Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA100 - DEMONSTRATE PERSONAL SAFETY IN THE TRAINING LAB

Unit Number: PA100

Dates: Spring 2016 **Hours:** 60.00

Last Edited By: Plumbing (05-10-2016)

Unit Description/Objectives:

Student will know and be able to identify the responsibilities and personal characteristics of a professional crafts person, explain the role that safety plays in the construction crafts, describe what job-site safety means, explain the appropriate safety precautions around common job-site hazards, and demonstrate the use and care of appropriate personal protective equipment.

Tasks:

PA101 - Demonstrate and follow rules for fire safety.

PA102 - Demonstrate and follow rules for housekeeping safety.

PA103 - Demonstrate and follow shop rules.

PA104 - Demonstrate and follow rules for material handling safety.

PA105 - Demonstrate and follow rules for eye protection.

PA106 - Demonstrate and follow rules for hearing protection.

PA107 - Demonstrate and follow rules for respiratory protection.

PA108 - Demonstrate and follow rules for hand tool safety.

PA109 - Demonstrate and follow rules for power equipment safety.

PA110 - Demonstrate and follow rules for portable electric hand tool safety.

PA111 - Demonstrate and follow rules for SDS Safety.

PA112 - Demonstrate and follow safety rules as they relate to E.C.P. (Exposure Control Procedures: blood borne pathogens, etc.).

PA113 - Demonstrate knowledge of the Occupational Safety Health Act (OSHA) and state its purposes.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices.
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job.

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material.
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Identify the responsibilities and personal characteristics of a professional crafts person
Explain the role that safety plays in the construction crafts
Describe what job-site safety means
Explain the appropriate safety precautions around common job-site hazards
Demonstrate the use and care of appropriate personal protective equipment
Follow safe procedures for lifting heavy objects
Describe safe behavior on and around ladders and scaffolds
Explain the importance of the Haz-Com requirement and MSDS's
Describe fire prevention and fire-fighting techniques
Define safe work procedures around electrical hazards

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)

Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012

National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012

National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada.
SIMUGAS ® Gas Furnace Simulator Information
SIMUOIL ® Oil Furnace Simulator Information
SIMUHYDRO ® Hot Water Boiler Simulator

Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe
Copper
CPVC
PVC
Pex
Arc
Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Saw blade set

Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers
Assorted wrenches
Levels
Ref. Gages
Robin air charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Presto lite Torch
1" snake

1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA200 - RESERVED

Unit Number: PA200

Dates: Spring 2016 **Hours:** 30.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to explain the importance of the Occupational Safety and Health Administration and explain the purpose of the Environmental Protection Agency and its effect on employees in the workplace.

Tasks:

PA201 - RESERVED

PA202 - RESERVED

PA203 - RESERVED

Instructional Activities:

Knowledge:

Participate in co-operative group discussions
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Discuss provisions, inspections and citations of OSHA.
Demonstrate compliance to EPA regulations for handling refrigerants.
Describe the common unsafe acts and unsafe conditions that cause accidents
Describe how to handle unsafe acts and unsafe conditions
Explain how the cost of accidents and illnesses affects everyone on site
Demonstrate the use and care of appropriate personal protection equipment
Identify job-site hazardous work specific to plumbers
Demonstrate the proper use of ladders
Demonstrate how to maintain power tools safely
Explain how to work safely in and around a trench
Describe and demonstrate the lockout/tagout process

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Safety:

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times.

Assessment:

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

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SIMUOIL ® Oil Furnace Simulator Information
SIMUHYDRO ® Hot Water Boiler Simulator

Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe	Duct board tools	1" snake
Copper	Nitrogen Regulator	1/4 elect. snake
CPVC	Charging scale	Wire casing rip.
PVC	Recovery tanks	1/8" to 2" cutter
Pex	Digital thermometer	Shop Vac
Arc	Amprobe	Oilers
Tig	Multi-meter	Clamps
Oxy-Acetylene	Mini- stripers	Grease gun
Brazing	Assorted benders	Lead Ladels
Soldering	Drill bit kit	Wire strippers
Electrical components	Strikers	Cats paw
Electrical Meters	Insp. Mirror	Elec. Hammer Drill
Freons	Chisel	Sawzall
Refrigeration Components	Assorted hammers	Solder gun
Refrigeration Test Equipment	Assorted pliers	Putty Knives
Refrigeration Appliances	Assorted wrenches	Aviation Snips
Heating Components	Levels	Assorted cutters
Heating Test equipment	Ref. Gauges	16' Tape Measures
Heating Appliances	Robinair charging station	Burring Reamers
Fuels	Efficiency test	Soil Pipe Assembly tool
OZ Recovery	Angle Drill	Tri-Squares
Turbo Tips	Hole Hawg	Squares
Assorted NPT Taps	Enviro-tech	Crow Bars
Assorted Screw drivers	Vacuum pump	Closet auger
Flashlights	Hand grinder	1/2" Breaker Bar
Allen key set	Assorted saws	1/2" Snap-On Ratchet
Thermistor vacuum gauge	Picks	1/2"x 10" extension
Electronic leak detector	Shovels	1/2" x 5" extension
Compressor Analyzer	Rakes	Assorted deep well
Sawblade set	Prestolite Torch	Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA300 - READ BLUEPRINTS AND SKETCHING OF PIPE SYSTEMS

Unit Number: PA300

Dates: Spring 2016 **Hours:** 60.00

Last Edited By: Plumbing (05-10-2016)

Unit Description/Objectives:

Student will know and be able to recognize and identify basic blueprint terms, components, and symbols; relate information on blueprints to actual locations on the print; recognize different classifications of drawings; and interpret and use drawing dimensions.

Tasks:

PA301 - Identify types of drawings.

PA302 - Identify the various lines used on drawings.

PA303 - Interpret specifications, and dimensions.

PA304 - Identify the three basic views of a drawing.

PA305 - Identify piping systems according to color-coding.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Recognize and identify basic blueprint terms, components, and symbols
Relate information on blueprints to actual locations on the print
Recognize different classifications of drawings
Interpret and use drawing dimensions
Identify pictorial (isometric and oblique) schematic, and orthographic drawings, and discuss how different views are used to depict information about objects
Identify the basic symbols used in schematic drawings of pipe assemblies
Explain the types of drawings that may be included in a set of plumbing drawings and the relationship among the different drawings
Interpret plumbing-related information from a set of plumbing drawings
Discuss how code requirements apply to certain drawings.

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations

Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed areas

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable

Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)

Practical tasks include related theory testing applicable to the task and will be graded

Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

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SIMUGAS ® Gas Furnace Simulator Information
SIMUOIL ® Oil Furnace Simulator Information
SIMUHYDRO ® Hot Water Boiler Simulator

Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe
Copper
CPVC
PVC
Pex
Arc
Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers

Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers
Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA400 - DEMONSTRATE KNOWLEDGE OF PIPE SPECIFICATIONS AND SYSTEMS

Unit Number: PA400

Dates: Spring 2016 **Hours:** 80.00

Last Edited By: Plumbing (05-10-2016)

Unit Description/Objectives:

Student will know and be able to identify the common types of materials and schedules; identify the common types of fittings and valves; identify and determine the kinds of hangers and supports; and demonstrate the ability to properly measure, cut, and join piping.

Tasks:

PA401 - Identify pipe and connections according to specification.

PA402 - Demonstrate knowledge of plumbing standards, codes and specifications.

PA403 - Read and interpret plumbing specifications.

PA404 - RESERVED

PA405 - Explain the effects and corrective measures for thermal expansion in piping system.

PA406 - Explain types and applications of pipe insulation.

