

MODULE OVERVIEW

This module introduces trainees to concepts and practices that are essential for competitive, successful plumbing businesses. Trainees will learn basic business accounting and project estimating, as well as techniques for cost control and task organization.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum*; *Plumbing Level One*; *Plumbing Level Two*; and *Plumbing Level Three*.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Identify and interpret a balance sheet and a profit and loss statement.
2. Prepare a material takeoff as part of an estimate.
3. Identify the business activities that affect profit and loss.

PERFORMANCE TASK

Under the supervision of the instructor, the trainee should be able to do the following:

1. Prepare a material takeoff as part of an estimate.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen

Transparencies

Blank acetate sheets

Transparency pens

Whiteboard/chalkboard

Markers/chalk

Pencils and scratch paper

Appropriate personal protective equipment

Copies of your local code

Calculators

Copies of well written and poorly written estimates

Sample invoices from various suppliers

Sample inventory forms showing data from previous inventories

Copies of *Figure 9*

Sample critical path management (CPM) diagram covering a large job or a substantial part of a large job

Copies of the handout "Pipe Specifications of the Government" (optional)**

Project drawings and specifications, and copies of *Figures 1 through 3* (optional)

Copies of *Figure 12* (optional)

Module Examinations*

Performance Profile Sheets*

* Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

**Located at the end of this module.

SAFETY CONSIDERATIONS

Ensure that trainees understand the role that insurance and liability factors play in bidding, safety on the job, and hazardous waste removal. Remind trainees of the importance of safeguarding equipment and materials at a job site.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

Financial Management and Accounting for the Construction Industry. New York, NY: Construction Financial Management Association.

Plumbing Contractor: Start and Run a Money-Making Business. R. Dodge Woodson. Blue Ridge Summit, PA: TAB Books.

Plumbing Estimating Methods. Joseph J. Galeno and Sheldon T. Greene. Kingston, MA: R. S. Means Company.

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 15 hours are suggested to cover *Business Principles for Plumbers*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Trainee proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

Topic	Planned Time
Session I. Basic Business Accounting	
A. Introduction to Business Math for Plumbers	_____
B. Basic Business Accounting	_____
Session II. Estimating a Project, Part One	
A. Bids, Estimates, and Direct and Indirect Costs	_____
B. Insurance and Liability	_____
Session III. Estimating a Project, Part Two	
A. The Estimating Process	_____
B. Updates and Revisions	_____
Session IV. Cost Control, Part One	
A. Importance of Controlling Costs	_____
B. Ordering and Receiving Materials	_____
C. Material Storage	_____
Session V. Cost Control, Part Two	
A. Proper Use of Tools and Equipment	_____
B. Company Vehicles	_____
C. Change Orders	_____

Session VI. On-the-Job Task Organization

A. Task Planning and Critical Path Management

B. Review

C. Module Examination

1. Trainees must score 70 percent or higher to receive recognition from NCCER.

2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

D. Performance Testing

1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises and Teaching Tips can be used to satisfy the Performance Testing requirements.

2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

COURSE OVERVIEW

This course introduces the basic leadership skills a crew leader needs in order to supervise a crew. Trainees will learn about:

- The construction industry today
- Construction organization
- Team building
- Gender and minority issues
- Communication
- Motivation
- Problem solving
- Decision making
- Safety
- Project control

PREREQUISITES

There are no prerequisites for this course.

LEARNING OBJECTIVES

Upon completion of this course, the trainee will be able to:

1. Discuss current issues and organizational structure in the construction industry today.
2. Understand and incorporate leadership skills into work habits, including communication, motivation, team building, problem solving, and decision-making skills.
3. Demonstrate an awareness of safety issues, including the cost of accidents and safety regulations.
4. Identify a supervisor's typical safety responsibilities.
5. Show a basic understanding of the planning process, scheduling, and cost and resource control.

PERFORMANCE OBJECTIVES

This is a knowledge-based module—there is no performance profile examination.

NCCER STANDARDIZED CRAFT TRAINING PROGRAM

The National Center for Construction Education and Research (NCCER) provides a standardized national program of accredited craft training. Key features of the program include instructor certification, competency-based training, and performance testing. The program provides trainees, instructors, and companies with a standard form of recognition through a National Craft Training Registry. The program is described in full in the *Guidelines for Accreditation*, published by the NCCER. For more information on standardized craft training, contact the NCCER by writing us at 13614 Progress Boulevard, Alachua, FL 32615, calling 1-800-NCCER20, or e-mailing info@NCCER.org. More information may be found at our website at www.nccer.org.

NOTE TO INSTRUCTORS

If you are training under an Accredited NCCER Sponsor, note that you may be eligible for dual credentials for successful completion of Introductory Skills for the Crew Leader. When submitting the Form 200, indicate completion of the two module numbers that apply to Introductory Skills for the Crew Leader – MT101 (from NCCER's Contren® Management Series) and 04406-09 (from NCCER's Sheet Metal Level Four) and transcripts will be issued to you accordingly.

