

Essential Skills for Piping Project

Lesson Plans with Integrated Essential Skills for “Sprinkler Level 1” Curriculum

Time Hrs	<u>Day 1</u> Learning Tasks	Instructor Activities	Student Essential Skills Based Activities	References and Resources	Evaluation: Written Practical
1.5		Test on previous days topic (Rigging)		Instructor generated test	Mark in class
4.5	Explain & demonstrate pump theory & operation as per ITA items 1-15, pg 34-36	1) Explain pump theories, including <ul style="list-style-type: none"> • Pascals’s Law • Boyle’s Law • Charles Law • Bernouli’s theorem 	1) 4 Groups of 4 Students are each assigned one of the laws or the theorem. They collectively <ul style="list-style-type: none"> • make, review, and check their notes for accuracy, using the glossary and appendix • explain (verbally, to the class) what their understanding is (of the law or theorem), using a graphic (white board or overhead) and learning from any instructor feedback • describe one scenario with a faulty pipe and/or serious environmental factors, in context with the law or theorem they are assigned, and any possible relevant plumbing problems (e.g. with pipe and/or its content’s pressure, flow, and/or volume) or safety concerns. <p>6 of 9 Essential Skills Used:</p> <ul style="list-style-type: none"> • A: Reading Text • B: Document Use • C: Writing • E: Oral Communication • F: Thinking Skills • G: Working with Others 	<ul style="list-style-type: none"> • Handout the Glossary c/w Appendix to allow students to mark up as needed • Handout Intro to pumps 	

Time Hrs	<u>DAY 2</u> Learning Tasks	Instructor Activities	Student Essential Skills Based Activities	References and Resources	Evaluation: Written Practical
6.0		4) Describe the basic differences between positive displacement pumps in terms of - gear, lobe, crescent (internal gear), vane (balanced, unbalanced), piston, screw Assist students in their directed research of PDPs	<p style="text-align: center;"><u>Previously Done as Homework &/or with Laptops In-Class</u></p> 4) 4 Groups of 4 Students are assigned the task of researching different types of positive displacement pumps (PDPs) used for equipment or machinery in 4 different industry contexts (e.g. Medical Lab or Hospital; Oil & Gas; Waste Management; etc.) Websites such as Global Spec (The Engineering Search Engine) can be used for finding specific information to record on the assignment sheet: <ul style="list-style-type: none"> • Cite 5 examples of industry equipment and machines that use specific types of PDPs. • State what these 5 types of equipment or machines are used for in that industry. • Compare 3 PDPs from 3 different manufacturers (e.g. Omega Eng. PDP versus others), using relevant criteria and online specifications. These 3 PDPs must be used for similar industry equipment/machines. Student groups give a brief (1-2 minute) presentation to the class. <p>7 of 9 Essential Skills Used:</p> <ul style="list-style-type: none"> • A: Reading Text • B: Document Use • C: Writing • E: Oral Communication • F: Thinking Skills • G: Working with Others • H: Computer Use 	Read through Ch 3, and Handout Ch 3, then do Assignment 1	Mark in class