PA407 - Identify various metals and specification process used in the plumbing and heating industry.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key

terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Identify the common types of materials and schedules of piping
Identify the common types of fittings and valves used with piping
Identify and determine the kinds of hangers and supports needed
Demonstrate the ability to properly measure, cut, and join piping

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities

Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations

Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed areas

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable

Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)

Practical tasks include related theory testing applicable to the task and will be graded

Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012

National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012

National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada.
SIMUGAS ® Gas Furnace Simulator Information
SIMUOIL ® Oil Furnace Simulator Information
SIMUHYDRO ® Hot Water Boiler Simulator

Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe
Copper
CPVC
PVC
Pex
Arc
Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers

Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA500 - DEMONSTRATE USE OF HAND AND POWER TOOLS

Unit Number: PA500

Dates: Spring 2016 **Hours:** 20.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to identify the basic hand and power tools used in the plumbing trade, demonstrate the proper maintenance procedures to be used for hand and power tools, and explain safety as it applies to plumbing tools.

Tasks:

PA501 - Identify basic hand tools, state their uses, and use them in the trade.

PA502 - Identify, safely use, and maintain power tools.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

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Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

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RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Identify the basic hand and power tools used in the plumbing trade
Demonstrate the proper maintenance procedures to be used for hand and power tools
Explain safety as it applies to plumbing tools
Demonstrate the proper use of plumbing tools
Demonstrate the ability to know when and how to select the proper tool(s) for tasks
Describe the safety requirements for using plumbing tools

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
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Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations

Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed areas

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable

Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)

Practical tasks include related theory testing applicable to the task and will be graded

Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

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SIMUOIL ® Oil Furnace Simulator Information
SIMUHYDRO ® Hot Water Boiler Simulator

Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe
Copper
CPVC
PVC
Pex
Arc
Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe

Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers
Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.

1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA600 - IDENTIFY AND INSTALL VALVES

Unit Number: PA600

Dates: Spring 2016 **Hours:** 70.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:
Student will know and be able to identify the basic types of valves, describe the differences in pressure ratings for valves, and demonstrate the ability to service various types of valves.

Tasks:

PA601 - Identify usage and installation of backflow prevention devices

PA602 - Identify and install types of valves that start and stop flow.

PA603 - Identify and install types of valves that regulate flow.

PA604 - Identify valves that relieve pressure.

PA605 - Explain the factors that influence valve selection.

PA606 - Disassemble and assemble various types of valves (such as gate valve, globe valve, and flush valve)

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

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Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

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Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

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Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

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Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

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Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Identify the basic types of valves
Describe the differences in pressure ratings for valves

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling

Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012

National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012

National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada.
SIMUGAS ® Gas Furnace Simulator Information
SIMUOIL ® Oil Furnace Simulator Information
SIMUHYDRO ® Hot Water Boiler Simulator

Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe
Copper
CPVC
PVC
Pex
Arc
Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers
Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA700 - DEMONSTRATE SKILL IN WORKII

Unit Number: PA700

Dates: Spring 2016 **Hours:** 40.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to identify the common types of materials and schedules used with copper piping; identify the common types of fittings and valves used with copper piping; identify the techniques used in hanging and supporting copper piping; and demonstrate the ability to properly measure, ream, cut, and join copper piping.

Tasks:

PA701 - Demonstrate skills in joining, cutting and bending various types of copper pipe tubing:

solder, compression, flare, swage, press fit.

PA702 - Demonstrate skills in compression flaring, swaging and press fitting copper pipe.

PA703 - Prepare and braze a joint.

PA704 - Perform tests on soldered and brazed joints according to plumbing code.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to properly measure, ream, cut, and join copper piping
Identify the types of materials and schedules used with copper piping
Identify the material properties, storage, and handling requirements of copper piping
Identify the types of fittings and valves used with copper piping
Identify the hazards and safety precautions associated with copper piping

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes

Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

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SIMUOIL ® Oil Furnace Simulator Information
SIMUHYDRO ® Hot Water Boiler Simulator

Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe
Copper
CPVC
PVC
Pex
Arc
Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers
Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzaw
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA800 - DEMONSTRATE SKILL IN VARIOUS TYPES OF PLASTIC PIPE AND TUBING

Unit Number: PA800

Dates: Spring 2016 **Hours:** 44.00

Last Edited By: Plumbing (05-10-2016)

Unit Description/Objectives:

Student will know and be able to identify the common types of materials and schedules of plastic piping; identify the common types of fittings and valves used with plastic piping; and demonstrate the ability to properly measure, cut, and join plastic piping.