HOW TO USE THIS ANNOTATED INSTRUCTOR'S GUIDE

Each page presents two sections of information. The larger section displays each page exactly as it appears in the Trainee Guide. The narrow column ties suggested trainee and instructor actions to each page and provides icons to call your attention to material, safety, audiovisual, or testing requirements. The bottom of each page includes space for your notes.

Review questions and participant exercises are found periodically throughout the Trainee Guide in order for the trainees to test their knowledge. An answer key to these review questions and suggested answers for the participant exercises are located at the back of this Annotated Instructor's Guide. After trainees complete their review questions, go over the correct answers with them to be sure they understand all concepts.

PREPARATION

Before teaching this course, you should review the Course Outline, Learning Objectives, and the Materials and Equipment List. Be sure to allow ample time to prepare your own training or lesson plan and gather all required equipment and materials.

MATERIALS AND EQUIPMENT LIST

Materials:

Transparencies

Markers/chalk

Calculator

Pencils/scratch paper

Example of OSHA Log Books

Examples of MSDS Sheets

Copies of Module Examinations*

Equipment:

Overhead projector

Screen (or large blank wall)

Whiteboard/chalkboard

* Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code..

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

Construction Contracting, 1994. Richard H. Clough and Glenn A. Sears. New York: John Wiley & Sons.

Construction Management, 1997. Daniel W. Halpin and Ronald W. Woodhead. New York: John Wiley & Sons.

Construction Operations Manual of Policies and Procedures, 2000. Andrew Civitello Jr. New York: McGraw-Hill.

Professional Construction Management, 1991. Donald S. Barrie, Boyd C. Paulson (Contributor). New York: McGraw-Hill.

TEACHING TIME FOR THIS COURSE

An outline for use in developing your lesson plan is presented below. This course is designed to be taught in one of two formats: two 8-hour sessions (such as all-day workshops) or eight 2-hour sessions (such as after-work training seminars). Because of this, each session below has a suggested time period of two hours. If leading 8-hour sessions, simply teach four of these 2-hour sessions both times your class meets. All instructors will need to adjust the time required for participant activities and testing based on class size and resources.

Topic	Planned Time
Session I. Orientation to the Job	
A. Overview of the Construction Industry	_____
1. Historical Importance of the Construction Industry	_____
2. Growth and Economics of the Construction Industry	_____
3. Changing Values of Workers	_____
B. The Construction Industry Today	_____
1. Training	_____
2. New Technology	_____
C. Gender and Minority Issues	_____
1. Communication Styles of Men and Women	_____
2. Language Barriers	_____
3. Cultural Differences	_____
4. Sexual Harassment	_____
5. Gender and Minority Discrimination	_____
D. Construction Projects	_____
E. The Construction Organization	_____
1. Division of Responsibility	_____
2. Authority and Responsibility	_____
3. Job Descriptions	_____
4. Policies and Procedures	_____
Session II. Leadership Skills, Part One	
A. Introduction to Supervision	_____
B. The Shift in Work Activities	_____
C. Becoming a Leader	_____
1. Characteristics of Leaders	_____
2. Functions of a Leader	_____
3. Leadership Styles	_____
4. Ethics in Leadership	_____
D. Communication	_____
1. Verbal Communication	_____
2. Non-Verbal Communication	_____
3. Written or Visual Communication	_____
4. Communication Issues	_____
E. Motivation	_____
1. Employee Motivators	_____
2. Motivating Employees	_____

Session III. Leadership Skills, Part Two

A. Team Building

- 1. Successful Teams
- 2. Building Successful Teams

B. Getting the Job Done

- 1. Delegating Responsibilities
- 2. Implementing Policies and Procedures

C. Problem Solving and Decision Making

- 1. Problem Solving vs. Decision Making
- 2. Types of Decisions
- 3. Formal Problem-Solving Techniques
- 4. Special Leadership Problems

Session IV. Safety, Part One

A. Safety Overview

B. Costs of Accidents

- 1. Insured Costs
- 2. Uninsured Costs

C. Safety Regulations

- 1. Workplace Inspections
- 2. Penalties for Violations

Session V. Safety, Part Two

A. Safety Responsibilities

- 1. Safety Program
- 2. Safety Policies and Procedures
- 3. Hazard Identification and Assessment
- 4. Safety Information and Training
- 5. Safety Record Systems
- 6. Accident Investigation Procedures

B. Supervisor Involvement in Safety

- 1. Safety Meetings
- 2. Inspections
- 3. First Aid
- 4. Fire Protection and Prevention
- 5. Substance Abuse
- 6. Accident Investigations