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	<p>DAY 2 <i>continued</i></p>	<p>5) Explain the piping procedures for the suction & discharge piping for a pump</p> <p>6) Describe &/or explain the limits (length of pipe & number of fittings) to suction piping</p> <p>7) Describe the minimum sizes for suction & discharge pump connections</p> <p>8) Describe the acceptable pipe size reductions used on the suction line</p> <p>9) Explain the use of a foot valve</p> <p>10) Explain the need for priming, & the priming lines to a pump</p> <p>11) Describe the use of the following: relief valves, air vents, isolating valves, suction strainers, discharge strainers, filters (full flow, and percentage flow.</p>	<p><i>Note: Students could begin the Essential Skills Activity described on Day 3 in this class on Day 2.</i></p>	<p>Read through Ch 4 and handout Ch 4, then Assignments 1, 2 & 3</p>	<p>Mark in class</p>
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	<p>DAY 2 <i>continued</i></p>	<p>12) Explain the term vacuum as it relates to pumps</p> <p>13) Describe how a vacuum is measured</p> <p>14) Explain how a vacuum pump creates a vacuum</p> <p>15) Describe the methods for piping up a vacuum pump</p> <p>• Homework: Study for pumps test.</p>	<p><u>Previously Done as Homework &/or with Laptops In-Class</u></p> <p>15) Students work in pairs or trios to complete the tasks associated with the following scenario: They are half-way through the installation of the piping for a vacuum pump system at a specific job site, when they get a call that they’ll be transferred to an emergency plumbing situation and another plumber will be completing the installation they began. Students complete these tasks:</p> <p>a) Imagine a realistic job site with a real vacuum pump system that fits with this job site.</p> <p>b) Research an appropriate vacuum pump system using, for example, a credible website such as that for Dekker Vacuum Technologies Inc. >www.dekkervacuum.com<, which has relevant installation, operation, and maintenance (IOM) manuals.</p> <p>c) Write a message to the plumber who will be taking over the vacuum pump installation, telling him/her what has been done.</p> <p>d) Include a set of clear step-by-step instructions, showing the plumber what has been done and what work is left to do.</p> <p>7 of 9 Essential Skills Used:</p> <ul style="list-style-type: none"> • A: Reading Text • B: Document Use • C: Writing • E: Oral Communication • F: Thinking Skills • G: Working with Others • H: Computer Use 	
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Time Hrs	<u>Day 3</u> Learning Tasks	Instructor Activities	Student Essential Skills Based Activities	References and Resources	Evaluation: Written Practical
2.0		Test on previous days objective		Instructor generated test	Mark in class
4.0	Demonstrate the basic knowledge of automatic sprinklers & systems as per ITA items 1-11, pg. 15 & 16	<ol style="list-style-type: none"> 1) Explain the need for sprinkler systems 2) Describe some of the early sprinkler systems 3) Identify when & by whom these early systems were invented 4) Explain &/or describe the life safety aspects of sprinkler systems 5) Explain how property damage can be kept to a minimum & direct savings realized through the use of sprinkler systems 6) Describe the indirect savings realized due to the shorter or no work stoppage due to fire damage 7) Describe the installation of sprinkler systems in commercial situations including shopping centres & warehouses 	<p>4), 5), 6) and 7)</p> <p><u>Scenario:</u> Students imagine they are helping their company put together a bid, which specializes in the installation of sprinkler systems for large warehouses and manufacturing plants. They imagine a name for their business, and imagine that they are drafting a brief letter or flyer to promote their sprinkler systems to a new plywood remanufacturing (ReMan) plant in Langley. This ReMan plant is scheduled for construction, beginning in four months. In their letter or brochure, the writers stress the many advantages of installing a sprinkler system, and also include their basic process, timeline, and costs. The Sprinkler Level 1 Instructor could add details to this scenario, such as the size of the ReMan plant, the type of sprinkler system, cost info, etc.</p> <p>4 Essential Skills Used:</p> <ul style="list-style-type: none"> • B: Document Use • C: Writing • F: Thinking Skills • G: Working with Others 	<p>Handout SPF 05 Handout Intro to Fire Protection</p> <ul style="list-style-type: none"> • Ch 1 & 2 • Ch 2 above • Ch 2 above • Ch 3 • Ch 3 above • Ch 3 above • Ch 4 	<p>Students to go through on their own time</p> <p>Complete questions on lesson 1 & 2 Mark in class</p> <p>Complete questions on lesson 3 Mark in class Complete questions on lesson 4 Mark in class</p>

