MODULE OVERVIEW
This module introduces the carpentry trainee to the carpentry trade, including the apprenticeship process and the opportunities within the trade.

PREREQUISITES
Prior to training with this module, it is suggested that the trainee shall have successfully completed Core Curriculum.

OBJECTIVES
Upon completion of this module, the trainee will be able to do the following:
1. Describe the history of the carpentry trade.
2. Identify the aptitudes, behaviors, and skills needed to be a successful carpenter.
3. Identify the training opportunities within the carpentry trade.
4. Identify the career and entrepreneurial opportunities within the carpentry trade.
5. Identify the responsibilities of a person working in the construction industry.
6. State the personal characteristics of a professional.
7. Explain the importance of safety in the construction industry.

PERFORMANCE TASKS
This is a knowledge-based module—there is no performance testing.

MATERIALS AND EQUIPMENT LIST

<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transparencies</td>
<td>Pencils and scratch paper</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Overhead projector and screen</td>
</tr>
<tr>
<td>Blank acetate sheets</td>
<td>Whiteboard/chalkboard</td>
</tr>
<tr>
<td>Transparency pens</td>
<td>Appropriate personal protective equipment</td>
</tr>
<tr>
<td></td>
<td>Module Examinations*</td>
</tr>
</tbody>
</table>

* 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.

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 2½ hours are suggested to cover Orientation to the Trade. You will need to adjust the time required for hands-on activity and testing based on your class size and resources.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session I. Orientation to the Trade</strong></td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td></td>
</tr>
<tr>
<td>B. History of Carpentry</td>
<td></td>
</tr>
<tr>
<td>C. Modern Carpentry</td>
<td></td>
</tr>
<tr>
<td>D. Opportunities in the Construction Industry</td>
<td></td>
</tr>
<tr>
<td>1. Formal Construction Training</td>
<td></td>
</tr>
<tr>
<td>2. Apprenticeship Program</td>
<td></td>
</tr>
<tr>
<td>3. Responsibilities of the Employee</td>
<td></td>
</tr>
<tr>
<td>4. What You Should Expect from Your Employer</td>
<td></td>
</tr>
</tbody>
</table>
5. What You Should Expect from a Training Program

6. What You Should Expect from the Apprenticeship Committee

E. Human Relations
   1. Making Human Relations Work
   2. Human Relations and Productivity
   3. Attitude
   4. Maintaining a Positive Attitude

F. Employer and Employee Safety Obligations

G. Review

H. 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 the carpentry trainee to wood building materials, fasteners, and adhesives.

**PREREQUISITES**

Prior to training with this module, it is suggested that the trainee shall have successfully completed Core Curriculum; Carpentry Fundamentals Level One, Module 27101-06.

**OBJECTIVES**

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

1. Identify various types of building materials and their uses.
2. State the uses of various types of hardwoods and softwoods.
3. Identify the different grades and markings of wood building materials.
4. Identify the safety precautions associated with building materials.
5. Describe the proper method of storing and handling building materials.
6. State the uses of various types of engineered lumber.
7. Calculate the quantities of lumber and wood products using industry-standard methods.
8. Describe the fasteners, anchors, and adhesives used in construction work and explain their uses.

**PERFORMANCE TASKS**

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

1. Calculate the quantities of lumber and wood products using industry-standard methods.
2. Given a selection of building materials, identify a particular material and state its use.

**MATERIALS AND EQUIPMENT LIST**

| Transparencies | Samples of various concrete blocks |
| Markers/chalk | Samples of metal framing materials |
| Blank acetate sheets | Samples of various kinds of: |
| Transparency pens | Nails |
| Pencils and scratch paper | Screws |
| Overhead projector and screen | Bolts |
| Whiteboard/chalkboard | Anchors |
| Appropriate personal protective equipment | Construction adhesives |
| Samples of lumber containing: | Cross section of a tree trunk (optional) |
| Grade stamps | Drill and bits |
| Natural defects | Hammer |
| Manufacturing defects | Screwdriver |
| Samples of plywood containing grade stamps | Calculator |
| Samples of engineered sheet materials | Module Examinations* |
| (OSB, particleboard, etc.) | Performance Profile Sheets* |
| Samples of engineered lumber | |
| (LVL, PSL, glulam, etc.) | |

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**SAFETY CONSIDERATIONS**

Ensure that the trainees are equipped with appropriate personal protective equipment.
**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.


**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 Building Materials, Fasteners, and Adhesives. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session I. Introduction; Lumber Sources and Uses; Lumber Defects;</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Lumber Grading; Plywood</strong></td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td></td>
</tr>
<tr>
<td>B. Lumber Sources and Uses</td>
<td></td>
</tr>
<tr>
<td>1. Lumber Cutting</td>
<td></td>
</tr>
<tr>
<td>2. General Classifications of Lumber</td>
<td></td>
</tr>
<tr>
<td>C. Lumber Defects</td>
<td></td>
</tr>
<tr>
<td>1. Moisture and Warping</td>
<td></td>
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<tr>
<td>2. Preventing Warping and Splitting</td>
<td></td>
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<tr>
<td>D. Lumber Grading</td>
<td></td>
</tr>
<tr>
<td>1. Grading Terms</td>
<td></td>
</tr>
<tr>
<td>2. Classification of Manufacturing Defects</td>
<td></td>
</tr>
<tr>
<td>3. Abbreviations</td>
<td></td>
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<tr>
<td>E. Plywood</td>
<td></td>
</tr>
<tr>
<td>1. Plywood Sheet Sizes</td>
<td></td>
</tr>
<tr>
<td>2. Grading for Softwood Construction Plywood</td>
<td></td>
</tr>
<tr>
<td>3. Plywood Storage</td>
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</tbody>
</table>

**Session II. Building Boards; Engineered Wood Products; Pressure-Treated Lumber; Calculating Lumber Quantities; Concrete Block Construction; Commercial Construction Methods**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tbody>
<tr>
<td>A. Building Boards</td>
<td></td>
</tr>
<tr>
<td>1. Hardboard</td>
<td></td>
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<tr>
<td>2. Particleboard</td>
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</tr>
<tr>
<td>3. High-Density Overlay (HDO) and Medium-Density Overlay (MDO) Plywood</td>
<td></td>
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<tr>
<td>4. Oriented Strand Board (OSB)</td>
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<tr>
<td>5. Mineral Fiberboards</td>
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</tr>
</tbody>
</table>
B. Engineered Wood Products
   1. Laminated Veneer Lumber (LVL)
   2. Parallel Strand Lumber (PSL)
   3. Laminated Strand Lumber (LSL)
   4. Wood I-Beams
   5. Glue-Laminated Lumber (Glulam)

C. Pressure-Treated Lumber

D. Calculating Lumber Quantities

E. Laboratory
   Have the trainees calculate the quantities of lumber and wood products required for an instructor-supplied project. This laboratory corresponds to Performance Task 1.

