering & Brazing Manual
2.0	Demonstration of Soldering Chapter 7 of U.A. Soldering and Brazing		
	<u>Assign Homework:</u> Assignments Chapter 13 Tools Assignments Chapter 7 Soldering and Brazing		
<p><u>ES Activities #5 and #6</u></p> <p><u>Activity #5:</u> Students are assigned ES Activity #5 right before they watch either (or both) procedure demonstrations. Each student is given a form/sheet with standard “Instructions” headings and blank spaces, in which they insert their point-form notes. Student group final drafts of these “Procedure Instructions” are completed and reviewed at the end of the Day 4 class. (See page 9 for more detail.)</p> <p><u>Activity #6:</u> This activity can be done in class in small groups, after the instructor reviews the sample information for the 1st of the 10 tool or pieces of equipment listed on the table. Alternately, this activity can be an individual homework assignment, which is reviewed at the beginning of the Day 5 class. One way to complete a review of the answers is to tape 9 large flip-chart sheets of paper to the classroom walls, to represent the row and columns for each of the other 9 tools or pieces of equipment. Student groups are given marking pens to fill in and add to information in each of the columns for these other 9 tools or pieces of equipment. (See page 10 for more detail.)</p>			

#5. Developing Observation and Listening Skills Through Note-Taking

Purposes:

1. To practice listening skills by taking clear, accurate and thorough notes.
2. To assist in the understanding of commonly used piping procedures.
3. To reinforce the organizational and safety aspects associated with these procedures.

Method:

1. Each student takes detailed notes on any or all the procedures demonstrated in the lab: Flaring and Tube Bending and/or Soldering and Brazing. Each student inserts point-form notes on a form/sheet that has all of the standard Instruction document headings, such as “Overview” (with its subsections), “Materials”, and “Procedure”.
2. Groups of 2-4 students check their individual point-form notes for accuracy, using their piping manuals and instructor assistance, and/or comparing their notes against sets of posted instructions for these procedures.

6 Essential Skills Used:

- A: Reading Text
- B: Document Use
- C: Writing
- E: Oral Communication
- F: Thinking Skills
- G: Working with Others

#6. Potential Short and Long-Term Effects of Tool/Equipment Misuse

Purposes:

1. to reinforce the rationale for safety practices with various tools and pieces of equipment
2. to increase student awareness of potential short and long-term consequences of unsafe practices.

Method: Students in small groups do the laptop/textbook research to complete the table described below during the Day 4 class. Then the instructor leads the class in a review of the answers, asking each group for sequential feedback, so that the same students don’t answer all of the questions.

Alternately, this can be an individual homework assignment, which the instructor reviews after all students insert and add to the answers on 9 large sheets of flip-chart paper taped to the classroom walls (see page 8).

Material: The instructor prepares a table with four columns:

1. Column #1 with 10 Tool and Equipment Names: those that can cause a variety of minor and major bodily harm when used incorrectly
2. A wider Column #2 for students to insert descriptions of specific tool or equipment misuse, which may also include faulty maintenance
3. Column #3 for students to insert very specific examples of possible immediate bodily harm requiring first aid (e.g. various injuries, shock, stroke, death, burns, loss of finger(s), etc.)
4. Column #4 for students to insert possible cosmetic, medical, and/or financial complications resulting from this bodily harm (e.g. scarring from burns and/or surgery, loss of eyesight, infections that are hard to treat with antibiotics, lost days of work, etc.).

The instructor fills in one row of detailed point-form information in all of the columns for one tool or piece of equipment (e.g. electric drills), to model the detail level expectations for the students.

7 Essential Skills Used:

- A: Reading Text
- B: Document Use
- C: Writing
- E: Oral Communication
- F: Thinking Skills
- G: Working with Others
- H: Computer Use
- I: Continuous Learning

Time Hrs	Day 5 Learning Tasks	Instructor Activities	Student Essential Skills Based Activities	References and Resources	Evaluation: Written Practical
2.5	<p>Homework Assignment Reviews (7:00 a.m. – 9:30 a.m.)</p> <ul style="list-style-type: none"> Review answers for Chapter 13 Tools Review answers for Chapter 7 Soldering and Brazing 		<p>See ES Activities #7 detailed below and on page 12.</p>	<p>Note: Student Safety Shoes and Glasses for Shop Demos</p> <ul style="list-style-type: none"> U.A. Use and Care of Tools Manual Shop Shop Classroom Laptops 	
1.8	<p>Chapter 14: Special Pipe and Tube Tools (9:45 a.m. – 11:30 a.m.)</p> <ul style="list-style-type: none"> Shop Demonstration of Roll Grooving Machine 				
2.0	<p>Shop Demonstration of T. Drill</p> <p><u>Assign Homework:</u></p> <ul style="list-style-type: none"> Chapter 14 Assignments (and Chapters 15 and 16?) 				
<p style="text-align: center;"><u>ES Activity #7</u></p> <p>ES Activity #17 replaces the 1.8 hours of classroom work on Chapter 17 on Day 6. To free up more time for this activity, the assignment answers for Chapters 13 and 7 (reviewed on Day 5) and for Chapters 14, 15 and 16 (reviewed on Day 6) could be posted online, or printed out for student pairs (or larger groups) to check their answers against. Alternately, the instructor could review the most difficult questions and answers with the students.</p> <p>Students are assigned ES Activity #7 on Day 5, and they complete most of their “Station Work” research during the Day 5 class. Any remaining research can be assigned for homework. Approximately 30 minutes of “Station Work” preparation time is given between 9:15 and 9:45 a.m. on Day 6.</p>					

#7: Curriculum Coverage of Chapter 17, Miscellaneous Tools and Equipment

Purposes:

1. to ensure curriculum coverage of (for example) all of the miscellaneous tools and equipment described in Chapter 17
2. to fully engage students in being more responsible for their own learning and that of others, such as apprentices.