	<p>DAY 3 <i>continued</i></p>	<p>8) Describe &/or review employee responsibilities including</p> <ul style="list-style-type: none"> a) appearance b) punctuality c) hard work d) interest in continuing to learn about the trade 	<p>8) <u>Conflict Resolution Skills</u>: Students work in pairs, sitting in chairs across from each other at a desk. They each choose a piece of paper with either an “A” or “B” on it. They turn these papers over and very quietly read either scenario A or B, being careful not to show their scenarios to each other.</p> <p><u>Scenario</u>: Person A has been arriving at work 20 minutes late several days the past month. She or he has excellent reasons for this (described in detail on the scenario) but hasn’t shared these with anyone. Person B, the boss, is baffled about A’s behaviour, because A has been a conscientious and punctual employee for at least a decade. Person A is angry, upset, and defensive—very worried about personal situations, and why she or he has been called into B’s office. Person B, the boss, uses a series of open, non-accusatory, curious, concerned questions to get Person A to calm down and share the source of the problem. (This is just a brief outline of what would be on the A and B scenarios.)</p> <p>Once the students have read the scenarios and had time to get into their “roles”, they have a conflict resolution meeting no shorter than 5 to 7 minutes long. A is quiet, but very upset and defensive. B is patient, respectfully probing with open questions, and carefully avoiding directly asking any “why” questions, which often increase defensiveness.</p> <p>4 Essential Skills Used:</p> <ul style="list-style-type: none"> • A: Reading Text • E: Oral Communication • F: Thinking Skills • G: Working with Others 	<ul style="list-style-type: none"> • Discussion with students making suggestions for instructor generated forms for a, b, c and d. 	
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<p>6.0</p>	<p>DAY 3 <i>continued</i></p>	<p>9) Describe &/or review employer responsibilities including provision of adequate training and a safe working environment</p> <p>10) Describe and review the safe handling of</p> <ul style="list-style-type: none"> • Hand tools • Power tools • Power actuated tools <p>11) Describe the safe erection and dismantling of permanent and rolling scaffolding.</p> <p>Homework: SPF lessons 6, 7 & 8</p>	<p><u>Note:</u> The following two activities could be divided up between all five days of lessons, with 2 or more presentations on each day.</p> <p>I. Students work in small groups to research and find two upcoming professional development opportunities related to the plumbing trade. They persuasively present the details (using one or more well-designed overhead) on these two conferences or seminars (etc) to their classmates.</p> <p style="text-align: center;">&</p> <p>II. Student groups give oral presentations on new innovations, specifically in piping, based on their research of the archived articles in the online Plumbing + HVAC magazine . Published articles with problems and solutions, such as “Low Sulphur Fuels Causing Oil Pump Failures”, “Constant Hot Water”, and “Earthquake Zone Piping” may be appropriate to encourage creativity and problem-solving skills.</p> <p>6 Essential Skills Used in Both Activities:</p> <ul style="list-style-type: none"> • A: Reading Text • C: Writing • E: Oral Communication • G: Working with Others • H: Computer Use • I: Continuous Learning 	<ul style="list-style-type: none"> • Apprentices are indentured to the PIAB/Union as far as training -previously covered Day 1 • Covered in “the use of work related tools” • Covered in “knowledge of general safety” • SPF 05 	
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Time Hrs	<u>DAY 4</u> Learning Tasks	Instructor Activities	Student Essential Skills Based Activities	References and Resources	Evaluation: Written Practical
2.0		Mark homework in class		<ul style="list-style-type: none"> SPF 05 	<ul style="list-style-type: none"> Lessons 6, 7 & 8
1.0	Demonstrate the basic knowledge of automatic sprinklers & systems as per ITA items 12-16, pg 16 & 17	<p>12) Describe and review the safe use and handling of</p> <ol style="list-style-type: none"> <u>ladders</u> barrier ropes <u>planking</u> <u>shoring</u> safety signs <p>13) Describe the safe operation of</p> <ul style="list-style-type: none"> <u>scissor lifts</u> <u>man lifts</u> <u>chain falls</u> turfurs <p>14) Describe &/or review the need for proper safety apparel such as</p> <ul style="list-style-type: none"> gloves goggles or shields head gear footwear rainwear noise protection <p>15) Describe the requirements of personal & working cleanliness</p>	<p><u>Station Work (2 hours)</u></p> <p>For 12 through 16 (on the next page), this “Expert Station Work” activity can assist the instructor and students in the review of curriculum, and increase retention of safety rationale. Some research for this activity can be assigned as homework prior to the activity.</p> <p>Students are divided into 4 groups of 4 students. Each group uses a variety of resources (textbooks, handouts, poster boards, laptops, the internet, instructor resources, etc.) to present the information in the subject areas (12, 13/14, 15, and 16 in the column to the left. Students are given one hour to prepare their expert “station” areas in the classroom. They may be given guidelines from their instructor, to ensure that specific curriculum is accurately and thoroughly covered.</p> <p>While 2 or 3 students remain at their specific group’s station, to present and explain concepts to other students, the other student(s) join others moving from station-to-station. All students have a sheet of instructor-generated questions, which they answer while they’re listening to the experts at each station. Questions focus on the “what, when and why” of safety procedures and regulations.</p> <p>Concurrently, the instructor is gathering information at each station, noting what has been covered, and what may need to be corrected or reviewed in the general instructor-led debriefing at the end of this activity.</p>	<ul style="list-style-type: none"> As follows: <ol style="list-style-type: none"> covered in “Safety” covered in UA Safety <u>safe use</u> <u>safe use</u> <u>fx, fh, 1st aid, tape, keep out</u> covered in “Safety” covered in “Safety” covered in “Safety” 	

Time Hrs	<u>DAY 5</u> Learning Tasks	Instructor Activities	Student Essential Skills Based Activities	References and Resources	Evaluation: Written Practical
.5 2.0 1.0	Students to review/study	<ul style="list-style-type: none"> Be available for questions Test on previous objective (automatic sprinklers) Test on SPF05 (auto spr) 	<p>Note: Day 5 is a study and review day to help prepare students for their midterm. Therefore, no ES activities beyond those currently in place (see below) were developed.</p> <p>ES Activities currently in place:</p> <ul style="list-style-type: none"> Students to mark tests & discuss questions & answers as a class discussion 	<ul style="list-style-type: none"> Instructor generated test Instructor generated test SPF 05, Chapters 1, 2, 3, 4, 6, 7, 8, 9, 10 & 11 	<p>Mark in class</p> <p>Mark in class</p>
2.5	Review for Midterm	<ul style="list-style-type: none"> To review all objectives to date for Midterm using previous verbal questions for group answering activity 			
	Assign homework	Homework: students to study for Midterm test			
6.0					