F. Concrete Block Construction

G. Commercial Construction Methods
   1. Floors
   2. Exterior Walls
   3. Interior Walls and Partitions
   4. Metal Framing Materials

Session III. Nails; Staples; Screws; Bolts; Mechanical Anchors; Epoxy Anchoring Systems; Adhesives; Review; Module Examination and Performance Testing

A. Nails
B. Staples
C. Screws
   1. Wood Screws
   2. Sheet Metal Screws
   3. Machine Screws
   4. Lag Screws and Shields
   5. Concrete/Masonry Screws
   6. Deck Screws
   7. Drywall Screws
   8. Drive Screws
   9. Hammer-Driven Pins and Studs
D. Bolts
   1. Stove Bolts
   2. Machine Bolts
   3. Carriage Bolts
E. Mechanical Anchors
   1. Anchor Bolts
   2. One-Step Anchors
   3. Bolt Anchors
   4. Screw Anchors
   5. Self-Drilling Anchors
   6. Guidelines for Drilling Anchor Holes in Hardened Concrete or Masonry
   7. Hollow-Wall Anchors
F. Epoxy Anchor Systems

G. Adhesives
   1. Glues
   2. Construction Adhesives
   3. Mastics
   4. Shelf Life

H. Laboratory
   Have the trainees identify and state the use of various building materials.
   This laboratory corresponds to Performance Task 2.

I. Review

J. 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.

K. 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 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 expands upon the hand and power tool information provided in the Core Curriculum and introduces the carpentry trainee to additional tools used in the carpentry trade.

PREREQUISITES
Prior to training with this module, it is suggested that the trainee shall have successfully completed Core Curriculum; Carpentry Fundamentals Level One, Modules 27101-06 and 27102-06.

OBJECTIVES
Upon completion of this module, the trainee will be able to do the following:
1. Identify the hand tools commonly used by carpenters and describe their uses.
2. Use hand tools in a safe and appropriate manner.
3. State the general safety rules for operating all power tools, regardless of type.
4. State the general rules for properly maintaining all power tools, regardless of type.
5. Identify the portable power tools commonly used by carpenters and describe their uses.
6. Use portable power tools in a safe and appropriate manner.

PERFORMANCE TASKS
Under the supervision of the instructor, the trainee should be able to do the following:
1. Demonstrate the safe and proper use of the following hand tools:
   - Levels
   - Squares
   - Planes
   - Clamps
   - Saws
2. Demonstrate or describe the safe and proper use of five of the following power tools:
   - Circular saw
   - Portable table saw
   - Compound miter saw
   - Frame and trim saw
   - Drill press
   - Router/laminate trimmer
   - Portable power plane
   - Power metal shears
   - Pneumatic nailer/stapler
# MATERIALS AND EQUIPMENT LIST

- **Transparencies**
- **Markers/chalk**
- **Blank acetate sheets**
- **Transparency pens**
- **Pencils and scratch paper**
- **Overhead projector and screen**
- **Whiteboard/chalkboard**
- **Appropriate personal protective equipment**
- **Soapstone**
- **Yard-long lengths of 1” reinforcing rod**
- **1 × 4 stock about 18” to 24” long**
- **2 × 4s 18” to 24” long**
- **2 × 4s 4’ long**
- **6” × 12” pieces of ¾” plywood**
- **Pieces of crown molding 4’ long**
- **Angle iron, steel rod, or pipe for cutting**
- **Wood stock of various sizes**
- **Laminate samples**
- **Blocks of scrap wood**
- **Fasteners (nails and staples) designed for the pneumatic fastener being used**
- **Sheet metal stock**
- **Folding rule or steel tape**
- **Levels:**
  - Line
  - Water
  - Builder’s
  - Transit
  - Laser
- **Squares:**
  - Try
  - Sliding T-bevel
  - Speed square
  - Miter
  - Framing
  - Adjustable T-square
- **Planes:**
  - Block
  - Jack
  - Smoothing
  - Jointer

### Clamps:
- Web
- Hand-screw
- Bar
- Spring
- Locking C
- Pipe

### Saws:
- Hacksaw and replacement blades
- Backsaw
- Dovetail
- Compass
- Coping
- Chalkline
- Clamping device
- Portable circular saw
- Circular saw protractor
- Portable table saw
- Miter/compound miter saw
- Frame and trim saw
- Demolition saw
- Chop saw
- Miter gauge
- Ripping fence for portable circular saw
- Push stick
- Sawhorses or other solid support
- Drill press and chuck key
- Portable power plane and blades
- Power metal shears
- Router and router bits
- Laminate trimmer and bits
- Pneumatic fastener and manufacturer’s instruction manual
- Electric air compressor with air hose
- Copies of Worksheet 1*
- Copies of Job Sheets 1 through 7*
- Module Examinations**
- Performance Profile Sheets**

* Packaged with this Annotated Instructor’s Guide.

**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.
### 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.

- *Tricks of the Trade: Jigs, Tools and Other Labor-Saving Devices*. Newton, CT: Taunton Press, Inc.

Black & Decker. [www.blackanddecker.com](http://www.blackanddecker.com)

Bosch Tool Corporation. [www.boschtools.com](http://www.boschtools.com)

Delta Machinery. [www.deltamachinery.com](http://www.deltamachinery.com)

DeWalt Industrial Tool Company. [www.dewalt.com](http://www.dewalt.com)

Makita Tools USA. [www.makita.com](http://www.makita.com)

Milwaukee Electric Tool Company. [www.milwaukee Tool.com](http://www.milwaukee Tool.com)

Porter-Cable Corporation. [www.portercable.com](http://www.portercable.com)

Ridge Tool Company. [www.ridgid.com](http://www.ridgid.com)

The Stanley Works. [www.stanleytools.com](http://www.stanleytools.com)

L.S. Starrett Company. [www.starrett.com](http://www.starrett.com)

### 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 *Hand and Power Tools*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session I. Introduction; Hand Tools</strong></td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td></td>
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<tr>
<td>B. Hand Tools</td>
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<tr>
<td>1. Levels</td>
<td></td>
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<tr>
<td>2. Laboratory</td>
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</tr>
<tr>
<td>Under your supervision, have the trainees practice using various levels. This laboratory corresponds to Performance Task 1.</td>
<td></td>
</tr>
<tr>
<td>3. Squares</td>
<td></td>
</tr>
<tr>
<td>4. Laboratory</td>
<td></td>
</tr>
<tr>
<td>Hand out Job Sheet 27103-1. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 1.</td>
<td></td>
</tr>
</tbody>
</table>
5. Planes

6. Laboratory
   Under your supervision, have the trainees practice using various planes.
   This laboratory corresponds to Performance Task 1.