Tasks:

PA801 - Measure, cut and assemble PVC, CPVC, and ABS.

PA802 - Measure, cut and assemble PEX plastic tubing and PE and HDPE.

PA803 - Fabricate a crimp joint connection.

PA804 - Fabricate a tubing type joint.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12

Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12

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Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

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Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to properly measure, cut, and join plastic piping
Follow basic safety precautions for the installation, operation, and maintenance of plastic tubing
Identify types of materials and schedules of plastic piping
Identify proper and improper applications of plastic piping
Identify types of fittings and valves used with plastic piping
Identify and determine the kinds of hangers and supports needed for plastic piping
Identify the various techniques used in hanging and supporting plastic piping
Explain proper procedures for handling, storage and protection of plastic pipes

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
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Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
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Highly Structured Classroom
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Limited, Short Directions
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Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
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Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing

Testing - Allow Dictation of Lengthy Answers
Time out
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Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations

Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed areas

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable

Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)

Practical tasks include related theory testing applicable to the task and will be graded

Practical tasks include related assignments applicable to the task and will be graded

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Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada.
SIMUGAS ® Gas Furnace Simulator Information
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SIMUHYDRO ® Hot Water Boiler Simulator

Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe
Copper
CPVC
PVC
Pex
Arc
Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers

Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA900 - INSTALL PIPE HANGERS AND SUPPORTS

Unit Number: PA900

Dates: Spring 2016 **Hours:** 22.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to demonstrate the ability to install a water distribution system using appropriate hangers and demonstrate the ability to install a DWV system using appropriate hangers and correct grade.

Tasks:

PA901 - Use hangers to secure horizontal and vertical pipe lines to masonry, metal and wood.

PA902 - Layout, anchor, install various carrier fixture.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Discuss how water moves from the source through the water distribution system to the fixture
Identify the major components of a water distribution system and describe the function of each component
Explain the relationships between components of a water distribution system

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor

Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012

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Turbo Tips
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Flashlights
Allen key set
Thermistor vacuum gauge
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Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers
Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA1000 - INSTALL WATER DISTRIBUTION LINES

Unit Number: PA1000

Dates: Spring 2016 **Hours:** 44.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to discuss how water moves from the source through the water distribution system to the fixture, identify the major components of a water distribution system and describe the function of each component, and explain the relationships between components of a water distribution system.

Tasks:

PA1001 - Perform a tests on water distribution lines that meets plumbing code.

PA1002 - Rough-in water supply lines for bathtubs, wall mounted urinals, water closets, clothes washer, kitchen sink, lavatories according to manufacturer sheet.

PA1003 - Demonstrate knowledge of a water distribution whirlpool tub installation.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

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Supporting Anchor/Standards:

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Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

GEOMETRY
Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.
Standard 2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
Standard 2.3.HS.A.13 Analyze relationships between two dimensional and three dimensional objects.

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to properly measure, cut, and join carbon steel piping
Identify the major components of a water distribution system and describe the function of each component
Explain the relationship between components of a water distribution system

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response

De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
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Resources/Equipment:

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Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers

Assorted wrenches
Levels
Ref. Gages
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Presto lite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA1100 - DEMONSTRATE SKILL IN WORKING WITH STEEL PIPE

Unit Number: PA1100

Dates: Spring 2016 **Hours:** 33.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to identify the common types of materials and schedules used with carbons; demonstrate the ability to properly measure, cut, and join carbon steel piping; and identify the hazards and safety precautions associated with carbon steel piping.

Tasks:

PA1101 - Thread steel pipe with an adjustable die, power threading machine, non-adjustable die.

PA1102 - Measure, cut, ream, assemble, and test various types of steel piping.

PA1103 - Adapt steel pipe to other piping materials.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12

Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

GEOMETRY
Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.
Standard 2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
Standard 2.3.HS.A.13 Analyze relationships between two dimensional and three dimensional objects.