Method: “Station Work” based on a class size of 16 students. Five “Expert” Groups of 2, 3 or 4 students research these topics:

- **Group 1 (3 students):** hand snips and shears, rivet tools, bolt cutters, & ripping and prying bars
- **Group 2 (2 students):** grinders
- **Group 3 (4 students):** powder actuated fastening tools
- **Group 4 (3 students):** pipe plugs & hydrostatic test pumps
- **Group 5 (4 students):** drain cleaning equipment

In 5 different “Station” areas of the classroom, expert groups present their information in oral and visual form: using spoken descriptions and explanations, and point form handouts, drawings, photos, props (e.g. borrowed tools or equipment), laptop PowerPoint presentations, and/or posters, etc.

Using an equitable rotation basis, one or more students from each expert group provide the information at their specific station, while the other(s) in their group join their peers to learn from the other student experts at the other 5 stations. While students are visiting each station, they record answers on an instructor-generated assignment question sheet. The instructor has distributed this question sheet before the day of the Station Work, to help students determine the technical content and detail at their stations, and to reinforce specific numeracy (e.g. Imperial to metric conversions) and fact finding skills.

All 9 Essential Skills Used:

- A: Reading Text
- B: Document Use
- C: Writing
- D: Numeracy
- E: Oral Communication
- F: Thinking Skills
- G: Working with Others
- H: Computer Use
- I: Continuous Learning

Time Hrs	Day 6 Learning Tasks	Instructor Activities	Student Essential Skills Based Activities	References and Resources	Evaluation: Written Practical
2.5 1.8 2.0	<p>Homework Assignment Reviews (7:00 a.m. – 9:30 a.m.)</p> <ul style="list-style-type: none"> Review answers for Chapter 14, 15 and 16 (?) Tools <p>Group “Station Work” Preparation</p> <p>“Station Work” for Chapter 17 Tools (9:45 a.m. – 11:30 a.m.)</p> <ul style="list-style-type: none"> Shop Demonstration of different Drain Cleaning Equipment (could supplement or be part of Group 5’s “Station Work”) <p>Chapter 18 Tools (12:00 p.m. – 2:00 p.m.)</p> <p>Assign Homework:</p> <ul style="list-style-type: none"> Chapter 17 & 18 Assignments 		<p>See ES “Station Work” Activity #7, which was assigned on Day 5 (described on pages 11 and 12).</p> <p>See ES Activity #8 detailed below and on page 14.</p>	<p>Note: Ensure Students have Proper P.P.S.</p> <ul style="list-style-type: none"> U.A. Use and Care of Tools Manual Shop (?) Classroom Laptops 	
<p style="text-align: center;"><u>ES Activity #8</u></p> <p>ES Activity #18 can be adapted to reinforce any safety practices with ladders, scaffolds and hoists. However, it was assumed that the Rigging course presents specific information on Rigging and Hoisting Equipment. Therefore, Activity #18 was designed for ladder use and safety.</p> <p>Students are assigned ES Activity #8 on Day 6, and they complete the</p> <ol style="list-style-type: none"> Verbal component on Day 6. Follow-up written component as homework. 					

Day 6 ES Activity #8 continued

#8: Verbal and Written Requests for Equipment Upgrade

Purposes:

1. to reinforce ladder types and choices, and relevant safety rules
2. to practice clear, accurate requests for equipment upgrades on jobsites.

Scenario: The instructor designs/writes a realistic scenario for two jobsite injuries caused by specific ladders (specific types) that need to be replaced. So far, the injuries have been minor. This scenario also specifies exactly what the job site is and what ladders are used for on this job site. The job site piping supervisor must relay all of the specific information (in the scenario) verbally (in person or on the phone) to the general site foreman or contractor. The piping supervisor must also clearly request the immediate replacement of the old ladders with new ladders: specific type(s) made by specific manufacturer(s). At the end of the conversation, the general site foreman (or general contractor) asks the piping supervisor to forward him/her an e-mail, which reminds him/her of all of the details in their conversation: information about the old ladders, the two injuries, and the request for new ladders, including recommendations for specific type(s) based on comparisons of manufacturer specifications.

Note: To save time, the instructor can limit student research to specific ladder types and manufacturers.

Method:

1. Students (in groups of 4) research appropriate ladder recommendations, using the information in Chapter 18 (pgs. 365-368) and online.
2. Students work in pairs, taking turns to complete the verbal conversation component of this activity.
3. Students work in their groups again, to complete the written e-mail component of this activity.

All 9 Essential Skills Used:

- A: Reading Text
- B: Document Use
- C: Writing
- D: Numeracy
- E: Oral Communication
- F: Thinking Skills
- G: Working with Others
- H: Computer Use
- I: Continuous Learning