C. Promoting Safety

- 1. Meetings
- 2. Contests
- 3. Recognition and Awards
- 4. Publicity

Session VI. Project Control, Part One

A. Project Control Overview

B. Project Delivery Systems

- 1. General Contracting
- 2. Design-Build
- 3. Construction Management

- C. An Overview of Planning
 - 1. What is Planning?
 - 2. Why Plan?
- D. Stages of Planning
 - 1. Pre-Construction Planning
 - 2. Construction Planning
- E. The Planning Process
 - 1. Establishing a Goal
 - 2. Identifying the Work to be Done
 - 3. Determining Tasks
 - 4. Communicate Responsibilities
 - 5. Follow-Up
- F. Planning Resources
 - 1. Planning Materials
 - 2. Planning Equipment
 - 3. Planning Tools
 - 4. Planning Labor
- G. Ways to Plan

Session VII. Project Control, Part Two

- A. Estimating
- B. Scheduling
 - 1. The Scheduling Process
 - 2. Bar Charts
 - 3. Network Schedule
 - 4. Short-Interval Production Scheduling
 - 5. Updating a Schedule

Session VIII. Project Control, Part Three

- A. Cost Awareness And Control
 - 1. Categories of Costs
 - 2. Field Reporting System
 - 3. Supervisor's Role in Cost Control
- B. Resource Control
 - 1. Control
 - 2. Materials Control
 - 3. Equipment Control
 - 4. Tools Control
 - 5. Labor Control
- C. Production and Productivity
- D. Summary
 - 1. Summarize Course
 - 2. Answer Questions
- E. Module Examination
 - 1. Trainee must score 70% or higher to receive recognition from the NCCER.
 - 2. Record testing results on Craft Training Report Form 200 and submit the results to the Training Program Sponsor.

Annotated Instructor's Guide

MODULE OVERVIEW

This module reviews the components of water pressure booster and recirculation systems. Trainees will learn how to design and install booster and recirculation systems, as well as how to troubleshoot and diagnose problems.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum; Plumbing Level One; Plumbing Level Two; Plumbing Level Three; and Plumbing Level Four*, Modules 02401-06 and 02402-06.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Explain the complete water pressure booster system and its components.
2. Explain the maintenance and basic troubleshooting processes for water pressure booster systems.
3. Describe the characteristics of the different recirculation systems.
4. Identify the basic components of a recirculation system.
5. Identify the location of various components within a recirculation system.
6. Install the basic components of a recirculation system.
7. Use the local plumbing code to find and cite requirements for recirculation systems.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Install the basic components of a recirculation system.
2. Use the local plumbing code to find and cite requirements for recirculation systems.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen

Transparencies

Blank acetate sheets

Transparency pens

Whiteboard/chalkboard

Markers/chalk

Pencils and scratch paper

Appropriate personal protective equipment

Copies of your local code

Copies of *Figures 4 and 7*

Small plastic bottle with two holes punched in the throat, on opposite sides, and a third hole punched in the bottom. The bottle should have string tied through the pair of holes at the top, with the knot over the center of the bottle. Leave about 3 feet of string attached.

Various components of a water booster system with manufacturer's instructions, including the following:

Small storage tank

Centrifugal water booster pump

Vertical turbine pump

Vibration isolators

Temperature and flow sensors

Water hammer arresters

Appropriate tools for assembling and disassembling various types of water booster and recirculation systems

Pressure gauge

Copies of engineering plans for one or more types of water booster pressure systems (optional)

Copies of Quick Quiz** (optional)

Module Examinations*

Performance Profile Sheets*

* Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

**Located at the end of this module.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Ensure that they understand how to protect against damage and injury when installing and servicing water pressure booster systems and hot water recirculation systems. Remind them to take special precautions when cleaning electric pump motors, setting pump operating pressures, and working around pressurized hot water tanks.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

Efficient Building Design Series, Volume 3: Water and Plumbing, 1999. Ifte Choudhury and J. Trost. New York, NY: Prentice Hall.

Plumbing, Cold Water Supplies, Drainage, and Sanitation, 1981. Fred Hall. New York, NY: Van Nostrand Reinhold.

Plumbing, Hot Water Supply, and Heating Systems, 1981. Fred Hall. New York, NY: Van Nostrand Reinhold.

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 17½ hours are suggested to cover *Water Pressure Booster and Recirculation Systems*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Trainee proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

Topic	Planned Time
Session I. Types of Water Pressure Booster Systems	
A. Elevated Tank Systems	_____
B. Hydropneumatic Tank Systems	_____
C. Constant-Speed Systems	_____
D. Variable-Capacity Systems	_____
Session II. Components of Water Pressure Booster Systems	
A. Storage Tanks	_____
B. Pumps	_____
C. Pump Motors	_____
D. Controls	_____
E. Water Hammer Arresters	_____
Session III. Designing, Installing, and Maintaining Water Pressure Booster Systems, Part One	
A. Designing Water Pressure Booster Systems	_____
B. Installing and Maintaining Piping Materials	_____
C. Installing and Maintaining Water Tanks	_____
Session IV. Designing, Installing, and Maintaining Water Pressure Booster Systems, Part Two	
A. Installing Motors and Pumps	_____
B. Problems With the Pump and Motor	_____

Session V. Types of Recirculation Systems

- A. Gravity Return System
- B. Forced Circulation System
- C. Multiple Heaters and Storage Tanks