7. Clamps

8. Laboratory
   Under your supervision, have the trainees practice using various clamps.
   This laboratory corresponds to Performance Task 1.

9. Saws

10. Laboratory
    Hand out Job Sheet 27103-2. Under your supervision, have the trainees perform the tasks on the Job Sheet. Note the proficiency of each trainee.

Session II. Guidelines for Using All Power Tools; Power Saws
A. Guidelines for Using All Power Tools
   1. Safety Rules Pertaining to All Power Tools
   2. Guidelines Pertaining to the Care of All Power Tools

B. Power Saws
   1. Circular Saws
   2. Laboratory
      Hand out Worksheet 27103-1 and Job Sheets 27103-3 and -4. Under your supervision, have the trainees complete the circular saw safety test prior to performing the related tasks on the Job Sheets. Note the proficiency of each trainee.
   3. Portable Table Saws
   4. Laboratory
      Hand out Worksheet 27103-1 and Job Sheets 27103-3 and -4. Under your supervision, have the trainees complete the table saw safety test before performing the related tasks on the Job Sheets. Note the proficiency of each trainee.
   5. Power Miter Saws/Compound Miter Saws
   6. Laboratory
      Hand out Worksheet 27103-1 and Job Sheet 27103-5. Under your supervision, have the trainees complete the compound miter saw safety test before performing the related tasks on the Job Sheet. Note the proficiency of each trainee.
   7. Frame and Trim Saws
   8. Laboratory
      Hand out Worksheet 27103-1 and Job Sheet 27103-5. Under your supervision, have the trainees complete the frame and trim saw safety test before performing the related tasks on the Job Sheet. Note the proficiency of each trainee.
   9. Abrasive Saws
   10. Power Saw Blades

Session III. Drill Press; Routers/Laminate Trimmers; Portable Power Planes; Power Metal Shears; Pneumatic/Cordless Nailers and Staplers
A. Drill Press
   1. Laboratory
      Hand out Worksheet 27103-1 and Job Sheet 27103-6. Under your supervision, have the trainees complete the drill press safety test prior to performing the related tasks on the Job Sheet. Note the proficiency of each trainee.
B. Routers/Laminate Trimmers
   1. Laboratory
      Hand out Worksheet 27103-1. Under your supervision, have the trainees complete the router and laminate trimmer safety test before operating these tools. Note the proficiency of each trainee.

C. Portable Power Planes
   1. Laboratory
      Hand out Worksheet 27103-1. Under your supervision, have the trainees complete the power plane safety test before operating these tools. Note the proficiency of each trainee.

D. Power Metal Shears
   1. Laboratory
      Hand out Worksheet 27103-1. Under your supervision, have the trainees complete the power metal shears safety test before using the shears. Note the proficiency of each trainee.

E. Pneumatic/Cordless Nailers and Staplers
   1. Laboratory
      Hand out Worksheet 27103-1 and Job Sheet 27103-7. Under your supervision, have the trainees complete the pneumatic fasteners safety test before performing the related tasks on the Job Sheet. Note the proficiency of each trainee.

Session IV. Review; Module Examination and Performance Testing
   A. Review
   B. 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.
   C. 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 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 and builds on the construction drawing (blueprint) material introduced in the Core Curriculum. It also introduces new information and techniques relevant to the carpentry trade for reading construction drawings and specifications.

PREREQUISITES
Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum; and Carpentry Fundamentals Level One, Modules 27101-06 through 27103-06.

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

1. Describe the types of drawings usually included in a set of plans and list the information found on each type.
2. Identify the different types of lines used on construction drawings.
3. Identify selected architectural symbols commonly used to represent materials on plans.
4. Identify selected electrical, mechanical, and plumbing symbols commonly used on plans.
5. Identify selected abbreviations commonly used on plans.
6. Read and interpret plans, elevations, schedules, sections, and details contained in basic construction drawings.
7. State the purpose of written specifications.
8. Identify and describe the parts of a specification.
9. Demonstrate or describe how to perform a quantity takeoff for materials.

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

1. Interpret selected symbols and abbreviations used on drawings.
2. Read and interpret site/plot plans.
3. Read and interpret foundation, floor, and other plan view drawings.
4. Read and interpret elevation view drawings.
5. Read and interpret section and detail drawings.
6. Read and interpret schedules.
7. Read and interpret written specifications.
8. Perform a quantity takeoff for materials.

MATERIALS AND EQUIPMENT LIST

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transparencies</td>
<td>Example specification in the Construction Specification Institute (CSI) format</td>
</tr>
<tr>
<td>Markers/chalk</td>
<td>Detailed copy of the Construction Specification Institute (CSI) format</td>
</tr>
<tr>
<td>Blank acetate sheets</td>
<td>Copies of local building codes</td>
</tr>
<tr>
<td>Transparency pens</td>
<td>Copies of quantity takeoff forms</td>
</tr>
<tr>
<td>Pencils and scratch paper</td>
<td>Architect’s and engineer’s rule</td>
</tr>
<tr>
<td>Overhead projector and screen</td>
<td>Calculator</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Copies of Worksheets 1 through 4*</td>
</tr>
<tr>
<td>Appropriate personal protective equipment</td>
<td>Module Examinations**</td>
</tr>
<tr>
<td>Set(s) of architect’s or general contractor’s drawings</td>
<td>Performance Profile Sheets**</td>
</tr>
</tbody>
</table>

* Packaged with this Annotated Instructor’s Guide.
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SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment.

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. Newton, CT: Taunton Press.


The Construction Specifications Institute. An organization that seeks to facilitate communication among all those involved in the building process. www.csinet.org


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 20 hours are suggested to cover Reading Plans and Elevations. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tbody>
<tr>
<td>Session I. Introduction; Drawing Set</td>
<td></td>
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<tr>
<td>A. Introduction</td>
<td></td>
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<tr>
<td>B. Drawing Set</td>
<td></td>
</tr>
<tr>
<td>1. Title Sheets, Title Blocks, and Revision Blocks</td>
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<tr>
<td>2. Plan View Drawings</td>
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<tr>
<td>3. Elevation Drawings</td>
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<td>4. Section Drawings</td>
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<td>5. Detail Drawings</td>
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<tr>
<td>6. Schedules</td>
<td></td>
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<tr>
<td>7. Structural Drawings</td>
<td></td>
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<tr>
<td>8. Plumbing, Mechanical, and Electrical Plans</td>
<td></td>
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<tr>
<td>9. Shop Drawings</td>
<td></td>
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<tr>
<td>10. As-Built Drawings</td>
<td></td>
</tr>
<tr>
<td>11. Soil Reports</td>
<td></td>
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</tbody>
</table>
Session II. Reading and Interpreting Drawings
A. Reading and Interpreting Drawings
   1. Lines Used on Drawings
   2. Symbols Used on Drawings
   3. Dimensioning
   4. Abbreviations
   5. Architectural Terms Used in Drawings and Specifications
B. Laboratory
   Hand out Worksheet 27104-1. Have the trainees complete the Worksheet.
   This laboratory corresponds to Performance Task 1.