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to properly measure, cut, and join carbon steel piping
Recognize proper applications of carbon steel piping
Identify the material properties, storage, and handling requirements of carbon steel piping
Identify the various techniques used in hanging and supporting carbon steel piping

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities

Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations

Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed areas

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable

Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)

Practical tasks include related theory testing applicable to the task and will be graded

Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012

National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012

National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada.
SIMUGAS ® Gas Furnace Simulator Information
SIMUOIL ® Oil Furnace Simulator Information
SIMUHYDRO ® Hot Water Boiler Simulator

Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe
Copper
CPVC
PVC
Pex
Arc
Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers

Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA1200 - DEMONSTRATE SKILL IN WORKING WITH CAST IRON PIPE

Unit Number: PA1200

Dates: Spring 2016 **Hours:** 33.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to identify the common types of materials and schedules used with cast iron piping; identify common types of fittings and valves used with cast iron piping; demonstrate the ability to properly measure, cut, and join cast iron piping; and identify the hazards and safety precautions associated with cast iron piping.

Tasks:

PA1201 - Identify and use tools for working with cast iron pipe.

PA1202 - Measure and cut cast iron soil pipe with a chain cutter.

PA1203 - Assemble cast iron to various pipe types with no hub, Fernco, rubber gasket joints

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12

Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
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RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

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- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to properly measure, cut, and join cast-iron piping
Recognize proper and improper applications of cast-iron piping
Identify the material properties, storage, and handling requirements of cast-iron piping
Identify the types of materials and schedules used in cast-iron piping
Identify the types of fittings used with cast-iron piping
Identify the various techniques used in hanging and supporting cast-iron piping
Identify the hazards and safety precautions associated with cast-iron piping.

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
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Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart

All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

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Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe
Copper
CPVC
PVC
Pex
Arc
Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers

Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA1300 - DEMONSTRATE KNOWLEDGE OF A BUILDER LEVELER

Unit Number: PA1300

Dates: Spring 2016 **Hours:** 22.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:
Student will know and be able to set, operate, and obtain differences in elevation using a builder's level and stadia rod.

Tasks:

PA1301 - Identify and set up a builder's level.

PA1302 - Set up the level shoot elevations and grade pipe.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

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CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

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Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

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Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

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Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

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Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

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Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to properly measure, cut, and join carbon steel piping using end to end, end to center, center to throat, and overall improvements
Demonstrate the proper use of a builder's level.
Demonstrate the proper maintenance for caring for a builder's level

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
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Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations

Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed areas

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable

Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)

Practical tasks include related theory testing applicable to the task and will be graded

Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

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Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

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PVC
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Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers

Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers
Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter

Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA1400 - BUILD DRAINS AND SEWERS

Unit Number: PA1400

Dates: Spring 2016 **Hours:** 99.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to use appropriate leveling devices to establish drainage pitch, know when and how to install backflow preventative valves, air test DWV and make necessary repairs, and rough in all appliances and fixtures requiring supply or drain connections.

Tasks:

PA1401 - Lay out and establish grade/slope for drain lines.

PA1402 - Install backwater prevention valves.

PA1403 - Test a drain and sewer according to plumbing code.

PA1404 - Install air admittance valves.

PA1405 - Rough-in waste lines and vents for bathtubs, lavatories, dishwashers, water closets, showers, bidets and urinals according to manufacturer's specification.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

ALGEBRA

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to install a building sewer piping system
Use a level to set the elevation of a floor or area drain
Install a drain
Install waterproof membranes and flashing

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
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Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

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Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed areas

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable

Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)

Practical tasks include related theory testing applicable to the task and will be graded

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Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers
Assorted wrenches

Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA1500 - INSTALL FIXTURES

Unit Number: PA1500

Dates: Spring 2016 **Hours:** 63.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to describe the general procedures you should follow before installing any fixtures; demonstrate the ability to install bathtubs, shower stalls, valves, and faucets; demonstrate the ability to install water closets and urinals; and demonstrate the ability to install lavatories, sinks, and pop-up drains.

Tasks:

PA1501 - Install tank-type water closets.

PA1502 - Install bathtubs.

PA1503 - Install wall mounted lavatories.

PA1504 - Install wall mounted urinals.

PA1505 - Install kitchen sink.

PA1506 - Install prefabricated shower base drains.

PA1507 - Install built-in lavatories.