Session VI. Components of Recirculation Systems

- A. Storage Tanks
- B. Pumps
- C. Pipes
- D. Valves
- E. Aquastats
- F. Expansion Pipes and Tanks

Session VII. Installing and Maintaining Recirculation Systems

- A. Installing a Hot Water Recirculation System
- B. Troubleshooting and Maintaining a Recirculation System
- C. Review
- D. Module Examination
 - 1. Trainees must score 70 percent or higher to receive recognition from NCCER.
 - 2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.
- E. Performance Testing
 - 1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises and Teaching Tips can be used to satisfy the Performance Testing requirements.
 - 2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

MODULE OVERVIEW

This module reviews the installation and maintenance of indirect and special waste systems. Trainees will also learn about code requirements and safety precautions for these systems.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum; Plumbing Level One; Plumbing Level Two; Plumbing Level Three; and Plumbing Level Four*, Modules 02401-06 through 02403-06.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Identify and install an indirect waste system.
2. Identify and install an interceptor.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Identify and install an indirect waste system.
2. Identify and install an interceptor.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen	Copies of your local code
Transparencies	Automatic trap primer
Blank acetate sheets	Small grease interceptor
Transparency pens	Copies of site plans that illustrate the location of a large interceptor (optional).
Whiteboard/chalkboard	Module Examinations*
Markers/chalk	Performance Profile Sheets*
Pencils and scratch paper	
Appropriate personal protective equipment	

* Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Remind them to take extra precautions when working with indirect and special waste systems to prevent injury, exposure, or infection from hazardous wastes, and stress strict adherence to code. Emphasize the importance of thorough confined-space training before working in climb-in interceptors.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

Introduction to Wastewater Treatment Processes, 1997. Rubens Sette Ramalho. New York, NY: Academic Press.
Water, Sanitary, and Waste Services for Buildings, 1995. Alan F. E. Wise and J. A. Swaffield. Boston, MA: Addison-Wesley.

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 12½ hours are suggested to cover *Indirect and Special Waste*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Trainee proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

Topic	Planned Time
Session I. Indirect Waste Systems, Part One	
A. Introduction to Indirect Waste Systems	_____
B. Indirect Waste Systems	_____
C. Installation of Indirect Waste Piping	_____
Session II. Indirect Waste Systems, Part Two	
A. Food Preparation, Handling, and Storage Installations	_____
B. Health Care Installations	_____
C. Other Clear Water Waste Installations	_____
D. Laboratory: Identifying and installing indirect waste systems. This laboratory corresponds to Performance Task 1.	_____
Session III. Special Waste Systems, Part One	
A. Types of Special Waste	_____
B. Installation of Interceptors	_____
C. Grease Interceptors	_____
Session IV. Special Waste Systems, Part Two	
A. Installing Oil Interceptors	_____
B. Installing Sediment Interceptors	_____
C. Laboratory: Identifying and installing interceptors. This laboratory corresponds to Performance Task 2.	_____
Session V. Special Waste Systems, Part Three	
A. Catch Basins	_____
B. Review	_____
C. Module Examination	_____
1. Trainees must score 70 percent or higher to receive recognition from NCCER.	
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	
D. Performance Testing	_____
1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises and Teaching Tips can be used to satisfy the Performance Testing requirements.	
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	

Annotated Instructor's Guide

MODULE OVERVIEW

This module introduces the basic types of hydronic and solar heating systems and their components. Trainees will learn how to lay out and install hydronic and solar heating systems. The module also reviews methods for inhibiting corrosion in solar heating systems.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum; Plumbing Level One; Plumbing Level Two; Plumbing Level Three; and Plumbing Level Four*, Modules 02401-06 through 02404-06.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Describe the basic types of hydronic and solar heating systems and their components.
2. Describe the procedures for rough-in, installation, and testing of the piping in hydronic or solar heating systems.
3. Lay out and build a hydronic or a solar heating system.

PERFORMANCE TASK

Under the supervision of the instructor, the trainee should be able to do the following:

1. Lay out and build a hydronic or a solar heating system.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen

Transparencies

Blank acetate sheets

Transparency pens

Whiteboard/chalkboard

Markers/chalk

Pencils and scratch paper

Appropriate personal protective equipment

Copies of your local code

Copies of *Figure 1* with the callouts covered

Copies of *Figures 11* through *15* with the callouts covered (optional)

Module Examinations*

Performance Profile Sheets*

* Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize that hydronic and solar heating systems may use toxic liquids and often require check valves and backflow preventers to avoid contaminating the potable water supply. Stress the precautions they should take when working with pumps and with hot water under pressure.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

Quick & Basic Hydronic Controls: A Contractor's Easy Guide to Hydronic Controls, Wiring, and Wiring Diagrams. Carol Fey. Littleton, CO: P.I.G. Press.

Radiant Floor Heating. R. Dodge Woodson. New York, NY: McGraw-Hill.

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 15 hours are suggested to cover *Hydronic and Solar Heating Systems*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Trainee proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

Topic	Planned Time
Session I. Principles of Hydronic and Solar Heating Systems, Part One	
A. Introduction	_____
B. Water Heaters, Boilers, and Collectors	_____
Session II. Principles of Hydronic and Solar Heating Systems, Part Two	
A. Hot Water Circulation	_____
B. Radiators and Radiant Loops	_____
Session III. Types of Hydronic Systems	
A. One-Pipe Hydronic Systems	_____
B. Two-Pipe Hydronic Systems	_____
Session IV. Types of Passive and Active Solar Heating Systems	
A. Batch Systems	_____
B. Thermosyphon Systems	_____
C. Direct Systems	_____
D. Indirect Systems	_____
Session V. Installing Hydronic and Solar Heating Systems, Part One	
A. Roughing in the Pipe	_____
B. Installing the Boiler and Heating Units	_____
C. Installing Controls	_____
Session VI. Installing Hydronic and Solar Heating Systems, Part Two	
A. Testing and Balancing the System	_____
B. Preventing Corrosion	_____
C. Laboratory—Trainees sketch and note installation features of a hydronic or solar heating system. This laboratory corresponds to Performance Task 1.	_____
D. Review	_____
E. Module Examination	_____
1. Trainees must score 70 percent or higher to receive recognition from NCCER.	
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	
F. Performance Testing	_____
1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises and Teaching Tips can be used to satisfy the Performance Testing requirements.	
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	

Annotated Instructor's Guide

MODULE OVERVIEW

This module reviews the different types of codes used by plumbers. Trainees will learn how those codes are written, adopted, modified, and implemented.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum; Plumbing Level One; Plumbing Level Two; Plumbing Level Three; and Plumbing Level Four*, Modules 02401-06 through 02405-06.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Describe the model and local plumbing codes and their purposes.
2. Explain the procedure for modifying plumbing codes.
3. Use the local plumbing code to find and cite references.

PERFORMANCE TASK

Under the supervision of the instructor, the trainee should be able to do the following:

1. Use the plumbing code recognized in your area to find and cite references.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen	Saddle fitting plus additional fittings, piping materials, or other components prohibited by your local code (if any)
Transparencies	Examples of actual code change proposals submitted to ICC or another model code organization
Blank acetate sheets	Copies of <i>Figure 2</i>
Transparency pens	Copy of the model code on which the local code is based (optional)
Whiteboard/chalkboard	Copies of Quick Quiz (optional)**
Markers/chalk	Module Examinations*
Pencils and scratch paper	Performance Profile Sheets*
Appropriate personal protective equipment	
Copies of your local code	
Copies of <i>Figure 1</i> with callouts covered	

* Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

**Located at the end of this module.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Point out that a primary inspiration driving the development, modification, implementation, and enforcement of codes is to protect and further the safety and health of the nation. Remind trainees to become familiar with local codes whenever taking on a task and project.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

Code Check: A Field Guide to Building a Safe House, 2000. Redwood Kardon, Michael Casey, and Douglas Hansen. Newtown, CT: Taunton Press.

Code Check Plumbing: A Field Guide to Plumbing, 2000. Redwood Kardon, Michael Casey, and Douglas Hansen. Newtown, CT: Taunton Press.

The Engineering Resources Code Finder for Building and Construction, 2001. Dennis Phinney. Anaheim, CA: BNI Building News.

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 7½ hours are suggested to cover *Codes*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Trainee proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

Topic	Planned Time
Session I. Introduction	
A. History of Codes	_____
B. Model Codes	_____
Session II. How Codes Work, Part One	
A. Overview	_____
B. Model Code Standards	_____
C. Revision of Model Codes	_____
D. Adoption of Model Codes	_____
Session III. How Codes Work, Part Two	
A. Typical Changes to Model Codes	_____
B. Typical Chapters of a Model Code	_____
C. The Worksheet	_____
D. Review	_____
E. Module Examination	_____
1. Trainees must score 70 percent or higher to receive recognition from NCCER.	
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	
F. Performance Testing	_____
1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises and Teaching Tips can be used to satisfy the Performance Testing requirements.	
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	

Annotated Instructor's Guide

MODULE OVERVIEW

This module reviews the diagnosis and repair procedures for water supply and drainage piping, water heaters, and other appliances and fixtures. The module also describes how to troubleshoot corrosion, freezing, and hard water problems in plumbing systems.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum; Plumbing Level One; Plumbing Level Two; Plumbing Level Three; and Plumbing Level Four*, Modules 02401-06 through 02406-06.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Diagnose and address problems with water supply and quality.
2. Explain different types of corrosion and their effects on pipes.
3. Diagnose and solve fixture and appliance problems.
4. Troubleshoot and repair water heater problems.
5. Troubleshoot and repair DWV problems.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Troubleshoot and repair water supply problems.
2. Troubleshoot and repair water heater problems.
3. Troubleshoot and repair DWV problems.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen

Transparencies

Blank acetate sheets

Transparency pens

Whiteboard/chalkboard

Markers/chalk

Pencils and scratch paper

Appropriate personal protective equipment

Copies of your local code

Several articles from relevant trade journals that offer practical tips about servicing piping systems

Sections of pipe, couplings, and mini tube cutters

Water hammer arrester and pressure-reducing valve

Schrader valve

Assorted water filters

Hand auger, power auger, various types and sizes of attachments for both, including a root-cutter, and a drain

Sections of corroded pipe

Tank flush valves, including:

Flush valves with tank balls

Flush valves with flapper tank balls

Appropriate tools for assembling and disassembling flush valves

Module Examinations*

Performance Profile Sheets*

* Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Remind them to take appropriate steps to prevent slips and falls, electrical shock, or other accidents or injuries when making service calls or working in confined spaces. Emphasize the importance of following all safety precautions and procedures, especially when working with power tools, water heaters, pressurized water and air, and DWV systems.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

Kitchen & Bathroom Plumbing, How to Fix It Series, Vol. 1, No. 20, 1998. Ron Hazelton, ed. New York, NY: Time-Life Books.

Plumbing: A Guide to Repairs and Improvements, 1998. Jeff Beneke. New York, NY: Sterling Publishing Company.

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 22½ hours are suggested to cover *Servicing Piping Systems, Fixtures, and Appliances*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Trainee proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

Topic	Planned Time
Session I. General Guidelines for Service Calls	
A. Introduction and Overview	_____
B. General Guidelines for Service Calls	_____
Session II. Servicing Leaks and Frozen Pipes	
A. Leaks	_____
B. Frozen Pipes	_____
Session III. Troubleshooting Water Pressure Problems	
A. Low Pressure	_____
B. High Pressure	_____
C. Bladder Tanks	_____
Session IV. Troubleshooting Water Quality and Flow Issues	
A. Water Quality	_____
B. Water Flow Rate	_____
C. Performance Testing (Task 1)	_____
Session V. Servicing Water Heaters and Underground Pipes	
A. Water Heaters	_____
B. Laboratory – Trainees describe steps to correct common water heater problems. Note the trainees' proficiency. This laboratory corresponds to Performance Task 2.	_____
C. Servicing Underground Pipes	_____

Session VI. Servicing DWV Systems and Troubleshooting Pipe Corrosion

- A. Blockage
- B. Odors
- C. Performance Testing (Task 3)
- D. Pipe Corrosion

Session VII. Troubleshooting Plumbing Fixtures, Part One

- A. Repairing and Replacing Sinks and Lavatories
- B. Repairing and Replacing Tubs, Showers, and Water Closets

Session VIII. Troubleshooting Plumbing Fixtures, Part Two

- A. Troubleshooting Flushometers
- B. Troubleshooting Tank Flush Valves
- C. Troubleshooting Ball Cocks

Session IX. Installing Additional Fixtures and Appliances

- A. Installing Domestic Dishwashers
- B. Installing Lawn Sprinklers
- C. Review
- D. Module Examination
 1. Trainees must score 70 percent or higher to receive recognition from NCCER.
 2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.
- E. Performance Testing
 1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises and Teaching Tips can be used to satisfy the Performance Testing requirements.
 2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.

Annotated Instructor's Guide

MODULE OVERVIEW

This module explains the operation of pumps and well components. Trainees will learn how to identify the qualities of good wells and how to assemble and disassemble pumps and components.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum; Plumbing Level One; Plumbing Level Two; Plumbing Level Three; and Plumbing Level Four*, Modules 02401-06 through 02407-06.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Identify the qualities of a good well.
2. Explain the operation of various types of pumps and well components.
3. Explain the installation of private water supply well system components.
4. Assemble and disassemble given components of private water supply well systems.

PERFORMANCE TASK

Under the supervision of the instructor, the trainee should be able to do the following:

1. Assemble and disassemble given components of private water supply well systems.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen

Transparencies

Blank acetate sheets

Transparency pens

Whiteboard/chalkboard

Markers/chalk

Pencils and scratch paper

Appropriate personal protective equipment

Copies of your local code

Copies of a drilling log

Copies of *Figure 7* with callouts removed and blank lines substituted

Waterproof mechanical splice kit

Submersible pumps and appropriate assembly tools

Copies of *Figures 2 through 5* with their titles, which identify the wells, blocked out (if possible, enlarge to show greater detail) (optional)

Module Examinations*

Performance Profile Sheets*

* Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize that flooded wells are a serious health and safety hazard and may result in damaged pumps and motors. Remind them that careful handling of electric pump motors helps prevent electrical injury, and regular inspections and testing help protect private water supplies.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

Finding Water: A Guide to the Construction and Maintenance of Private Water Supplies, Second Edition. Rick Brassington. Chichester, NY: John Wiley & Sons.

Wells and Septic Systems. Max Auth, Charlotte Auth, and S. Blackwell Duncan. Blue Ridge Summit, PA: Tab Books.