Session III. Guidelines for Reading a Drawing Set
A. Guidelines for Reading a Drawing Set

Session IV. Laboratory
A. Laboratory
   Hand out Worksheets 27104-2 and 27104-3. Have the trainees complete the Worksheets.
   This laboratory corresponds to Performance Tasks 2 through 6.

Session V. Specifications
A. Specifications
   1. Organization and Types of Specifications
B. Laboratory
   Hand out Worksheet 27104-4. Have the trainees complete the Worksheet.
   This laboratory corresponds to Performance Task 7.

Session VI. Building Codes; Quantity Takeoffs
A. Building Codes
B. Quantity Takeoffs
C. Laboratory
   Under your supervision, and using an instructor-supplied drawing set and specifications, have the trainees practice doing a material quantity takeoff for a building, or one room in a building, etc. This laboratory corresponds to Performance Task 8.

Session VII. Project Organization; Working with Other Trades; Project Schedules; Review
A. Project Organization
B. Working with Other Trades
C. Project Schedules
D. Review

Session VIII. Module Examination and Performance Testing
A. 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.
B. 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 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 introduces the carpentry trainee to residential floor systems. It covers the materials and general methods used to construct floor systems, with emphasis placed on the platform method of floor framing.

PREREQUISITES

Prior to training with this module, it is suggested that the trainee shall have successfully completed Core Curriculum; and Carpentry Fundamentals Level One, Modules 27101-06 through 27104-06.

OBJECTIVES

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

1. Identify the different types of framing systems.
2. Read and interpret drawings and specifications to determine floor system requirements.
3. Identify floor and sill framing and support members.
4. Name the methods used to fasten sills to the foundation.
5. Given specific floor load and span data, select the proper girder/beam size from a list of available girders/beams.
6. List and recognize different types of floor joists.
7. Given specific floor load and span data, select the proper joist size from a list of available joists.
8. List and recognize different types of bridging.
9. List and recognize different types of flooring materials.
10. Explain the purposes of subflooring and underlayment.
11. Match selected fasteners used in floor framing to their correct uses.
12. Estimate the amount of material needed to frame a floor assembly.
13. Demonstrate the ability to:
   - Lay out and construct a floor assembly
   - Install bridging
   - Install joists for a cantilever floor
   - Install a subfloor using butt-joint plywood/OSB panels
   - Install a single floor system using tongue-and-groove plywood/OSB panels

PERFORMANCE TASKS

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

1. Lay out and construct a floor assembly.
2. Install bridging.
3. Install joists for a cantilever floor.
4. Install a subfloor using butt-joint plywood/OSB panels.
5. Install a single floor system using tongue-and-groove plywood/OSB panels.
6. Estimate the amount of material needed to frame a floor assembly.
7. Given specific floor load and span data, select the proper girder/beam and joist size from a list of available girders/beams/joists.
MATERIALS AND EQUIPMENT LIST

- Transparencies
- Markers/chalk
- Blank acetate sheets
- Transparency pens
- Pencils and scratch paper
- Overhead projector and screen
- Whiteboard/chalkboard
- Appropriate personal protective equipment
- Floor adhesive (optional)
- Beam material
- Grout
- Plywood or OSB butt-joint panels to cover floor area
- Plywood or OSB (tongue-and-groove, 1/4") to cover floor area
- Shim materials
- Sill sealer
- Steel bridging and instructions
- Termite shield
- 2 × 6s for sills
- 2 × 10s for joists and headers
- 1 × 4s or 2 × 10s for bridging
- 8d box nails for bridging
- 8d box, screw, or ring shank nails for flooring
- 16d box nails for joists and headers
- 8d doublehead box nails
- Pictures, photographs, etc., showing braced, balloon, platform, and post-and-beam framing
- Sets of building working drawings and specifications
- Examples of several floor plans and specifications
- Pictures/photos of building damage that resulted from defective floor and sill framing (optional)
- Tool box consisting of standard carpenter’s hand tools
- Chalkline
- Electric drill and assorted drill and flat bits
- Framing square
- Level
- 100’ tape
- Power circular saw and extension cord
- Reciprocating saw
- Tin snips
- Copies of Worksheets 1 through 3*
- Copies of Job Sheets 1 through 5*
- Module Examinations**
- Performance Profile Sheets**

* Packaged with this Annotated Instructor’s Guide.

**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.

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.


Building with Floor Trusses. Madison, WI: Wood Truss Council of America (11-minute DVD or video).


American Wood Council. A trade association that develops design tools and guidelines for wood construction. [www.awc.org](http://www.awc.org)

Western Wood Products Association. A trade association representing softwood lumber manufacturers in 12 western states and Alaska. [www.wwpa.com](http://www.wwpa.com)