PA1508 - Install flush valve-type water closets.

PA1509 - Install traps and cleanouts.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

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Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

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Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Describe the general procedures you should follow before installing any fixture
<u>Demonstrate the ability to install:</u>

bathtubs
lavatories
sinks
pop-up drains
water closets
urinals
shower stalls
valves
faucets

Identify the basic types of materials used in the manufacture of plumbing fixtures
Discuss common types of sinks, lavatories, and faucets
Identify and discuss common types of bathtubs, bath-shower modules, shower stalls, and shower baths
Discuss common types of toilets, urinals, and bidets
Identify and describe common types of drinking fountains and water coolers
Discuss common types of garbage disposals and domestic dishwashers

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
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Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
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Nitrogen Regulator
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Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers
Assorted wrenches

Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA1600 - INSTALL APPLIANCES

Unit Number: PA1600

Dates: Spring 2016 **Hours:** 180.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to install general and home appliances required for convenience and sanitary operations.

Tasks:

PA1601 - Describe the installation of a dishwasher.

PA1602 - Describe the installation of an electric water heater.

PA1603 - Describe the installation of a gas water heater.

PA1604 - Describe the installation of a clothes washing machine.

PA1605 - Describe the installation of other water heaters (for example, oil, tankless, or heat pump).

PA1606 - Describe the installation of a water re-circulating pump.

PA1607 - Describe the installation of al garbage disposal unit.

PA1608 - Describe the installation of a sump pump.

PA1609 - Describe the installation of a sewerage pump.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Install general and home appliances required for convenience and sanitary operations
Describe the installation of a dishwashers
Describe the installation of a electric water heaters
Describe the installation of a gas water heaters
Describe the installation of a clothes washing machines
Describe the installation of a oil-fired water heater
Describe the installation of a water re-circulating pumps
Describe the installation of al garbage disposal units
Describe the installation of a sump pumps
Describe the installation of a sewerage pump.

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities

Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations

Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed areas

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable

Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)

Practical tasks include related theory testing applicable to the task and will be graded

Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012

National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012

National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada.
SIMUGAS ® Gas Furnace Simulator Information
SIMUOIL ® Oil Furnace Simulator Information
SIMUHYDRO ® Hot Water Boiler Simulator

Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe
Copper
CPVC
PVC
Pex
Arc
Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers

Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA1700 - INSTALL VENTS

Unit Number: PA1700

Dates: Spring 2016 **Hours:** 75.00

Last Edited By: Plumbing (05-10-2016)

Unit Description/Objectives:

Student will know and be able to install appropriate vent systems and termination related to fixture placement.

Tasks:

PA1701 - Install soil or waste back vents

PA1702 - Install soil or waste loop vents.

PA1703 - Demonstrate knowledge for installation of a vent terminals (roof-flashing).

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

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Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

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Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

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Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12

Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
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Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Install appropriate vent systems and termination related to fixture placement
Explain how waste moves from a fixture through the drain system to the environment
Identify the major components of a drainage system and describe their functions
Identify the different types of traps and their components, explain the importance of traps, and identify the ways that traps can lose their seals
Identify the various types of drain, waste, and vent (DWV) fittings and describe their applications
Identify significant code and health issues, violations and consequences related to DWV systems

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations

Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed areas

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable

Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)

Practical tasks include related theory testing applicable to the task and will be graded

Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

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National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012

National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

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Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada.
SIMUGAS ® Gas Furnace Simulator Information
SIMUOIL ® Oil Furnace Simulator Information
SIMUHYDRO ® Hot Water Boiler Simulator

Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe
Copper
CPVC
PVC
Pex
Arc
Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers
Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws

Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun

Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool

Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA1800 - MAINTAIN PLUMBING SYSTEMS

Unit Number: PA1800

Dates: Spring 2016 **Hours:** 105.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to perform the required maintenance needed on fixtures, traps, drains, valves, and piping systems for proper operation of the plumbing system.

Tasks:

PA1801 - Clear obstructions from lavatory drains.

PA1802 - Remove obstructions from main drain lines.