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 10 hours are suggested to cover *Private Water Supply Well Systems*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Trainee proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

Topic	Planned Time
Session I. Drilling Wells	
A. Locating Wells	_____
B. Sizing Wells	_____
C. Drilling Wells	_____
D. Cleaning Wells	_____
Session II. Selecting and Installing Pumps, Part One	
A. Introduction to Jet Pumps in Wells	_____
B. Shallow-Well Jet Pumps	_____
Session III. Selecting and Installing Pumps, Part Two	
A. Deep-Well Jet Pumps	_____
B. Submersible Jet Pumps	_____
Laboratory	
Session IV. Selecting and Installing Water Supply Lines and Storage Tanks	
A. Water Supply Lines	_____
B. Water Storage Tanks	_____
C. Review	_____
D. Module Examination	_____
1. Trainees must score 70 percent or higher to receive recognition from NCCER.	
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	
E. Performance Testing	_____
1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises and Teaching Tips can be used to satisfy the Performance Testing requirements.	
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	

Annotated Instructor's Guide

MODULE OVERVIEW

This module describes the types of private sewage systems, discusses the maintenance and replacement of these systems, and explains how to determine the local code requirements for these systems. Trainees will learn how to perform percolation tests and to plan and lay out a sewage system.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum; Plumbing Level One; Plumbing Level Two; Plumbing Level Three; and Plumbing Level Four*, Modules 02401-06 through 02408-06.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Describe the types of private waste disposal systems.
2. Discuss the installation and maintenance of private waste disposal systems.
3. Discuss the local code requirements for private waste disposal systems.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen

Transparencies

Blank acetate sheets

Transparency pens

Whiteboard/chalkboard

Markers/chalk

Pencils and scratch paper

Appropriate personal protective equipment

Copies of your local code

Distribution box

Calculators

Section of perforated plastic distribution pipe, nylon screens, and section of flexible, corrugated, perforated pipe

Copies of a system's design drawings, site plans, and soil quality data (optional)

Copies of Quick Quiz**

Module Examinations*

Performance Profile Sheets*

* Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

**Located at the end of this module.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Remind them to take proper precautions and follow confined spaces safety procedures when working in or around septic tanks and septic systems. Stress the importance of disposing of sewage and sludge safely and in accordance with local codes.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

The Septic System Owner's Manual. Lloyd Kahn, et al. Bolinas, CA: Shelter Publications Inc.

Wells and Septic Systems. Max Alth, Charlotte Alth, and S. Blackwell Duncan. Blue Ridge Summit, PA: Tab Books.

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 10 hours are suggested to cover *Private Waste Disposal Systems*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Trainee proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

Topic	Planned Time
Session I. Types of Private Waste Disposal Systems, Part One	
A. Introduction	_____
B. Soil Absorption Systems	_____
1. Septic Systems	_____
2. Aeration Systems	_____
2. Pressure Distribution Systems	_____
Session II. Types of Private Waste Disposal Systems, Part Two	
A. Organic Systems	_____
B. Closed Systems	_____
C. Drywells and Cesspools	_____
Session III. Locating and Sizing Soil Absorption Systems	
A. General Considerations	_____
B. Locating and Sizing Septic Tanks	_____
C. Soil Evaluation and Percolation Testing	_____
D. Sizing the Leach Field	_____
Session IV. Installing and Servicing Private Waste Disposal Systems	
A. Installing Septic Tanks	_____
B. Installing Distribution Pipes in Leach Fields	_____
C. Cleaning and Servicing Septic Tanks and Aeration Tanks	_____
D. Review	_____
E. Module Examination	_____
1. Trainees must score 70 percent or higher to receive recognition from NCCER.	
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	

MODULE OVERVIEW

This module introduces trainees to plumbing systems in swimming pools, hot tubs, and spas. Trainees will learn how to install and troubleshoot water supply systems and drains for these recreational fixtures.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum; Plumbing Level One; Plumbing Level Two; Plumbing Level Three; and Plumbing Level Four*, Modules 02401-06 through 02409-06.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Identify swimming pool and hot tub systems and their components.
2. Calculate the volume and turnover rate of a pool using your local code.
3. Explain water quality issues related to swimming pools and hot tubs.
4. Identify and explain backflow prevention requirements for swimming pools and hot tubs according to local procedures and codes.

PERFORMANCE TASKS

Under the supervision of the instructor, the trainee should be able to do the following:

1. Calculate the volume and turnover rate of a pool using your local code.
2. Identify components of piping for a spa.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen	Skimmer
Transparencies	Water supply fitting
Blank acetate sheets	Floater, chlorine tablets, and basin of water
Transparency pens	Chlorine and pH test kits and samples of swimming pool water
Whiteboard/chalkboard	Copies of <i>Figure 14</i> with callouts covered (optional)
Markers/chalk	Access to several computers with internet connections (optional)
Pencils and scratch paper	Module Examinations*
Appropriate personal protective equipment	Performance Profile Sheets*
Copies of your local code	
Water supply fittings for swimming pools, as follows:	
Vacuum fitting	
Sidewall drain	

* Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize that pool and spa chemicals should be stored tightly sealed, away from direct sunlight. Stress the importance of regular cleaning and maintenance of filters and regular inspection of hot tubs and spas.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

Basic Above Ground Pool Installation. Don Burger. Hesperia, CA: Superior Publishing.