Wood I-Joist Manufacturers Association. An organization representing manufacturers of prefabricated wood I-joist and structural composite lumber. [www.i-joist.org](http://www.i-joist.org)
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 equals 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 25 hours are suggested to cover Floor Systems. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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</thead>
<tbody>
<tr>
<td>Session I. Introduction; Methods of Framing Houses; Building Working Drawings and Specifications</td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td></td>
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<tr>
<td>B. Methods of Framing Houses</td>
<td></td>
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<tr>
<td>1. Platform Frame</td>
<td></td>
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<tr>
<td>2. Braced Frame</td>
<td></td>
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<tr>
<td>3. Balloon Frame</td>
<td></td>
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<tr>
<td>4. Post-and-Beam Frame</td>
<td></td>
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<tr>
<td>C. Building Working Drawings and Specifications</td>
<td></td>
</tr>
<tr>
<td>1. Architectural Drawings</td>
<td></td>
</tr>
<tr>
<td>2. Plumbing, Mechanical, and Electrical Plans</td>
<td></td>
</tr>
<tr>
<td>3. Reading Blueprints</td>
<td></td>
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<tr>
<td>4. Specifications</td>
<td></td>
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<tr>
<td>Session II. The Floor System</td>
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<tr>
<td>A. The Floor System</td>
<td></td>
</tr>
<tr>
<td>1. Sills</td>
<td></td>
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<tr>
<td>2. Beams/Girders and Supports</td>
<td></td>
</tr>
<tr>
<td>3. Floor Joists</td>
<td></td>
</tr>
<tr>
<td>4. Bridging</td>
<td></td>
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<tr>
<td>5. Subflooring</td>
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<tr>
<td>Session III. Laying Out and Constructing a Platform Floor Assembly</td>
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<tr>
<td>A. Laying Out and Constructing a Platform Floor Assembly</td>
<td></td>
</tr>
<tr>
<td>1. Checking the Foundation for Squareness</td>
<td></td>
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<tr>
<td>2. Installing the Sill</td>
<td></td>
</tr>
<tr>
<td>3. Installing a Beam/Girder</td>
<td></td>
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<tr>
<td>4. Laying Out Sills and Girders for Floor Joists</td>
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<tr>
<td>5. Laying Out Joist Locations for the Partition and Floor Openings</td>
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<tr>
<td>6. Cutting and Installing Joist Headers</td>
<td></td>
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<tr>
<td>7. Installing Floor Joists</td>
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<tr>
<td>8. Framing Opening(s) in the Floor</td>
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<tr>
<td>9. Installing Bridging</td>
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<tr>
<td>10. Installing Subflooring</td>
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<tr>
<td>B. Laboratory</td>
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<tr>
<td></td>
<td>Hand out Worksheets 27105-1 and 27105-2. Have the trainees complete the tasks on the Worksheets. Note the proficiency of each trainee.</td>
</tr>
</tbody>
</table>
Session IV. Laboratory
A. Laboratory
Hand out Job Sheet 27105-1. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 1.

Session V. Laboratory
A. Laboratory
Hand out Job Sheet 27105-2. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 2.

Session VI. Laboratory
A. Laboratory
Hand out Job Sheet 27105-3. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 3.

Session VII. Laboratory
A. Laboratory
Hand out Job Sheet 27105-4. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 4.

Session VIII. Installing Joists for Projections and Cantilevered Floors
A. Installing Joists for Projections and Cantilevered Floors
B. Laboratory
Hand out Job Sheet 27105-5. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 5.

Session IX. Estimating the Quantity of Floor Materials
A. Estimating the Quantity of Floor Materials
1. Sill, Sill Sealer, and Termite Shield
2. Beams/Girders
3. Joists and Joist Headers
4. Bridging
5. Flooring
B. Laboratory
Hand out Worksheet 27105-3. Have the trainees complete the tasks on the Worksheet. This laboratory corresponds to Performance Task 6.

Session X. Guidelines for Determining Proper Girder and Joist Sizes; Review; Module Examination and Performance Testing
A. Guidelines for Determining Proper Girder and Joist Sizes
1. Sizing Girders
2. Sizing Joists
B. Laboratory
Have the trainees select the proper girder/beam and joist size from the tables in the Trainee Module for various floor plans, floor loads, and span data. This laboratory corresponds to Performance Task 7.
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 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 introduces the carpentry trainee to the materials and general procedures used in wall and ceiling framing.

PREREQUISITES
Prior to training with this module, it is suggested that the trainee shall have successfully completed Core Curriculum; and Carpentry Fundamentals Level One, Modules 27101-06 through 27105-06.

OBJECTIVES
Upon completion of this module, the trainee will be able to do the following:
1. Identify the components of a wall and ceiling layout.
2. Describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window openings, partition Ts, bracing, and fire stops.
3. Describe the correct procedure for assembling and erecting an exterior wall.
4. Identify the common materials and methods used for installing sheathing on walls.
5. Lay out, assemble, erect, and brace exterior walls for a frame building.
6. Describe wall framing techniques used in masonry construction.
7. Explain the use of metal studs in wall framing.
8. Describe the correct procedure for laying out ceiling joists.
9. Cut and install ceiling joists on a wood frame building.
10. Estimate the materials required to frame walls and ceilings.

PERFORMANCE TASKS
Under the supervision of the instructor, the trainee should be able to do the following:
1. Lay out, assemble, erect, and brace exterior walls.
2. Cut and install ceiling joists on a wood frame building.
3. Estimate the materials required to frame walls and ceilings.

MATERIALS AND EQUIPMENT LIST
- Transparencies
- Markers/chalk
- Blank acetate sheets
- Transparency pens
- Pencils and scratch paper
- Overhead projector and screen
- Whiteboard/chalkboard
- Appropriate personal protective equipment
- Metal brace material
- 8d common nails
- Sheathing material
- 16d box nails
- Joist lumber
- Floor plan
- 2 × 4 or 2 × 6 framing lumber for studs and joists
- 2 × 12 header material
- 25' tape
- ½" CD plywood for header spacers
- Chalkline
- ½" CD plywood
- Steel tape
- Stock for blocking
- Framing hammer
- Framing square or speed square
- 4' level
- Copies of Job Sheets 1 through 5*
- 6' stepladder
- Module Examinations**
- Extension cord
- Performance Profile Sheets**

* Packaged with this Annotated Instructor’s Guide.
**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.

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.


*Framing Floors, Walls and Ceilings.* Newton, CT: Taunton Press.

*Framing Walls* (DVD). Newton, CT: Taunton Press.

*Graphic Guide to Frame Construction.* Newton, CT: Taunton Press.

*Precision Framing for Pros by Pros.* Newton, CT: Taunton Press.


International Code Council. A membership organization dedicated to building safety and fire prevention through development of building codes. [www.iccsafe.org](http://www.iccsafe.org)

National Association of Home Builders. A trade association whose mission is to enhance the climate for housing and the building industry. [www.nahb.org](http://www.nahb.org)

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 20 hours are suggested to cover Wall and Ceiling Framing. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tbody>
<tr>
<td>Session I. Introduction; Components of a Wall; Laying Out a Wall; Measuring and Cutting Studs; Assembling and Erecting Walls</td>
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<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Components of a Wall</td>
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<tr>
<td>1. Corners</td>
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<tr>
<td>2. Partition Intersections</td>
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<tr>
<td>3. Headers</td>
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<tr>
<td>C. Laying Out a Wall</td>
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<tr>
<td>1. Laying Out Wall Openings</td>
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<tr>
<td>D. Measuring and Cutting Studs</td>
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<tr>
<td>E. Assembling the Wall</td>
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<tr>
<td>1. Firestops</td>
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<tr>
<td>F. Erecting the Wall</td>
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<tr>
<td>1. Plumbing and Aligning Walls</td>
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<tr>
<td>Session II. Laying Out a Wall</td>
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<tr>
<td>A. Laying Out a Wall</td>
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<tr>
<td>B. Laboratory</td>
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</tbody>
</table>

Hand out Job Sheet 27106-1. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 1.
Session III. Measuring and Cutting Studs
   A. Measuring and Cutting Studs
   B. Laboratory
      Hand out Job Sheet 27106-2. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 1.