PA1803 - Remove obstructions from water closets

PA1804 - Repair/replace lavatory trap drains, and leaking water faucets or valves.

PA1805 - Repair leaking shower valves.

PA1806 - Repair water flush valves on water closets.

PA1807 - Replace a damaged section of galvanized water plumbing system.

PA1808 - Explain how to thaw frozen pipes.

PA1809 - Disassemble "P" traps to clear lavatory drains.

PA1810 - Repair/replace any type of water closets.

PA1811 - Replace all components in a tank style toilet.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

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RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Identify common repair and maintenance requirements for fixtures, valves, and faucets

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities

Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations

Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed areas

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable

Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)

Practical tasks include related theory testing applicable to the task and will be graded

Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

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National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012

National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

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Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

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Tig
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Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers

Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA1900 - PERFORM TESTS ON PIPING SYSTEMS

Unit Number: PA1900

Dates: Spring 2016 **Hours:** 60.00

Last Edited By: Plumbing (05-10-2016)

Unit Description/Objectives:
Student will know and be able to perform the necessary test procedures on piping systems as stated by code requirements.

Tasks:

PA1901 - Perform head pressure tests.

PA1902 - Perform hydrostatic tests.

PA1903 - Perform leak tests on gas supply lines.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

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Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
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Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to test a DWV system

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
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Use of Calculator
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Communication Regarding Behavior & Consequences (PBS)
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Provide repetition During Initial Instruction
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Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

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Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

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PVC
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Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers
Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA2000 - PERFORM ADVANCED PIPE FABRICATION

Unit Number: PA2000

Dates: Spring 2016 **Hours:** 60.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:
Student will know and be able to fabricate simple and complex three-line 45 degree equal and unequal offsets.

Tasks:

PA2001 - Calculate simple piping offsets.

PA2002 - Calculate three-line, 45° equal-spread offsets around a vessel.

PA2003 - Calculate three-line, 45° unequal-spread offsets.

PA2004 - Convert center, back throat, and/or face measurement to an end measurement.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

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Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

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Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

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Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

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Focus Anchor/Standard #2:

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Supporting Anchor/Standards:

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Connecting Anchor/Standard:

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Supporting Anchor/Standards:

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Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

GEOMETRY
Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.
Standard 2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
Standard 2.3.HS.A.13 Analyze relationships between two dimensional and three dimensional objects.

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
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Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Fabricate simple and complex three-line 45 degree equal and unequal offsets

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
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Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations

Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed areas

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

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Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe
Copper
CPVC
PVC
Pex
Arc
Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers

Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA2100 - WORK WITH PRESSURE BOILERS

Unit Number: PA2100

Dates: Spring 2016 **Hours:** 120.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to identify components associated to various pressure boilers; explain the operation involved in boiler, steam, and hydronic units and the various accessories for proper operation; and identify and explain the purpose of a draft control and various safety devices.

Tasks:

PA2101 - Identify and explain various boiler fittings and accessories, including thermal expansion devices.

PA2102 - Discuss the various types of boilers.

PA2103 - Identify and explain various boiler, steam, and hot water fittings and piping.

PA2104 - Identify and explain feed water accessories.

PA2105 - Identify and explain steam and hot water accessories.

PA2106 - Explain the operation of a boiler and its various controls.

PA2107 - Explain the operation of the draft controls.

PA2108 - Identify and explain boiler safety.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

GEOMETRY
Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.
Standard 2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
Standard 2.3.HS.A.13 Analyze relationships between two dimensional and three dimensional objects.

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Explain the operation and assemble a steam boiler including automatic water feed, pressure controls, and automatic cut-off

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities

Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times.

Assessment:

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

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Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladels
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
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Closet auger
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1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA2200 - WORK WITH HYDRONIC HEATING SYSTEM

Unit Number: PA2200

Dates: Spring 2016 **Hours:** 75.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to design a hydronic heating system with a primary and secondary loop systems; design a radiant floor system using PEX tubing and associated materials; and describe the operation of 3 and 4 way mixing valves, injection pump, tempering valves and safety controls of a hydronic system.

Tasks:

PA2201 - Describe and design a hydronic heating systems.