How to Build a Hot Tub. Carlton Hollander. New York: Sterling Publishing Company.

The Pool Book: Building and Maintaining Swimming Pools & Spas. Gerard C. O'Connell. Tucson, AZ: Fisher Books.

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 10 hours are suggested to cover *Swimming Pools and Hot Tubs*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Trainee proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

Topic	Planned Time
Session I. Private Swimming Pools, Part One	
A. Introduction to Swimming Pools	_____
B. Sizing a Swimming Pool	_____
C. Performance Testing (Task 1)	_____
Session II. Private Swimming Pools, Part Two	
A. Installing a Water Supply and Recirculation System	_____
B. Gutters and Drains	_____
C. Maintaining Sanitary Water Conditions	_____
Session III. Hot Tubs and Spas, Part One	
A. Overview of Hot Tubs and Spas	_____
B. Hot Tub Systems	_____
C. Spa Systems	_____
D. Pre-Installation Steps	_____
Session IV. Hot Tubs and Spas, Part Two	
A. Hot Tub and Spa Components	_____
B. Laboratory – Trainees label and explain the function of spa piping components. Note the trainees' proficiency. This laboratory corresponds to Performance Task 2.	_____
C. Installing Hot Tubs and Spas	_____
D. The Worksheet	_____
E. Review	_____
F. Module Examination	_____
1. Trainees must score 70 percent or higher to receive recognition from NCCER.	
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	
G. Performance Testing	_____
1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises and Teaching Tips can be used to satisfy the Performance Testing requirements.	
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	

Annotated Instructor's Guide**MODULE OVERVIEW**

This module describes the location and layout of plumbing systems for mobile home and travel trailer parks. Trainees will learn how to design and lay out a system, connect water and sewer lines to a mobile home, and estimate materials and costs for the park.

PREREQUISITES

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum; Plumbing Level One; Plumbing Level Two; Plumbing Level Three; and Plumbing Level Four*, Modules 02401-06 through 02410-06.

OBJECTIVES

Upon completion of this module, the trainee will be able to do the following:

1. Describe the proper location, layout, and procedures for connecting sewer and supply lines for a mobile home park.
2. Explain code issues that are specific to mobile homes.
3. Describe a travel trailer park and its plumbing needs.
4. Describe a sanitary dump system.

PERFORMANCE TASK

Under the supervision of the instructor, the trainee should be able to do the following:

1. Lay out a mobile home park for a minimum of 10 units.

MATERIALS AND EQUIPMENT LIST

Overhead projector and screen

Transparencies

Blank acetate sheets

Transparency pens

Whiteboard/chalkboard

Markers/chalk

Pencils and scratch paper

Appropriate personal protective equipment

Copies of your local code

Section of flexible pipe and quick-disconnect fitting of the same size

Hose connection vacuum breaker and a sill cock

Copies of a plot plan for a mobile home park (optional)

Module Examinations*

Performance Profile Sheets*

* Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly, especially when working with DWV and sewer lines. Remind them to install corrosion-resistant water supply piping that complies with local code. Stress the importance of using OSHA safety guidelines when working in trenches.

ADDITIONAL RESOURCES

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than for task training.

Code Check Plumbing: A Field Guide to Plumbing. Redwood Kardon, Michael Casey, and Douglas Hansen. Newtown, CT: Taunton Press.

Manufactured Housing Site Development Guide. Welford Sanders. Chicago, IL: American Planning Association.

Planning Drain, Waste & Vent Systems. Howard C. Massey. Carlsbad, CA: Craftsman Book Company.

TEACHING TIME FOR THIS MODULE

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 10 hours are suggested to cover *Plumbing for Mobile Homes and Travel Trailers*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Trainee proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.

Topic	Planned Time
Session I. Plumbing for Mobile Homes	
A. Plumbing Standards for Mobile Homes	_____
B. Types of Mobile Homes	_____
C. Piping and Fittings for Mobile Homes	_____
Session II. Plumbing for Travel Trailers	
A. Plumbing Standards for Travel Trailers	_____
B. Types of Travel Trailers	_____
C. Piping and Fittings for Travel Trailers	_____
Session III. Water Supply and DWV Systems for Mobile Home Parks	
A. Water Supply Systems	_____
B. DWV Systems	_____
C. Performance Testing	_____
Session IV. Water Supply and DWV Systems for Travel Trailer Parks	
A. Water Supply Systems	_____
B. DWV Systems	_____
C. Review	_____
D. Module Examination	_____
1. Trainees must score 70 percent or higher to receive recognition from NCCER.	
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	
E. Performance Testing	_____
1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises and Teaching Tips can be used to satisfy the Performance Testing requirements.	
2. Record the testing results on Craft Training Report Form 200, and submit the results to the Training Program Sponsor.	