Session IV. Assembling Walls
   A. Assembling Walls
   B. Laboratory
      Hand out Job Sheet 27106-3. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 1.

Session V. Erecting Walls
   A. Erecting Walls
   B. Laboratory
      Hand out Job Sheet 27106-4. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 1.

Session VI. Ceiling Layout and Framing
   A. Ceiling Layout and Framing
      1. Cutting and Installing Ceiling Joists
   B. Laboratory
      Hand out Job Sheet 27106-5. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 2.

Session VII. Laboratory
   A. Laboratory
      Hand out Job Sheet 27106-5. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 2.

Session VIII. Estimating Materials; Wall Framing in Masonry; Steel Studs in Framing; Review; Module Examination and Performance Testing
   A. Estimating Materials
   B. Laboratory
      Have the trainees estimate the materials required to frame example walls and ceilings. This laboratory corresponds to Performance Task 3.
   C. Wall Framing in Masonry
      1. Framing Door and Window Openings in Masonry
   D. Steel Studs in Framing
      1. Fabrication
   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 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 introduces the carpentry trainee to the methods and procedures used in roof framing.

PREREQUISITES
Prior to training with this module, it is suggested that the trainee shall have successfully completed Core Curriculum; and Carpentry Fundamentals Level One, Modules 27101-06 through 27106-06.

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

1. Understand the terms associated with roof framing.
2. Identify the roof framing members used in gable and hip roofs.
3. Identify the methods used to calculate the length of a rafter.
4. Identify the various types of trusses used in roof framing.
5. Use a rafter framing square, speed square, and calculator in laying out a roof.
6. Identify various types of sheathing used in roof construction.
7. Frame a gable roof with vent openings.
8. Frame a roof opening.
10. Estimate the materials used in framing and sheathing a roof.

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

1. Use a framing square and speed square in laying out a roof.
2. Frame and sheathe a gable roof with an opening.
3. Erect a gable roof using trusses.
4. Estimate the materials used in framing and sheathing a roof.

MATERIALS AND EQUIPMENT LIST

<table>
<thead>
<tr>
<th>Transparencies</th>
<th>Nails for sheathing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markers/chalk</td>
<td>H-clips</td>
</tr>
<tr>
<td>Blank acetate sheets</td>
<td>Roof trusses</td>
</tr>
<tr>
<td>Transparency pens</td>
<td>1 × 6 lumber or plywood for catwalk</td>
</tr>
<tr>
<td>Pencils and scratch paper</td>
<td>2 × 4 lumber for braces and stakes</td>
</tr>
<tr>
<td>Overhead projector and screen</td>
<td>Sample blueprints</td>
</tr>
<tr>
<td>Whiteboard/chalkboard</td>
<td>Chalkline</td>
</tr>
<tr>
<td>Appropriate personal protective equipment</td>
<td>String line</td>
</tr>
<tr>
<td>Scientific calculator</td>
<td>Steel tape with markings at 16&quot; OC</td>
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<tr>
<td>8d common nails</td>
<td>Framing hammer</td>
</tr>
<tr>
<td>8d box nails</td>
<td>Claw hammer</td>
</tr>
<tr>
<td>16d box nails</td>
<td>Spreader for lifting trusses (if applicable)</td>
</tr>
<tr>
<td>16d common nails</td>
<td>Crane for lifting trusses (if applicable)</td>
</tr>
<tr>
<td>Roof framing plan</td>
<td>Rafter framing square</td>
</tr>
<tr>
<td>2 × 4 or 2 × 6 framing lumber for rafters and ridgeboards</td>
<td>Sawhorses</td>
</tr>
<tr>
<td>Joist and header material for roof opening</td>
<td>Speed square and booklet</td>
</tr>
<tr>
<td>½&quot; CD plywood or other sheathing material</td>
<td>Circular saw</td>
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<tr>
<td></td>
<td>Extension cord</td>
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</tbody>
</table>

continued
Handsaw  
4' level  
6' stepladders  
Plumb bob and line

* Packaged with this Annotated Instructor’s Guide.
** 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.

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.


Framing Roofs. Newton, CT: Taunton Press.


Cedar Shake and Shingle Bureau. A trade organization that promotes the common interests of members involved in quality cedar shake and shingle roofing. [www.cedarbureau.org](http://www.cedarbureau.org).


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 37¼ hours are suggested to cover Roof Framing. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session I. Introduction; Types of Roofs; Basic Roof Layout</strong></td>
<td></td>
</tr>
<tr>
<td>A. Introduction</td>
<td></td>
</tr>
<tr>
<td>B. Types of Roofs</td>
<td></td>
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<tr>
<td>C. Basic Roof Layout</td>
<td></td>
</tr>
<tr>
<td>1. Rafter Framing Square</td>
<td></td>
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<tr>
<td>2. Basic Rafter Layout</td>
<td></td>
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<tr>
<td><strong>Session II. Laboratory</strong></td>
<td></td>
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<tr>
<td>A. Laboratory</td>
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<tr>
<td>Hand out Job Sheet 27107-1. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 1.</td>
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<tr>
<td><strong>Session III. Erecting a Gable Roof</strong></td>
<td></td>
</tr>
<tr>
<td>A. Erecting a Gable Roof</td>
<td></td>
</tr>
<tr>
<td>1. Installing Rafters</td>
<td></td>
</tr>
<tr>
<td><strong>Session IV. Laboratory</strong></td>
<td></td>
</tr>
<tr>
<td>A. Laboratory</td>
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<tr>
<td>Hand out Job Sheet 27107-2. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 2.</td>
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</tr>
<tr>
<td><strong>Session V. Framing the Gable Ends; Framing a Gable Overhang</strong></td>
<td></td>
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<tr>
<td>A. Framing the Gable Ends</td>
<td></td>
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<tr>
<td>B. Framing a Gable Overhang</td>
<td></td>
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<tr>
<td><strong>Session VI. Laboratory</strong></td>
<td></td>
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<tr>
<td>A. Laboratory</td>
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<tr>
<td>Hand out Job Sheet 27107-3. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 2.</td>
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<tr>
<td><strong>Session VII. Framing an Opening in the Roof</strong></td>
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<tr>
<td>A. Framing an Opening in the Roof</td>
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</tr>
<tr>
<td><strong>Session VIII. Laboratory</strong></td>
<td></td>
</tr>
<tr>
<td>A. Laboratory</td>
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<tr>
<td>Hand out Job Sheet 27107-4. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 2.</td>
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<tr>
<td><strong>Session IX. Installing Sheathing</strong></td>
<td></td>
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<tr>
<td>A. Installing Sheathing</td>
<td></td>
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<tr>
<td>B. Laboratory</td>
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<tr>
<td>Hand out Job Sheet 27107-5. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 2.</td>
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<tr>
<td><strong>Session X. Rafter Layout Using a Speed Square</strong></td>
<td></td>
</tr>
<tr>
<td>A. Rafter Layout Using a Speed Square</td>
<td></td>
</tr>
<tr>
<td>1. Procedure for Laying Out Common Rafters</td>
<td></td>
</tr>
</tbody>
</table>
Session XI. Truss Construction
   A. Truss Construction
      1. Truss Installation
      2. Bracing of Roof Trusses

Session XII. Laboratory
   A. Laboratory
      Hand out Job Sheet 27107-6. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 3.

Session XIII. Determining Quantities of Materials
   A. Determining Quantities of Materials
      1. Determine Materials Needed for a Gable Roof
   B. Laboratory
      Have the trainees estimate the materials used in framing and sheathing a roof. This laboratory corresponds to Performance Task 4.

Session XIV. Dormers; Plank-and-Beam Framing
   A. Dormers
   B. Plank-and-Beam Framing

Session XV. Metal Roof Framing; Review; Module Examination and Performance Testing
   A. Metal Roof Framing
   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 the NCCER. If applicable, proficiency noted during laboratory exercises 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 introduces the carpentry trainee to various cements and other materials that, when mixed together, form various types of concrete. Concrete volume estimates and concrete forms are also covered. In addition, reinforcement materials such as reinforcement bars, bar supports, and welded-wire fabric are discussed.

PREREQUISITES
Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum; and Carpentry Fundamentals Level One, Modules 27101-06 through 27107-06.

OBJECTIVES
Upon completion of this module, the trainee will be able to do the following:
1. Identify the properties of cement.
2. Describe the composition of concrete.
3. Perform volume estimates for concrete quantity requirements.
4. Identify types of concrete reinforcement materials and describe their uses.
5. Identify various types of footings and explain their uses.
6. Identify the parts of various types of forms.
7. Explain the safety procedures associated with the construction and use of concrete forms.
8. Erect, plumb, and brace a simple concrete form with reinforcement.

PERFORMANCE TASKS
Under supervision of the instructor, the trainee should be able to do the following:
1. Perform volume estimates for concrete quantity requirements.
2. Construct a simple concrete form with reinforcement.

MATERIALS AND EQUIPMENT LIST

| Transparencies                  | Various mechanical splices for reinforcement steel |
| Markers/chalk                   | Various sizes, types, and grades of reinforcement materials |
| Blank acetate sheets            | Samples of various types and sizes of wire fabric |
| Transparency pens               | Exterior plywood or plyform |
| Pencils and scratch paper       | Steel tape or rule |
| Overhead projector and screen  | Basic carpenter’s toolbox |
| Whiteboard/chalkboard          | Level |
| Appropriate personal protective equipment | Plumb bob |
| Hand calculator                 | String line |
| Concrete calculator             | Duplex nails |
| Copies of a concrete table      | Plan for simple form |
| Form boards, stakes, braces, ties, and spreaders | Circular saw and extension cord |
| 16-gauge tying wire             | Copies of Worksheet 1* |
| Samples of various aggregates   | Module Examinations** |
| Samples of concrete mix         | Performance Profile Sheets** |
| Various bar supports and accessories | |

* Packaged with this Annotated Instructor’s Guide.

**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.

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.


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 Introduction to Concrete, Reinforcing Materials, and Forms. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tbody>
<tr>
<td>Session I. Introduction; Concrete and Concrete Materials; Normal Concrete Mix Proportions and Measurements; Special Types of Concrete; Curing Methods and Materials; Concrete Slump Testing</td>
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<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Concrete and Concrete Materials</td>
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<tr>
<td>1. Portland Cement</td>
<td></td>
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<tr>
<td>2. Aggregates for Concrete</td>
<td></td>
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<tr>
<td>3. Water for Concrete</td>
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<tr>
<td>4. Admixtures for Concrete</td>
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<tr>
<td>C. Normal Concrete Mix Proportions and Measurements</td>
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<tr>
<td>D. Special Types of Concrete</td>
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<tr>
<td>E. Curing Methods and Materials</td>
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<td>F. Concrete Slump Testing</td>
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<tr>
<td>Session II. Estimating Concrete Volume; Concrete Reinforcement Materials</td>
<td></td>
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<tr>
<td>A. Estimating Concrete Volume</td>
<td></td>
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<tr>
<td>1. Rectangular Volume Calculations</td>
<td></td>
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<td>2. Circular Volume Calculations</td>
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<tr>
<td>B. Laboratory</td>
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<tr>
<td>Hand out Worksheet 27108-1. Have the trainees complete the Worksheet. This laboratory corresponds to Performance Task 1.</td>
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<tr>
<td>C. Concrete Reinforcement Materials</td>
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<td>1. Reinforcing Bars</td>
<td></td>
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<td>2. Bar Supports</td>
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<td>3. Splicing Reinforcing Bars</td>
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<td>4. Welded-Wire Fabric</td>
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</tbody>
</table>
Session III. Concrete Forms

A. Concrete Forms
   1. Form Safety
   2. Footings
   3. Wall Forms
   4. Edge Forms
   5. Removing Forms

B. Laboratory
   Under your supervision, have the trainees erect, plumb, and brace a simple concrete form. This laboratory corresponds to Performance Task 2.

Session IV. Review; Module Examination and Performance Testing

A. Review

B. 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.

C. 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 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 introduces the carpentry trainee to methods and procedures used in the selection and installation of residential windows and exterior doors.

PREREQUISITES

Prior to training with this module, it is suggested that the trainee shall have successfully completed Core Curriculum; and Carpentry Fundamentals Level One, Modules 27101-06 through 27108-06.

OBJECTIVES

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

1. Identify various types of fixed, sliding, and swinging windows.
2. Identify the parts of a window installation.
3. State the requirements for a proper window installation.
4. Install a pre-hung window.
5. Identify the common types of exterior doors and explain how they are constructed.
6. Identify the parts of a door installation.
7. Identify the types of thresholds used with exterior doors.
8. Install a pre-hung exterior door.
9. Identify the various types of locksets used on exterior doors and explain how they are installed.
10. Install a lockset.

PERFORMANCE TASKS

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

1. Install a pre-hung window.
2. Install a pre-hung exterior door.
3. Install a lockset.

MATERIALS AND EQUIPMENT LIST

- Transparencies
- Markers/chalk
- Blank acetate sheets
- Transparency pens
- Pencils and scratch paper
- Overhead projector and screen
- Whiteboard/chalkboard
- Appropriate personal protective equipment
- Manufacturer’s catalogs and brochures on windows
- Nails:
  - 4d finish
  - 6d finish
  - 8d finish or casing
  - 16d casing
- Pre-hung window unit
- Shims
- Flashing or drip cap
- Pre-hung door unit
- Wood shingles for blocking shims
- Fiberglass insulation or sill sealer
- Lockset with manufacturer’s instructions and template (if needed)
- Weatherstripping
- Screws for attaching weatherstripping
- Threshold and manufacturer’s installation instructions
- Concrete screw anchors and screws
- Miter saw
- Hand levels
- Handsaw
- Claw hammer
- Framing square
- Combination square
- Steel tape
- 30’ level
- Nail set
- Caulking gun and sealer
- Boring jig (if available)
- Wood chisels
- Tin snips
- Utility knife
SAFETY CONSIDERATIONS

Ensure that the trainees are equipped with appropriate personal protective equipment.

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.


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 Windows and Exterior Doors.

You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tbody>
<tr>
<td><strong>Session I. Introduction; Windows</strong></td>
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<tr>
<td>A. Introduction</td>
<td></td>
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<tr>
<td>B. Windows</td>
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<tr>
<td>1. Window Construction</td>
<td></td>
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<tr>
<td>2. Types of Windows</td>
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<tr>
<td>3. Types of Window Glass</td>
<td></td>
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<tr>
<td>4. Window Installation</td>
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<tr>
<td>5. Glass Blocks</td>
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<tr>
<td><strong>Session II. Laboratory</strong></td>
<td></td>
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<td>A. Laboratory</td>
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<tr>
<td>Hand out Job Sheet 27109-1. Under your supervision, have the trainees perform the tasks on the Job Sheet. This laboratory corresponds to Performance Task 1.</td>
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</tbody>
</table>
Session III. Exterior Doors
A. Exterior Doors
   1. Exterior Door Sizes
   2. Thresholds
   3. Weatherstripping
B. Laboratory
   Hand out Job Sheets 2710-2 and 2710-3. Under your supervision, have the trainees perform the tasks on the Job Sheets. (This laboratory is optional based on available time and materials.)

Session IV. Installing an Exterior Pre-Hung Door
A. Installing an Exterior Pre-Hung Door
   1. Locksets
B. Laboratory
   Hand out Job Sheets 2710-4 and 2710-5. Under your supervision, have the trainees perform the tasks on the Job Sheets. This laboratory corresponds to Performance Tasks 2 and 3.

Session V. Laboratory; Review; Module Examination and Performance Testing
A. Laboratory
   Hand out Job Sheet 2710-6. Under your supervision, have the trainees perform the tasks on the Job Sheet. (This laboratory is optional based on available time and materials.)
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 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 introduces the Carpentry trainee to the materials and methods used to construct interior and exterior wooden stairs.

PREREQUISITES
Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum; and Carpenter Fundamentals Level One, Modules 27101-06 through 27109-06.

OBJECTIVES
Upon completion of this module, the trainee will be able to do the following:
1. Identify the various types of stairs.
2. Identify the various parts of stairs.
3. Identify the materials used in the construction of stairs.
4. Interpret construction drawings of stairs.
5. Calculate the total rise, number and size of risers, and number and size of treads required for a stairway.
7. Build a small stair unit with a temporary handrail.

PERFORMANCE TASKS
Under the supervision of the instructor, the trainee should be able to do the following:
1. Lay out and build a small stair unit with a handrail to a given rise.

MATERIALS AND EQUIPMENT LIST

| Transparencies                  | Stair gauges          |
| Markers/chalk                  | Calculator            |
| Blank acetate sheets           | 2 × 12s for stringers |
| Transparency pens             | 2 × 12s for treads    |
| Pencils and scratch paper     | 1 × 8s for risers     |
| Overhead projector and screen | Handrail and brackets |
| Whiteboard/chalkboard         | 8d box nails          |
| Appropriate personal protective equipment | 16d box nails |
| Basic carpenter’s toolbox     | 16d casing nails      |
| Framing square                 | Stair plans           |
| Level                          | Copies of Job Sheet 1*|
| Circular saw and extension cord| Module Examinations** |
| Hand saw                       | Performance Profile Sheets** |

* Packaged with this Annotated Instructor’s Guide.
**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.
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 Stairbuilding. Newton, CT: Taunton Press, Inc. (Book with companion video or DVD.)
For Pros By Pros: Building Stairs. Newton, CT: Taunton Press, Inc.
Framing Floors and Stairs. Berkeley, CA: Publishers Group West. (Book with companion video or DVD.)

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 Basic Stair Layout. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tbody>
<tr>
<td><strong>Session I. Introduction; Types of Stairs; Stairway Components and Typical Code Requirements</strong></td>
<td></td>
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<tr>
<td>A. Introduction</td>
<td></td>
</tr>
<tr>
<td>B. Types of Stairs</td>
<td></td>
</tr>
<tr>
<td>C. Stairway Components and Typical Code Requirements</td>
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<tr>
<td><strong>Session II. Stair Framing</strong></td>
<td></td>
</tr>
<tr>
<td>A. Stair Framing</td>
<td></td>
</tr>
<tr>
<td>1. Headroom</td>
<td></td>
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<tr>
<td>2. Stringers</td>
<td></td>
</tr>
<tr>
<td>3. Treads and Risers</td>
<td></td>
</tr>
<tr>
<td>4. Width Requirement</td>
<td></td>
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<tr>
<td>5. Handrails</td>
<td></td>
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<tr>
<td>6. Stairwells</td>
<td></td>
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<tr>
<td><strong>Session III. Stairway and Stairwell Design and Layout</strong></td>
<td></td>
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<tr>
<td>A. Stairway and Stairwell Design and Layout</td>
<td></td>
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<tr>
<td>1. Stairway Design</td>
<td></td>
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<tr>
<td>2. Stairwells</td>
<td></td>
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<tr>
<td>3. Laying Out and Cutting a Stringer</td>
<td></td>
</tr>
<tr>
<td>4. Reinforced Cutout Stringers</td>
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</tbody>
</table>
Session IV. Laboratory

A. Laboratory

Hand out Job Sheet 27110-1. Under your supervision, have the trainees lay out and construct a stairway. This laboratory corresponds to Performance Task 1.

Session V. Forms for Concrete Stairs; Review; Module Examination and Performance Testing

A. Forms for Concrete Stairs

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 the NCCER. If applicable, proficiency noted during laboratory exercises 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.