PA2202 - Describe and design a primary and secondary loops.

PA2203 - Calculate lay-out and design a radiant floor system.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

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Instructional Activities:

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Participate in co-operative group theory projects
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Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
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Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Design and assemble a hydronic system using primary and secondary loops
Design and assemble a radiant floor system
Include the components and explain the operation of 3 and 4 way mixing valves and tempering devices within the system

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
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Directions/Comprehension Check (frequent checks for understanding)
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Cue for Oral Response
De-Escalation Opportunities
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Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing

Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations

Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed areas

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable

Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)

Practical tasks include related theory testing applicable to the task and will be graded

Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

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Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
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Compressor Analyzer
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Multi-meter
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Assorted benders
Drill bit kit
Strikers
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Chisel
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Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladles
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks:

Monroe Career & Technical Institute
Course: Plumbing Technology

Unit Name: PA2300 - DEMONSTRATE SAFE USE OF LADDERS AND SCAFFOLDS

Unit Number: PA2300

Dates: Spring 2016 **Hours:** 45.00

Last Edited By: Plumbing (05-10-2016)

Unit Description / Objectives:

Student will know and be able to describe the safety precautions required when setting up ladders and scaffolding used on the jobsite.

Tasks:

PA2301 - Identify the different types of ladders and scaffolds used on a worksite.

PA2302 - Properly set up, inspect, and use stepladders, extension ladders, and scaffolding.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

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CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

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Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

GEOMETRY
Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.
Standard 2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
Standard 2.3.HS.A.13 Analyze relationships between two dimensional and three dimensional objects.

Instructional Activities:

Knowledge:

Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Describe safe behavior on and around ladders and scaffolds

Remediation:

Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

Special Adaptations:

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, etc.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

Safety:

Student must:

Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations

Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed areas

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

Student practical tasks will be graded based on rubrics if applicable

Tasks will be inspected, tested and graded to meet HVAC-R standards. (Reference National Mechanical, Plumbing, and Electrical Code Book)

Practical tasks include related theory testing applicable to the task and will be graded

Practical tasks include related assignments applicable to the task and will be graded

Resources/Equipment:

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012

National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012

National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall.

Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada.
SIMUGAS ® Gas Furnace Simulator Information
SIMUOIL ® Oil Furnace Simulator Information
SIMUHYDRO ® Hot Water Boiler Simulator

Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes.

Steel pipe
Copper
CPVC
PVC
Pex
Arc
Tig
Oxy-Acetylene
Brazing
Soldering
Electrical components
Electrical Meters
Freons
Refrigeration Components
Refrigeration Test Equipment
Refrigeration Appliances
Heating Components
Heating Test equipment
Heating Appliances
Fuels
OZ Recovery
Turbo Tips
Assorted NPT Taps
Assorted Screw drivers
Flashlights
Allen key set
Thermistor vacuum gauge
Electronic leak detector
Compressor Analyzer
Sawblade set
Duct board tools
Nitrogen Regulator
Charging scale
Recovery tanks
Digital thermometer
Amprobe
Multi-meter
Mini- stripers
Assorted benders
Drill bit kit
Strikers
Insp. Mirror
Chisel
Assorted hammers
Assorted pliers

Assorted wrenches
Levels
Ref. Gauges
Robinair charging station
Efficiency test
Angle Drill
Hole Hawg
Enviro-tech
Vacuum pump
Hand grinder
Assorted saws
Picks
Shovels
Rakes
Prestolite Torch
1" snake
1/4 elect. snake
Wire casing rip.
1/8" to 2" cutter
Shop Vac
Oilers
Clamps
Grease gun
Lead Ladles
Wire strippers
Cats paw
Elec. Hammer Drill
Sawzall
Solder gun
Putty Knives
Aviation Snips
Assorted cutters
16' Tape Measures
Burring Reamers
Soil Pipe Assembly tool
Tri-Squares
Squares
Crow Bars
Closet auger
1/2" Breaker Bar
1/2" Snap-On Ratchet
1/2"x 10" extension
1/2" x 5" extension
Assorted deep well
Assorted drivers

Hyperlinks: