Acknowledgments

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Office of Career, Technical, and Adult Education
Virginia Department of Education

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Course Description

Suggested Grade Level: 11 or 12
Prerequisites: 8601

Carpentry II prepares students for successful transition into postsecondary education for careers in carpentry and related fields, such as construction management, architecture, and others. Students are taught the safe use of hand and power tools common to the industry to complement their Construction Industry OSHA 10 safety credential earned in Carpentry I. Students will become proficient in assembling and installing various types of residential construction components according to industry standards, including forming foundations, framing floors, walls, ceiling, roofs, trusses, roofing materials, stairs, and exterior doors and windows.

As noted in Superintendent's Memo #058-17 (2-28-2017), this Career and Technical Education (CTE) course must maintain a maximum pupil-to-teacher ratio of 20 students to one teacher, due to safety regulations. The 2016-2018 biennial budget waiver of the teacher-to-pupil ratio staffing requirement does not apply.

Task Essentials List

- Tasks/competencies designated by plus icons (⊕) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (⊙) are optional
- Tasks/competencies designated by minus icons (⊖) are omitted
- Tasks marked with an asterisk (*) are sensitive.

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<td>Identify personal protective equipment (PPE) requirements.</td>
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<td>Report personal injuries and environmental and equipment safety violations to the appropriate authority.</td>
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<td>Pass a safety exam for lab/site safety and the use of tools and equipment specific to the construction industry.</td>
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**Focusing on the Carpentry Profession**

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**Using Hand and Power Tools**

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Legend: ★ Essential  ○ Non-essential  ↔ Omitted

Curriculum Framework

Applying Basic Construction Safety Standards (Core Safety)

Task Number 39

Comply with federal, state, and local safety requirements.

Definition
Compliance should include

- understanding the roles of the Occupational Safety and Health Administration (OSHA), Virginia Occupational Safety and Health (VOSH), and the Environmental Protection Agency (EPA)
- identifying the OSHA Hazard Communication Standard (HazCom)
- interpreting the information included on safety data sheets (SDS)
- describing the responsibilities of employers and employees under HazCom.

Process/Skill Questions

- Where should hazardous materials be stored?
- What information can be found on an SDS?

NCCER Core Curriculum: Introductory Craft Skills, 2015

00101-15 Basic Safety
Module One (00101-15) explains the importance of safety in the construction and industrial crafts. Trainees will learn how to identify and follow safe work practices and procedures and how to properly inspect and use safety equipment. Trainees will be able to describe the safety practices associated with elevated work; energy release; and various hazards encountered on job sites.

Task Number 40

Identify personal protective equipment (PPE) requirements.

Definition

Identification could include procedures for inspecting, wearing, and removing

- eye protection
- respirator
- hard hat
- gloves
- safety harness
- hearing protection
- safety shoes.

Identification should also include explaining when particular PPE is required.

Process/Skill Questions

- What are some dangerous effects of sun exposure, and how can these risks be mitigated?
• Why is wearing jewelry prohibited while in the lab or on the job site?

NCCER Carpentry Standards

Level One, Module One (27101-13): Orientation to the Trade
Module One (27101-13) reviews the history of the carpentry trade, describes the apprentice program, identifies career opportunities for carpenters, explores the SkillsUSA program, and lists the responsibilities and characteristics a carpenter should possess.

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Task Number 41

Maintain a safe working environment.

Definition

Maintaining safety should be an ongoing process and should result in identifying potential hazards on a job site or in the lab, such as unstable or improperly erected scaffolding, electrical hazards, job-site debris, improperly stored materials, and air-quality hazards. When present, hazards must be remedied by appropriate measures, in compliance with school and instructor guidelines.

Process/Skill Questions

• What are examples of job-site hazards?
• Why is it important to use good housekeeping standards on a job site?
• Why is it important to store materials and tools in their proper places?

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Task Number 42

Explain safe working practices around electrical hazards.

Definition

Explanation should include

- identifying equipment used to test electrical circuits
- describing safe working conditions (e.g., grounding, using ground-fault circuit interrupters [GFCIs] and cords)
- demonstrating safe work habits.

Process/Skill Questions

- What is the definition of *proximity work*?
- What are safe working clearances, according to the National Electrical Code (NEC)?
- What are considered safe working conditions and safe work habits?
- What is the unseen hazard with electrical work?
- What are some common electrical workplace issues?

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Task Number 43

Identify emergency first-aid procedures.

Definition

Identification should include standard first-aid procedures and school policies regarding incidents involving

- bodily fluids
- electrical injuries
- eye injuries
- falls
- burns.

Process/Skill Questions

- What are the steps that should be followed after an accident?
- Why is knowing cardiopulmonary resuscitation (CPR) an important skill in the construction trades?
- Why is it important to be certified to administer first aid?
- What are the different degrees of electrical burns?

NCCER Carpentry Standards

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Task Number 44
Identify the types of fires and the methods used to extinguish them.

Definition

Identification should include classifications of fires (e.g., Classes A, B, C, and D), causes and prevention of fires, types of extinguishers, and, when possible, the demonstrated use of a fire extinguisher, in accordance with government regulations and instructor guidelines.

Process/Skill Questions

- Why do fires have different classifications, and what are they?
- What is the fire triangle and the fire tetrahedron?
- What are the three things necessary to start a fire?
- Why is it important to know the classification of fire when trying to extinguish it?
- Why should extinguishers be inspected, and how often should they be inspected?
- What are the classifications of extinguishers?

NCCER Core Curriculum: Introductory Craft Skills, 2015

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Task Number 45

Inspect course-specific hand and power tools to visually identify defects.

Definition

Inspection of tools should include

- identifying components of machinery (e.g., guards, blades, moving parts, start/stop switches)
- identifying standard safety procedures (i.e., lab practices and manufacturer recommendations)
- observing a demonstration of the safe operation and use of each piece of machinery in the lab
• identifying tool defects.

Process/Skill Questions

• What are some of the basic power tools used in construction?
• What are the proper actions to take before using a circular saw?
• Why should a power tool always be grounded?

NCCER Carpentry Standards

Level One, Module Three (27103-13): Hand and Power Tools
Module Three (27103-13) provides detailed descriptions of the hand tools and portable power tools used by carpenters. Emphasis is on safe and proper operation of tools, as well as care and maintenance.

NCCER Core Curriculum: Introductory Craft Skills, 2015

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Task Number 46

Demonstrate lifting and carrying techniques.

Definition

Demonstration involves lifting and carrying materials and equipment based on the principles of

• lifting with the legs
• keeping the back straight
• holding the load close to the body
• getting help, if necessary.

Process/Skill Questions

• What are common injuries associated with improper lifting techniques?
• What can one do to prevent injury?
• How does positioning affect technique?

NCCER Core Curriculum: Introductory Craft Skills, 2015
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Task Number 47

Demonstrate safe laddering techniques.

Definition

Demonstration should involve using appropriate conduct and safety procedures while

- using aluminum ladders (e.g., three-point contact)
- carrying ladders (e.g., two people at all times)
- erecting and setting ladders (e.g., using the 4:1 rule)
- identifying types of ladders and the components and safety features of each (e.g., wall or straight, extension, roof, attic, special-purpose, solid-beam, aluminum, wood/aluminum truss ladder, fiberglass).

Process/Skill Questions

- Why are ladders rated for certain weights?
- Why is the apex (highest point) of a stepladder not considered a step?
- What other methods are used to adjust ladders?

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Task Number 48

Demonstrate safe scaffolding techniques.

Definition
Demonstration should include inspecting settings, duty ratings, and safety tags.

Process/Skill Questions

- How can one determine the safe weight limit of any particular scaffolding?
- When is scaffolding preferred or required?

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Task Number 49

Report personal injuries and environmental and equipment safety violations to the appropriate authority.

Definition

Report should include

- providing a verbal or written statement
- identifying the violation
- documenting the date when the incident or behavior was observed
- following the protocol for submitting the report to the instructor, supervisor, or the local OSHA inspector.

Process/Skill Questions

- What ethical considerations might be involved when reporting coworkers?
- Why is it important to follow reporting procedures?
- What is liability?

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practices associated with elevated work; energy release; and various hazards encountered on job sites.

Task Number 50

Pass a safety exam for lab/site safety and the use of tools and equipment specific to the construction industry.

Definition

Assessment must measure participation in safety training programs, including attending safety meetings and periodically demonstrating knowledge and skills gained from program topics (e.g., interpretation of SDS).

Process/Skill Questions

- How often should one participate in safety training programs? Why?
- Why are retraining programs relevant to a company's insurance policy?
- What is workers' compensation?

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Focusing on the Carpentry Profession

Task Number 51

Identify the responsibilities and personal characteristics of a professional carpenter.

Definition

Identification should include responsibilities, such as
• having the skills to use current materials, tools, and equipment effectively, and efficiently adjusting methods to meet the needs of each situation
• training to remain current with new materials and equipment
• adhering to all safety standards.

Identification should also include characteristics, such as

• honesty
• loyalty
• commitment to excellence
• leadership
• fairness
• respect for rules and regulations
• integrity
• willingness to accept responsibility
• flexibility
• adaptability
• respect for self and others
• willingness to accept criticism and to learn from failure
• cooperation
• positive attitude
• politeness
• punctuality.

**Process/Skill Questions**

• What are the responsibilities of the general contractor on the job site?
• What are the responsibilities of a carpenter on the job site?

**NCCER Carpentry Standards**

**Level One, Module One (27101-13): Orientation to the Trade**
Module One (27101-13) reviews the history of the carpentry trade, describes the apprentice program, identifies career opportunities for carpenters, explores the SkillsUSA program, and lists the responsibilities and characteristics a carpenter should possess.

**NCCER Core Curriculum: Introductory Craft Skills, 2015**

**00108-15 Basic Employability Skills**
Module Eight (00108-15) provides trainees with guidance related to finding and securing a position in the construction trades. In addition, guidance in the areas of problem-solving and effective interaction with others is offered to help ensure their success in the construction trades.

**Task Number 52**
Research local and regional opportunities in the construction industry.

Definition

Research should include

- employment outlook sources (e.g., Virginia Employment Commission, Bureau of Labor Statistics)
- job posting sites
- education requirements.

Process/Skill Questions

- Why is it important to develop both an online and a hard-copy version of a résumé?
- Why is it a good idea to perform research about a company before interviewing with that company?
- How should carpenters dress for interviews?

NCCER Carpentry Standards

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NCCER Core Curriculum: Introductory Craft Skills, 2015

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Task Number 53

Describe the relationships among professional entities common to the construction industry.

Definition

Description should include
• identifying and giving examples of each of the Virginia All Aspects of Industry tasks pertaining to carpentry and the construction industry
• identifying the roles of investors, manufacturers, contractors, and subcontractors and how they interact to complete a construction project
• determining the roles of general and specialty carpenters, their interaction with other construction practitioners, and their contributions to the construction industry.

Process/Skill Questions

• What are different roles of individuals involved in construction?

NCCER Carpentry Standards

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Task Number 54

Communicate verbally and in writing, using construction terminology.

Definition

Communication should include

• using terminology specific to carpentry
• completing
  • work orders
  • proposals
  • prints
  • invoices
  • estimates
  • contracts
  • schedules.
Process/Skill Questions

- What does *liquidated damages* mean?
- What is a *bonus clause*?
- What is a *change order*?
- What is an *RFT*?

NCCER Core Curriculum: Introductory Craft Skills, 2015

00107-15 Basic Communication Skills
Module Seven (00107-15) provides trainees with the information and skills needed to communicate effectively and clearly. Developing good communications skills enables the construction professional to become a confident, reliable asset to their craft.

00108-15 Basic Employability Skills
Module Eight (00108-15) provides trainees with guidance related to finding and securing a position in the construction trades. In addition, guidance in the areas of problem-solving and effective interaction with others is offered to help ensure their success in the construction trades.

Task Number 55

Identify communication technology and hand signals common to the construction site.

Definition

Identification should include

- hand signals for working around machinery or in high-noise areas
- portable communication devices and etiquette for using them.

Process/Skill Questions

- With whom might you need to communicate on a construction site?
- What are the consequences of poor communication on the job site?
Module Eight (00108-15) provides trainees with guidance related to finding and securing a position in the construction trades. In addition, guidance in the areas of problem-solving and effective interaction with others is offered to help ensure their success in the construction trades.

Task Number 56

Measure materials, using a standard measuring device.

Definition

Measuring should include

- selecting the correct device for the situation
- recognizing and identifying correct lengths to within +/- 1/32 inch
- reading the measurement
- marking the stock.

Process/Skill Questions

- What is the smallest unit of measurement on most measuring tapes used in construction?
- What lengths of measuring tapes are commonly used in construction?

NCCER Core Curriculum: Introductory Craft Skills, 2015

00102-15 Introduction to Construction Math

Module Two (00102-15) introduces trainees to basic math skills needed in the construction environment. The module reviews whole numbers and fractions; working with decimals; the four primary math operations; reading rulers and tape measures; the Imperial and metric units of measurement; basic geometric figures; and area and volume calculations for two-dimensional and three-dimensional objects.

Using Hand and Power Tools

Task Number 57

Identify hand tools and power tools in carpentry.

Definition

Identification could include
• nail guns and hammers, including claw hammers, sledgehammers, and ball-peen hammers
• screwdrivers, including slot-, Phillips-, clutch-, star-, square-, and Allen-head screwdrivers
• ripping bars and nail pullers
• wrenches, including pipe, spud, box-end, open-end, striking, slugging, and combination wrenches
• pliers, including slip-joint, long-nose (needle-nose), lineman's, groove-joint or water pump, and locking pliers
• wire cutters
• spirit, electronic, and laser levels
• squares, including carpenter’s square and combination square
• rules and measuring tape
• vises
• clamps
• saws, including backsaw, circular, saber, reciprocating, compass saw, coping saw, dovetail saw, hacksaw, and hand saw (crosscut saw and ripsaw)
• files, rasps, and chisels
• plumb bob
• sockets and ratchets
• utility knives
• chain falls and come-alongs
• wire brushes
• shovels
• power drills, including electric, cordless, hammer electromagnetic, and pneumatic drills
• grinders and sanders, including angle grinders, end grinders, detail grinders, bench grinders, portable belt sanders, and random orbital sanders
• pavement breakers/hydraulic jacks.

Process/Skill Questions

• What are the different sizes of Phillips-head screwdrivers?
• What are the basic tools carpenters wear on a tool belt?
• What are the expectations on job sites regarding tool ownership? How is this different from school?

NCCER Carpentry Standards

Level One, Module Three (27103-13): Hand and Power Tools
Module Three (27103-13) provides detailed descriptions of the hand tools and portable power tools used by carpenters. Emphasis is on safe and proper operation of tools, as well as care and maintenance.

NCCER Core Curriculum: Introductory Craft Skills, 2015

00103-15 Introduction to Hand Tools
Module Three (00103-15) instructs trainees in the identification, use, and care of hand tools. Developing the knowledge to properly choose and safely use hand tools is an essential part of the construction industry.

**00104-15 Introduction to Power Tools**
Module Four (00104-15) identifies and describes some of the power tools used by construction workers. The construction of each tool is discussed, along with information regarding the safe usage and typical maintenance requirements of power tools.

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**Task Number 58**

**Maintain hand and power tools.**

**Definition**

Maintenance should include applying safety awareness and

- describing the rationale for keeping tools in good working order
- replacing tools in the same order and condition they were prior to their use (e.g., cleaning, lubricating, storing)
- making basic adjustments to or replacing worn components with instructor approval and by following manufacturer guidelines
- notifying the instructor about heavily worn, broken, or malfunctioning tools
- using the tool only for its intended purpose and adhering to all safety guidelines from the manufacturer, the instructor, and the school.

**Process/Skill Questions**

- What are safety concerns when using a power circular saw?
- Why should a power tool always be grounded?

**NCCER Carpentry Standards**

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**NCCER Core Curriculum: Introductory Craft Skills, 2015**

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Module Four (00104-15) identifies and describes some of the power tools used by construction workers. The construction of each tool is discussed, along with information regarding the safe usage and typical maintenance requirements of power tools.

Task Number 59

Describe the safe use of nail guns.

Definition

Description should include the following OSHA steps to follow for nail gun safety:

- Use full-sequential-trigger nail guns.
- Provide training.
- Establish nail gun work procedures.
- Provide PPE.
- Encourage the reporting and discussion of injuries and close calls.
- Provide first aid and medical treatment.

Process/Skill Questions

- How likely are nail gun injuries?
- What are the most common types of injuries associated with nail gun accidents? How serious can these injuries be?

NCCER Carpentry Standards

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NCCER Core Curriculum: Introductory Craft Skills, 2015

00104-15 Introduction to Power Tools
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Interpreting Blueprints

Task Number 60
Correlate information on blueprints.

Definition

Correlation should include locating, reading, and interpreting information on blueprints, using a gridline system.

Process/Skill Questions

- Where would you find information about the roof system?
- What is a sectional drawing?

NCCER Carpentry Standards

Level One, Module Four (27104-13): Introduction to Construction Drawings, Specifications, and Layout
Module Four (27104-13) describes the information contained in construction drawings, including foundation, floor, and other plan view drawings, as well as how to read them. It also describes how to interpret schedules and specifications, and how to use the 3-4-5 rule to square buildings.

NCCER Core Curriculum: Introductory Craft Skills, 2015

00105-15 Introduction to Construction Drawings
Module Five (00105-15) provides trainees with the information and skills needed to read and understand construction drawings. This module includes a set of four oversize drawings, which is included as an Appendix in the Trainee Guide. The drawings are also available for download from www.nccerirc.com.

Task Number 61

Interpret drawing dimensions.

Definition

Interpretation should include

- locating dimension lines
- aligning column and pier forms
- reading the dimensions
- distinguishing between exterior and interior measurements
- identifying drawing dimensions and discrepancies
- understanding a request for information (RFI) and when it is used
- reading window and door schedules.
Process/Skill Questions

- How would you find the dimensions of a room if they are not on the plans?
- What should you do if you find dimensions on the drawing to be incorrect?

NCCER Carpentry Standards

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**Task Number 62**

**Describe the importance of the Virginia Unified Statewide Building Code (USBC), what it governs, and how to use it as a reference.**

**Definition**

Description should include

- locating the official, updated code
- identifying the major sections and how to quickly find information
- identifying the rationale behind the code
- identifying the agency that enforces the code
- citing examples of penalties for noncompliance.

**Process/Skill Questions**

- How is the USBC enforced?
- How can builders and carpenters avoid code violations?
- Aside from penalties, what dangers exist when participating in building projects that are not compliant with the USBC?
NCCER Carpentry Standards

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Assembling and Fastening Components
Task Number 63
Identify nailing schedules and patterns for selected materials, according to local building codes.

Definition
Identification should include the number and location of nails required for selected materials.

Process/Skill Questions
- How do local and state building codes affect the use of certain materials?
- Where can nailing schedules for specific materials be found?

NCCER Core Curriculum: Introductory Craft Skills, 2015

00106-15 Basic Rigging
Module Six (00106-15) identifies different types of rigging slings and hardware and describes how those items are used. It explains how to properly inspect slings and hardware items. It also examines different types of hoists used in rigging, and it describes common rigging hitches and how to make the Emergency Stop hand signal.

Estimating and Selecting Materials
Task Number 64

Determine materials from a blueprint.

Definition

Determination should include

- generating a cutting list from plans
- indicating the number of pieces, thickness, width, and length to within +/- 1/16 inch.

Process/Skill Questions

- Why would a carpenter need to determine materials from a blueprint?
- Where on blueprints can information about doors and windows be found?

NCCER Carpentry Standards

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00109-15 Introduction to Materials Handling
Module Nine (00109-15) provides safety guidelines for workers handling materials on the job site. It covers proper procedures and techniques to use when lifting, stacking, transporting, and unloading materials. It also introduces basic motorized and non-motorized material-handling equipment commonly found in the construction environment.

Task Number 65

Estimate labor and material cost.

Definition
Estimation should include

- preparing a material list, using plans
- contacting a local supplier for pricing
- calculating the flat labor cost
- increasing the material and labor cost by 25 percent (or a specified percentage) to include profit.

Process/Skill Questions

- Where can information about labor costs be found?
- If material costs rise during a job, how will profit be affected?

NCCER Carpentry Standards

Level One, Module Two (27102-13): Building Materials, Fasteners, and Adhesives

Module Two (27102-13) provides an overview of the building materials used by carpenters, including lumber, engineered wood products, concrete, and steel framing materials. The module also describes the various fasteners, anchors, and adhesives used in construction.

Level Two, Module One (27201-13): Commercial Drawings

Module One (27201-13) describes how to read and interpret a set of commercial drawings and specifications.

NCCER Core Curriculum: Introductory Craft Skills, 2015

00109-15 Introduction to Materials Handling

Module Nine (00109-15) provides safety guidelines for workers handling materials on the job site. It covers proper procedures and techniques to use when lifting, stacking, transporting, and unloading materials. It also introduces basic motorized and non-motorized material-handling equipment commonly found in the construction environment.

Task Number 66

Determine the use of materials.

Definition

Determination should include identifying common material defects and the appropriate material for a given project.

Process/Skill Questions

- What problems can arise when the proper material is not used?
- How do local and state building codes affect the use of materials?
NCCER Carpentry Standards

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Building and Installing Foundations and Forms

Task Number 67
Set up a builder's level or a laser level.

Definition

Setup should include

- identifying the builder's level or the laser level, and each tool's basic components
- following manufacturer information about setting up and using each device
- securing and leveling the instrument and engaging locking devices.

Process/Skill Questions

- What is the purpose of a builder's level?
- What are the different types of levels available?
- In which situations might one level be preferred over the other?

Task Number 68
Establish elevation points from a benchmark.
**Task Number 69**

**Install batter boards.**

**Definition**

Installation should be accurate within a tolerance of +/- 1/16 inch, with corners square.

**Process/Skill Questions**

- At what point in the construction process should batter boards be installed?
- How is squarness of batter boards ensured?
- What are some of the consequences of improperly installed batter boards?

**Task Number 70**

**Identify types of footings.**

**Definition**

Identification should include

- keyways
- bulkheads
- dowels
- anchorages.

**Process/Skill Questions**

- In what situations is it necessary to construct forms?
What is the function of a keyway footing?

Task Number 71

Describe wall-framing techniques (e.g., block, poured) used in masonry construction.

Definition

Description should include

- applying furring strips to masonry walls
- attaching adjacent wooden wall frames.

Process/Skill Questions

- Why does the sole plate material need to be treated lumber?
- Should a vapor barrier be applied to exterior walls?

NCCER Carpentry Standards

Level One, Module Six (27111-13): Wall Systems
Module Six (27111-13) describes the procedures for laying out and framing walls, including roughing-in door and window openings, constructing corners and partition Ts, bracing walls, and applying sheathing. The module also includes estimating materials required to frame walls.

Task Number 72

Describe the installation of window and door jambs in masonry openings.

Definition

Description should include installation procedures for a metal window and door jamb with proper bracing and installation of spreaders.

Process/Skill Questions

- What are the proper techniques for installing steel door jambs?
- What is the purpose of spreaders?
Task Number 73

Describe form maintenance.

Definition

Description should include

- cleaning
- covering
- storing.

Process/Skill Questions

- What is the best way to store form materials?
- What are the consequences of not properly storing form materials?

Framing a Floor

Task Number 74

Install the sill plate.

Definition

Installation should include

- leveling the plates
- securing the plates to the foundation wall, using bolts and straps
- adhering to local building code.

Process/Skill Questions

- What type of lumber should be used for a sill plate?
- What type of system should be used to secure a sill plate?

NCCER Carpentry Standards

Level One, Module Five (27105-13): Floor Systems
Module Five (27105-13) describes the layout and construction procedures for floor systems, including how to read and interpret construction drawings and specifications, and how to identify
different types of framing systems, floor system components, and floor system materials. It also covers how to estimate the amount of materials needed for a floor assembly and on some common alternative floor systems.

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**Task Number 75**

**Install a solid or engineered wood beam/girder.**

**Definition**

Installation should include ensuring that the beam is

- plumb
- straight
- level
- located correctly, according to the blueprint.

**Process/Skill Questions**

- When are solid beams/girders used? When are engineered wood beams/girders used?
- How is a beam/girder supported?

**NCCER Carpentry Standards**

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**Task Number 76**

**Install the Lally column (i.e., basement pole).**

**Definition**

Installation should include ensuring that the column is

- plumb
- located correctly, according to the blueprint.
Process/Skill Questions

- What is the proper method for installing a Lally column?
- What are the consequences of removing a Lally column?

NCCER Carpentry Standards

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Task Number 77

Assemble floor framing detail on the sill plate.

Definition

Assembly should include

- locating the wall and floor openings
- completing the layout, according to the building plan.

Process/Skill Questions

- Which set of plans would be used to determine the floor layout?
- What specialty details accommodate floor framing?

NCCER Carpentry Standards

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Task Number 78

Assemble floor joists.
Definition

Assembly should include

- producing joists of correct length (to within +/- 1/16 inch) with ends at 90 degrees
- cutting and crowning.

Process/Skill Questions

- What is a crown? What is the difference between a bow and a crown?
- What are the consequences of improper installation?

NCCER Carpentry Standards

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Task Number 79

Frame the floor opening.

Definition

Framing should include

- sizing the opening to within +/- 1/8 inch
- locating the opening correctly, according to the blueprint, with proper double joist and header.

Process/Skill Questions

- What areas need floor frame openings?
- What are the special framing situations for floor openings?

NCCER Carpentry Standards

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**Task Number 80**

**Install floor joists.**

**Definition**

Installation should include

- following the blueprint
- crowning and nailing the floor joists
- working with cantilever floor joists.

**Process/Skill Questions**

- What is a cantilever floor joist?
- What determines the size and spacing of floor joists?
- Are all floor joists installed 16-inches on center?

**NCCER Carpentry Standards**

**Level One, Module Five (27105-13): Floor Systems**

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**Task Number 81**

**Install bridging and blocking.**

**Definition**

Installation should follow building plans and specifications and local building codes.

**Process/Skill Questions**

- What are the types of metal bridging?
- What are the different uses of bridging and blocking?

**NCCER Carpentry Standards**

**Level One, Module Five (27105-13): Floor Systems**

Module Five (27105-13) describes the layout and construction procedures for floor systems, including how to read and interpret construction drawings and specifications, and how to identify different types of framing systems, floor system components, and floor system materials. It also covers how to estimate the amount of materials needed for a floor assembly and on some common alternative floor systems.

**Task Number 82**

**Install subfloor sheathing.**

**Definition**

Installation should include

- following the manufacturer instructions for expansion
- ensuring that the subfloor is properly nailed, with joints staggered
- orientation of the sheathing with the long dimension laid perpendicular to the framing.

**Process/Skill Questions**

- What factors should be considered when determining the type of sheathing to use?
- What methods should be used to reduce the number of structural problems?
- What are the consequences of improper installation of sheathing?

**NCCER Carpentry Standards**

**Level One, Module Five (27105-13): Floor Systems**

Module Five (27105-13) describes the layout and construction procedures for floor systems, including how to read and interpret construction drawings and specifications, and how to identify different types of framing systems, floor system components, and floor system materials. It also covers how to estimate the amount of materials needed for a floor assembly and on some common alternative floor systems.

**Task Number 83**

**Select subfloor framing fasteners and adhesives.**
Definition

Selection should include

- identifying all available fasteners and adhesives
- correlating the correct fasteners and adhesives to a variety of floor-framing jobs.

Process/Skill Questions

- How is the appropriate fastener and/or adhesive selected for any floor-framing job? What factors contribute to this selection?
- What precautions should be taken when working with adhesives?

NCCER Carpentry Standards

Level One, Module Five (27105-13): Floor Systems
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Framing Walls

Task Number 84

Lay out the floor deck for walls.

Definition

Laying out should include marking for walls, according to the blueprints.

Process/Skill Questions

- Which set of plans should be used to determine wall locations?
- How is the location of a wall determined if no dimensions are given?
- Who is to blame if the dimensions measure incorrectly?

NCCER Carpentry Standards

Level One, Module Six (27111-13): Wall Systems
Module Six (27111-13) describes the procedures for laying out and framing walls, including roughing-in door and window openings, constructing corners and partition Ts, bracing walls, and applying sheathing. The module also includes estimating materials required to frame walls.

**Task Number 85**

**Lay out stud spacing on wall plates.**

**Definition**

Laying out should include

- locating rough openings, corners, and wall Ts
- ensuring that the stud layout is 16 inches or 24 inches OC, as required by the plan
- ensuring that door and window openings are of the proper width, +/- 1/16 inch
- identifying wall plate layout marks
- stocking the proper components.

**Process/Skill Questions**

- What are special wall-framing details?

**NCCER Carpentry Standards**

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**Task Number 86**

**Assemble wall framing members.**

**Definition**

Assembly should include

- following plans and schedules
- using studs, headers, jacks, rough sills, cripples, and corner and T-posts
- ensuring that blocking is flush and ends are square in corner and T-posts
- ensuring that the correct Spacer and nailing pattern is used for headers
- ensuring that the sides and ends of the headers are flush.
Process/Skill Questions

- What should be done before cutting these parts?
- How are the dimensions of the components verified?
- What are the different ways to make corner and T-posts?
- What are the differences between load-bearing and non-load-bearing headers?

NCCER Carpentry Standards

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Task Number 87

Frame the door opening.

Definition

Framing should include

- assembling jacks/trimmers to full studs, flush on the ends and sides
- attaching the header flush to the top of the jack/trimmer and flush with the full stud
- using the appropriate nails for the job.

Process/Skill Questions

- Which set of plans is used to determine the placement of door openings?
- What should be considered when installing headers for different types of door openings?

NCCER Carpentry Standards

Level One, Module Six (27111-13): Wall Systems
Module Six (27111-13) describes the procedures for laying out and framing walls, including roughing-in door and window openings, constructing corners and partition Ts, bracing walls, and applying sheathing. The module also includes estimating materials required to frame walls.

Task Number 88

Frame the window opening.
Definition
Framing should include

- keeping all components flush
- using the proper fasteners.

Process/Skill Questions

- Which set of plans is used to determine the placement of window openings?
- What should be considered when installing headers for different types of window openings?

NCCER Carpentry Standards

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Task Number 89

Install the double-top plate (i.e., cap plate).

Definition
Installation should include

- cutting the double-top plate to break over the studs
- breaking the top plate joint four feet from the double top plate joint
- ensuring that the double-top plate is flush
- ensuring that the intersecting wall laps and nailing pattern follow the building code.

Process/Skill Questions

- What are the purposes of double-top plates?
- What are intersecting wall laps?

NCCER Carpentry Standards

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**Task Number 90**

**Install wall blocking (i.e., backing).**

**Definition**

Installation should include ensuring that backing is

- flush with framing
- located correctly, according to the blueprints.

**Process/Skill Questions**

- Why is wall backing needed?
- What are the building code specifications for backing?

**NCCER Carpentry Standards**

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**Task Number 91**

**Describe the procedures and requirements for installing fire stops.**

**Definition**

Description should include

- procedures for cutting and installing fire blocking
- local building code requirements
- reasons for maintaining flush installation and using nails appropriate to the job.

**Process/Skill Questions**
• What is the purpose of a fire stop?
• Why is proper placement of fire stops critical?

NCCER Carpentry Standards

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Task Number 92
Install a corner brace.

Definition
Installation should include

• cutting bracing, according to angle and length, to within +/- 1/16 inch
• installing and attaching bracing.

Process/Skill Questions

• What purpose does a corner brace serve?
• What are the purposes of different types of corner braces?

NCCER Carpentry Standards

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Task Number 93
Install exterior wall sheathing.

Definition
Installation should include following the manufacturer specifications and using the appropriate fasteners according to local building codes.
Process/Skill Questions

- What types of sheathing are available?
- What types of sheathing should be used with specific exterior finishes?
- What types of nailing patterns are used for installation?
- What is a braced wall panel?

NCCER Carpentry Standards

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Task Number 94

Raise a wall.

Definition

Raising a wall should include

- following safety guidelines
- identifying the wall-raising sequence regarding butt walls and through walls
- following blueprints
- aligning, with appropriate leveling instruments
- anchoring
- ensuring the wall is plumb
- bracing at the best angle and at correct intervals with appropriate fasteners.

Process/Skill Questions

- What are different strategies for raising walls?
- How do building codes relate to the way wall sections must be anchored?
- What is the appropriate nailing schedule for anchoring wall sections?
- What is the relationship between the level of the floor and the plumb of the wall?

NCCER Carpentry Standards

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Module Six (27111-13) describes the procedures for laying out and framing walls, including roughing-in door and window openings, constructing corners and partition Ts, bracing walls, and applying sheathing. The module also includes estimating materials required to frame walls.
Task Number 95

Cut metal studs.

Definition

Cutting should include

- selecting the appropriate tool
- using appropriate PPE.

Process/Skill Questions

- What tools can be used to cut metal studs?
- What PPE should be used when cutting metal studs?

NCCER Carpentry Standards

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Task Number 96

Assemble wall sections, using alternative wall systems (e.g., metal studs).

Definition

Assembly should include

- following the plate layout
- keeping parts flush and within +/- 1/16 inch
- using the appropriate fasteners.

Process/Skill Questions

- What determines the placement of different framing members within the wall section?
- How does the height of the wall determine the size of the framing member used?

NCCER Carpentry Standards
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Framing a Ceiling

Task Number 97

Lay out ceiling framing detail on the top wall plate.

Definition

Laying out should include

- determining the number of ceiling joists needed for a given job
- placing ceiling joists on the top plate
- marking openings, according to blueprints.

Process/Skill Questions

- Where are the details for ceiling framing found?
- What are the typical layout dimensions for ceiling members?

NCCER Carpentry Standards

Level One, Module Seven (27112-13): Ceiling and Roof Framing
Module Seven (27112-13) provides an overview of ceiling and roof framing, including the components of ceiling and roof framing, the different types of roofs used in residential construction, and the use of trusses in basic roof framing. The methods for laying out rafters, erecting a gable roof, framing a basic gable end wall, and installing roof sheathing are introduced. It also provides instruction on how to estimate the amount of materials needed for a material takeoff for a roof.

Task Number 98

Cut ceiling joists.

Definition

Cutting should include
• measuring and marking joists
• clipping off corners to allow for roof sheathing
• ensuring joists fit rafters to an accuracy of within +/- 1/16 inch.

Process/Skill Questions

• How does roof sheathing affect the cut of a ceiling joist?
• What allowance should be made for the bearing on a wall plate?

NCCER Carpentry Standards

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Task Number 99

Install the ceiling joists.

Definition

Installation should include

• crowning and installing joists, according to layout
• using the appropriate fasteners.

Process/Skill Questions

• Should joists be installed 16 inches or 24 inches OC? Why?
• What determines the size of ceiling joists?

NCCER Carpentry Standards

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Task Number 100

Frame the ceiling opening.

Definition

Framing should include

- locating dimensions and placement from plans
- installing doubles, according to plans and local building code.

Process/Skill Questions

- How are ceiling openings identified on the plans?
- What situations might require special ceiling framing procedures?

NCCER Carpentry Standards

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Task Number 101

Install a strongback (i.e., stiffener or catwalk).

Definition

Installation should include locating and fastening the strongback, according to specifications.

Process/Skill Questions

- What is a strongback?
- When is a strongback required? When is a catwalk required?
- What are the consequences of not installing a strongback?
- Where is strongback located on an engineered building product?
Framing a Roof

Task Number 102

Identify types of roofs used in residential construction.

Definition

Identification should include

- flat
- shed
- gable
- mansard
- gambrel
- hip.

Process/Skill Questions

- What is the most common roof style?
- Which type of roof is most likely to leak?
- What are the uses for each type of roof?

NCCER Carpentry Standards

Level One, Module Seven (27112-13): Ceiling and Roof Framing

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Task Number 103

Lay out roof framing detail on the double-top plate.

Definition

Laying out should include determining the correct types of rafters, pitch, overhang, and spacing, according to blueprints.

Process/Skill Questions

• Which set of plans identifies roof framing detail on the double-top plate?
• How do region and climate affect spacing and sizing?
• What types of fasteners can be used to complete this procedure?

NCCER Carpentry Standards

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Task Number 104

Lay out the common, valley, hip, and jack/cripple rafters.

Definition

Laying out should include

• interpreting the rafter layout from blueprints
• computing the rafter length
• allowing for a specified pitch and birdsmouth, as required for cutting.

Process/Skill Questions

• What are the differences among common, valley, hip, and jack/cripple rafters? In what situations should each be used?
• Which set of plans identifies information about rafter layout?
NCCER Carpentry Standards

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Task Number 105

Lay out a common rafter as a pattern.

Definition

Layout should include

- interpreting the rafter layout from blueprints
- computing the rafter length
- allowing for a specified pitch and birdsmouth, as required for the cutting pattern, to within +/- 1/16 inch tolerance.

Process/Skill Questions

- What methods can be used to lay out a common rafter?
- What are the advantages and disadvantages of each method of laying out common rafters?

NCCER Carpentry Standards

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Task Number 106

Reproduce common rafters from a pattern.
Definition

Reproduction should include cutting from the pattern to within +/- 1/8 inch.

Process/Skill Questions

- Why is it important to designate a pattern?
- What are the drawbacks of not designating and following a precise pattern?

NCCER Carpentry Standards

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Task Number 107

Install the ridgeboard.

Definition

Installation should include

- measuring the ridgeboard
- cutting with 90-degree ends
- crowning
- laying out to match the top plate
- installing and bracing the ridgeboard.

Process/Skill Questions

- How is the height of a ridgeboard determined?
- Which building codes apply to ridgeboards?

NCCER Carpentry Standards

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erecting a gable roof, framing a basic gable end wall, and installing roof sheathing are introduced. It also provides instruction on how to estimate the amount of materials needed for a material takeoff for a roof.

**Task Number 108**

**Install common rafters.**

**Definition**

Installation should include

- positioning the rafters, according to layout
- using fasteners, according to specifications.

**Process/Skill Questions**

- What determines the spacing and size of rafters?
- Describe several methods of installing rafters. What are the advantages and disadvantages of each?

**NCCER Carpentry Standards**

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**Task Number 109**

**Frame a gable end.**

**Definition**

Framing should include constructing the gable end to specifications with a straight line, to within +/- 1/8 inch.

**Process/Skill Questions**
• What are the advantages and disadvantages of the various methods of attaching gable end studs to the rafters?
• Do all gable ends have a vent framed into them? Why or why not?
• What situations would warrant ventilation?
• What factors determine the size of a vent?
• What precautions should be taken when standing a wall with a gable attached?

NCCER Carpentry Standards

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Task Number 110

Install the collar ties (i.e., rafter ties).

Definition

Installation should include

• cutting the collar tie to length to within, +/- 1/16 inch
• cutting the collar tie to angle to within +/- 1 degree
• positioning the collar tie correctly
• installing according to blueprint specifications.

Process/Skill Questions

• What is the function of collar ties?
• What might happen if collar ties are not installed?

NCCER Carpentry Standards

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Task Number 111

Install roof sheathing.

Definition

Installation should include

- centering the roof sheathing on a rafter
- positioning the long dimension of the sheet perpendicular to the framing
- nailing the sheathing, according to local building code.

Process/Skill Questions

- What safety concerns are associated with roof sheathing installation?
- What are the possible consequences of improperly nailed sheathing?

NCCER Carpentry Standards

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Installing Trusses

Task Number 112

Lay out for a truss installation.

Definition

Layout should include

- identifying the truss detail
- identifying the nail pattern
• determining the position of centers (e.g., 12 inch, 16 inch, 19.2 inch, 24 inch) from details, accurate to within +/- 1/16 inch.

Process/Skill Questions

• What is the most common spacing of trusses? Why?
• What factors influence the spacing of trusses?

NCCER Carpentry Standards

Level Two, Module Five (27202-13): Roofing Applications
Module Five (27202-13) describes how to properly prepare the roof deck and install roofing for residential and commercial buildings.

Task Number 113

Describe the safe setting and anchoring of trusses by hand or by crane.

Definition

Description should include

• selecting the truss
• using lifting techniques
• positioning the truss, according to the layout, on the double-top plate
• anchoring with appropriate fasteners
• maintaining centers
• bracing temporarily to prepare for sheathing.

Process/Skill Questions

• What safety concerns are associated with setting trusses?
• What can a worker do to protect himself/herself when setting trusses?

NCCER Carpentry Standards

Level Two, Module Five (27202-13): Roofing Applications
Module Five (27202-13) describes how to properly prepare the roof deck and install roofing for residential and commercial buildings.

Task Number 114
Describe bracing the roof assembly.

Definition

Description should include

- cutting the brace
- installing the brace, according to manufacturer specifications
- using appropriate fasteners and materials (e.g., 2 x 4, 2 x 6).

Process/Skill Questions

- What is the purpose of bracing?
- What are the possible consequences of improper bracing?

NCCER Carpentry Standards

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Installing Roofing

Task Number 115

Install roof underlayment.

Definition

Installation should include

- identifying types of underlayment
- keeping the underlayment taut, with two-inch horizontal overlaps
- fastening according to local building code.

Process/Skill Questions

- What is the function of roof underlayment (i.e., roof felt)?
- What are problems associated with improperly installed roof felt?

NCCER Carpentry Standards
Task Number 116

Install asphalt roof shingles.

Definition

Installation should include

- keeping asphalt roof shingles flush to the surface
- following the nail pattern specified by the manufacturer
- maintaining exposure requirements.

Process/Skill Questions

- How does the slope of a roof affect the shingle application?
- What effect does the weight of a single shingle have on full installation?

NCCER Carpentry Standards

Task Number 117

Install the ridge cap.

Definition

Installation should include

- laying out the ridge cap installation
- cutting the ridge cap
- overlapping the ridge equally on both sides
- covering all exposed nails with the proper sealant.

Process/Skill Questions
• What is the proper method of cutting shingles for a ridge cap?
• What is the proper placement of nails for a ridge cap installation?

NCCER Carpentry Standards

Level Two, Module Five (27202-13): Roofing Applications
Module Five (27202-13) describes how to properly prepare the roof deck and install roofing for residential and commercial buildings.

Task Number 118

Identify attic area ventilators.

Definition
Identification should include the various types of attic area ventilators, including
• gable end
• soffit
• roof top
• ridge vent.

Process/Skill Questions
• What is the function of attic ventilators?
• What are the possible consequences of not ventilating an attic?

NCCER Carpentry Standards

Level Two, Module Five (27202-13): Roofing Applications
Module Five (27202-13) describes how to properly prepare the roof deck and install roofing for residential and commercial buildings.

Constructing and Installing Straight (i.e., Basic) Stairs

Task Number 119

Identify the types of stairways.
Definition

Identification should include

- straight
- spiral
- multiple landings.

Process/Skill Questions

- When are different types of stairs used?
- What are the advantages and disadvantages of each type of stairs?

NCCER Carpentry Standards

Level One, Module Nine (27110-13): Basic Stair Layout
Module Nine (27110-13) introduces the various types of stairs and the common building code requirements related to stairs. The module focuses on the techniques for measuring and calculating rise, run, and stairwell openings; laying out stringers; and fabricating basic stairways.

Task Number 120

Identify components of stairs.

Definition

Identification should include

- baluster
- balustrade
- guard
- handrail
- headroom
- housed stringer
- newel post
- nosing
- skirtboard
- stringer
- treads.

Process/Skill Questions

- What are the two essential components of any staircase?
- What are different materials used for treads?
• What is the difference between rise and run?

NCCER Carpentry Standards

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Task Number 121

Calculate the rise and run for stairs.

Definition

Calculations should include the total rise and run and individual riser heights and run lengths needed for the layout of stair stringers.

Process/Skill Questions

• What problems could arise from an inequality in rise dimension?
• What are rise and run?
• What is the maximum rise for a staircase?
• What is the minimum tread width?

NCCER Carpentry Standards

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Task Number 122

Lay out a straight-run stair stringer.

Definition

Laying out should include using a framing square and square gauges to ensure proper dimensions with accuracy to within +/- 1/16 inch.
Process/Skill Questions

- What type of lumber is a good choice for stringers?
- Why are some defects more disadvantageous than others?

NCCER Carpentry Standards

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Task Number 123

Cut the stair components.

Definition

Cutting of the components (e.g., stringers, risers, and tread) should be to within +/- 1/16 inch of given dimensions.

Process/Skill Questions

- What is the critical tolerance in cutting the stringer?
- How would this tolerance affect the product?

NCCER Carpentry Standards

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Task Number 124

Construct the unfinished stair unit.

Definition

Construction should include
- selecting the proper materials and fasteners
- assembling stair components for the unfinished stair unit, according to specifications.

**Process/Skill Questions**

- What are the various fasteners that should be used when constructing the stair unit?
- What other steps can be taken to ensure solid construction?

**NCCER Carpentry Standards**

**Level One, Module Nine (27110-13): Basic Stair Layout**
Module Nine (27110-13) introduces the various types of stairs and the common building code requirements related to stairs. The module focuses on the techniques for measuring and calculating rise, run, and stairwell openings; laying out stringers; and fabricating basic stairways.

## Installing Exterior Doors and Windows

**Task Number 125**

**Prepare rough openings for door and window units.**

**Definition**
Preparation should include proper flashing and waterproofing techniques.

**Process/Skill Questions**

- What types of flashing are commonly used?
- How should one properly shingle flashing?

**NCCER Carpentry Standards**

**Level Two, Module Six (27208-13): Doors and Door Hardware**
Module Six (27208-13) describes the installation of metal doors and related hardware in steel-framed, wood-framed, and masonry walls, along with their related hardware, such as locksets and door closers. A discussion on the installation of wood doors, folding doors, and pocket doors is also presented.

**Task Number 126**

**Identify types of exterior doors.**
Definition

Identification should include

- flush
- six-panel
- metal
- fiberglass
- wood.

Process/Skill Questions

- Which type of door is the most energy-efficient?
- Which door is the most cost-effective?
- What is a standard fire rating for a new door?
- Which types of doors offer the best fire ratings?

NCCER Carpentry Standards

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Task Number 127

Identify types of interior doors.

Definition

Identification should include

- sliding
- bi-fold
- swinging
- pocket.

Process/Skill Questions

- What is the difference between a door with a solid core and one with a hollow core?
- What is a left-hand and a right-hand door?
- What are the advantages and disadvantages of sliding, bi-fold, swinging, and pocket doors?
What is the standard height of a residential door?

**NCCER Carpentry Standards**

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**Task Number 128**

**Identify types of windows.**

**Definition**

Identification should include

- casement
- single-hung
- double-hung
- bay.

**Process/Skill Questions**

- Which type of window is operated with a crank?
- What is low-E argon, and how does it relate to windows? How is it applied?
- What are the most common materials used in windows?

**Task Number 129**

**Install new-construction windows.**

**Definition**

Installation should include

- using the appropriate fasteners
- adding the proper shimming
- keeping level, plumb, square, and straight jambs.
Process/Skill Questions

- How does local building code address waterproofing of the rough sill?
- What installation factors would affect operation of the window?
- How does local building code affect size of the windows?

Installing Exterior Finishes

Task Number 130

Construct a box or rake cornice.

Definition

Construction should include the proper alignment and location of all rafter tails, ledgers, and lookout.

Process/Skill Questions

- Which set of drawings contains box or rake cornice details?
- At what point during construction is the box or rake cornice installed?

NCCER Carpentry Standards

Level Two, Module Three (27204-13): Exterior Finishing
Module Three (27204-13) covers the various types of exterior finish materials and their installation procedures, including wood, metal, vinyl, and fiber-cement siding.

Task Number 131

Install a fascia.

Definition

Installation should include

- using the appropriate fasteners
- applying the proper joinery techniques
- following cornice detail for proper placement.

Process/Skill Questions
• At what point in construction is the fascia installed?
• What materials are used in the fascia? What are the applications for these materials?

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Task Number 132

Install a soffit.

Definition

Installation could include

• cutting the soffit
• installing the soffit with the appropriate fasteners
• joining the soffit tightly, to within +/− 1/16 inch
• ensuring the soffit is straight, to within +/− 1/16 inch
• ensuring minimal splintering on exposed edges of the soffit.

Process/Skill Questions

• At what point in construction is the soffit installed?
• What factors determine the type of soffit that is installed?

NCCER Carpentry Standards

Level Two, Module Three (27204-13): Exterior Finishing
Module Three (27204-13) covers the various types of exterior finish materials and their installation procedures, including wood, metal, vinyl, and fiber-cement siding.

Task Number 133

Install a corner trim for siding.

Definition

Installation should include
• cutting the corner board to length, to within +/- 1/16 inch
• placing it plumb and square with the appropriate fasteners.

Process/Skill Questions

• What part does the corner play in the siding process?
• What is the primary function of a corner board?

NCCER Carpentry Standards

Level Two, Module Three (27204-13): Exterior Finishing
Module Three (27204-13) covers the various types of exterior finish materials and their installation procedures, including wood, metal, vinyl, and fiber-cement siding.

Task Number 134

Install siding and accompanying accessories.

Definition

Installation should include

• cutting to length to within +/- 1/16 inch tolerances, with minimal splintering, and tight joints
• attaching siding with appropriate fasteners, allowing for proper exposure and correct joint placement.

Process/Skill Questions

• Why is siding typically not nailed tightly when attached?
• Why are exterior doors flashed prior to siding? How are they flashed?

NCCER Carpentry Standards

Level Two, Module Three (27204-13): Exterior Finishing
Module Three (27204-13) covers the various types of exterior finish materials and their installation procedures, including wood, metal, vinyl, and fiber-cement siding.

SOL Correlation by Task
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<tr>
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<th>Task Description</th>
<th>Subjects</th>
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</thead>
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<tr>
<td>39</td>
<td>Comply with federal, state, and local safety requirements.</td>
<td>English: 11.5, 11.8, 12.5, 12.8</td>
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<tr>
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<td></td>
<td>History and Social Science:</td>
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<tr>
<td></td>
<td></td>
<td>GOVT.7, GOVT.8, GOVT.14, GOVT.15, VUS.13, VUS.14</td>
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<tr>
<td></td>
<td></td>
<td>Science: CH.1</td>
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<tr>
<td>40</td>
<td>Identify personal protective equipment (PPE) requirements.</td>
<td>English: 11.8, 12.5</td>
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<td>41</td>
<td>Maintain a safe working environment.</td>
<td>Science: CH.1</td>
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<td>42</td>
<td>Explain safe working practices around electrical hazards.</td>
<td>English: 11.5, 11.8, 12.5, 12.8</td>
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<td>Identify emergency first-aid procedures.</td>
<td>English: 11.5, 12.5</td>
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<td>44</td>
<td>Identify the types of fires and the methods used to extinguish them.</td>
<td>English: 11.5, 12.5</td>
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<td></td>
<td>Science: CH.1</td>
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<td>45</td>
<td>Inspect course-specific hand and power tools to visually identify defects.</td>
<td>English: 11.5, 12.5</td>
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<td>46</td>
<td>Demonstrate lifting and carrying techniques.</td>
<td>English: 11.5, 12.5</td>
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<tr>
<td>47</td>
<td>Demonstrate safe laddering techniques.</td>
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<td>48</td>
<td>Demonstrate safe scaffolding techniques.</td>
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<tr>
<td>49</td>
<td>Report personal injuries and environmental and equipment safety violations to the appropriate authority.</td>
<td>English: 11.1, 11.2, 12.1</td>
</tr>
<tr>
<td>50</td>
<td>Pass a safety exam for lab/site safety and the use of tools and equipment specific to the construction industry.</td>
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</tr>
<tr>
<td>51</td>
<td>Identify the responsibilities and personal characteristics of a professional carpenter.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>52</td>
<td>Research local and regional opportunities in the construction industry.</td>
<td>English: 11.8, 12.8</td>
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<td>History and Social Science:</td>
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<td></td>
<td></td>
<td>GOVT.7, GOVT.8, GOVT.14, GOVT.15</td>
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<tr>
<td>53</td>
<td>Describe the relationships among professional entities common to the construction industry.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>54</td>
<td>Communicate verbally and in writing, using construction terminology.</td>
<td>English: 11.1, 11.5, 11.7, 11.8, 12.1, 12.5, 12.7, 12.8</td>
</tr>
<tr>
<td>55</td>
<td>Identify communication technology and hand signals common to the construction site.</td>
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<tr>
<td>56</td>
<td>Measure materials, using a standard measuring device.</td>
<td>English: 11.5, 12.5</td>
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<tr>
<td>57</td>
<td>Identify hand tools and power tools in carpentry.</td>
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<td>58</td>
<td>Maintain hand and power tools.</td>
<td>English: 11.5, 12.5</td>
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<td>59</td>
<td>Describe the safe use of nail guns.</td>
<td>English: 11.5, 12.5</td>
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<tr>
<td>60</td>
<td>Correlate information on blueprints.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>61</td>
<td>Interpret drawing dimensions.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>62</td>
<td>Describe the importance of the Virginia Unified Statewide Building Code (USBC), what it governs, and how to use it as a reference.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>63</td>
<td>Identify nailing schedules and patterns for selected materials, according to local building codes.</td>
<td>English: 11.5, 12.5</td>
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<tr>
<td>64</td>
<td>Determine materials from a blueprint.</td>
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<td>65</td>
<td>Estimate labor and material cost.</td>
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<tr>
<td>66</td>
<td>Determine the use of materials.</td>
<td>English: 11.5, 12.5</td>
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<tr>
<td>67</td>
<td>Set up a builder's level or a laser level.</td>
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<td>68</td>
<td>Establish elevation points from a benchmark.</td>
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<td>69</td>
<td>Install batter boards.</td>
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<tr>
<td>70</td>
<td>Identify types of footings.</td>
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<tr>
<td>71</td>
<td>Describe wall-framing techniques (e.g., block, poured) used in masonry construction.</td>
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<tr>
<td>72</td>
<td>Describe the installation of window and door jambs in masonry openings.</td>
<td>English: 11.1, 11.5, 12.1, 12.5</td>
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<tr>
<td>73</td>
<td>Describe form maintenance.</td>
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<tr>
<td>74</td>
<td>Install the sill plate.</td>
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<td>75</td>
<td>Install a solid or engineered wood beam/girder.</td>
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<tr>
<td>76</td>
<td>Install the Lally column (i.e., basement pole).</td>
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<td>77</td>
<td>Assemble floor framing detail on the sill plate.</td>
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<tr>
<td>78</td>
<td>Assemble floor joists.</td>
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<td>79</td>
<td>Frame the floor opening.</td>
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<td>80</td>
<td>Install floor joists.</td>
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<td>81</td>
<td>Install bridging and blocking.</td>
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<td>82</td>
<td>Install subfloor sheathing.</td>
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<td>83</td>
<td>Select subfloor framing fasteners and adhesives.</td>
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<td>84</td>
<td>Lay out the floor deck for walls.</td>
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<td>85</td>
<td>Lay out stud spacing on wall plates.</td>
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<tr>
<td>86</td>
<td>Assemble wall framing members.</td>
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<td>87</td>
<td>Frame the door opening.</td>
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<td>88</td>
<td>Frame the window opening.</td>
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<td>89</td>
<td>Install the double-top plate (i.e., cap plate).</td>
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<td>90</td>
<td>Install wall blocking (i.e., backing).</td>
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<tr>
<td>91</td>
<td>Describe the procedures and requirements for installing fire stops.</td>
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<td>92</td>
<td>Install a corner brace.</td>
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<td>93</td>
<td>Install exterior wall sheathing.</td>
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<td>94</td>
<td>Raise a wall. English: 11.5, 12.5</td>
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<td>95</td>
<td>Cut metal studs.</td>
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<tr>
<td>96</td>
<td>Assemble wall sections, using alternative wall systems (e.g., metal studs).</td>
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<tr>
<td>97</td>
<td>Lay out ceiling framing detail on the top wall plate.</td>
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<td>98</td>
<td>Cut ceiling joists.</td>
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<tr>
<td>99</td>
<td>Install the ceiling joists.</td>
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<tr>
<td>100</td>
<td>Frame the ceiling opening.</td>
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<tr>
<td>101</td>
<td>Install a strongback (i.e., stiffener or catwalk).</td>
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<tr>
<td>102</td>
<td>Identify types of roofs used in residential construction.</td>
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<tr>
<td>103</td>
<td>Lay out roof framing detail on the double-top plate.</td>
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<tr>
<td>104</td>
<td>Lay out the common, valley, hip, and jack/cripple rafters.</td>
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<tr>
<td>105</td>
<td>Lay out a common rafter as a pattern.</td>
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<tr>
<td>106</td>
<td>Reproduce common rafters from a pattern.</td>
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<td>107</td>
<td>Install the ridgeboard.</td>
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<td>108</td>
<td>Install common rafters.</td>
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<tr>
<td>109</td>
<td>Frame a gable end.</td>
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<tr>
<td>110</td>
<td>Install the collar ties (i.e., rafter ties).</td>
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<tr>
<td>111</td>
<td>Install roof sheathing.</td>
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<td>112</td>
<td>Lay out for a truss installation.</td>
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<tr>
<td>113</td>
<td>Describe the safe setting and anchoring of trusses by hand or by crane.</td>
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<td>114</td>
<td>Describe bracing the roof assembly.</td>
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<td>115</td>
<td>Install roof underlayment.</td>
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<td>116</td>
<td>Install asphalt roof shingles.</td>
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<td>117</td>
<td>Install the ridge cap.</td>
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<td>118</td>
<td>Identify attic area ventilators.</td>
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<tr>
<td>119</td>
<td>Identify the types of stairways.</td>
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<tr>
<td>120</td>
<td>Identify components of stairs.</td>
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<tr>
<td>121</td>
<td>Calculate the rise and run for stairs.</td>
<td>History and Social Science: WHI.5, WHI.6</td>
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<td>122</td>
<td>Lay out a straight-run stair stringer.</td>
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<tr>
<td>123</td>
<td>Cut the stair components.</td>
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<tr>
<td>124</td>
<td>Construct the unfinished stair unit.</td>
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<tr>
<td>125</td>
<td>Prepare rough openings for door and window units.</td>
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<tr>
<td>126</td>
<td>Identify types of exterior doors.</td>
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<tr>
<td>127</td>
<td>Identify types of interior doors.</td>
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<tr>
<td>128</td>
<td>Identify types of windows.</td>
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<tr>
<td>129</td>
<td>Install new-construction windows.</td>
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<td>130</td>
<td>Construct a box or rake cornice.</td>
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<tr>
<td>131</td>
<td>Install a fascia.</td>
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<td>132</td>
<td>Install a soffit.</td>
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<td>133</td>
<td>Install a corner trim for siding.</td>
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</tr>
<tr>
<td>134</td>
<td>Install siding and accompanying accessories.</td>
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</tbody>
</table>

### Green Building Infusion Units

The Green Building Infusion Unit (GBIU) was designed to encourage teachers to infuse instructional units on green building knowledge and skills into designated CTE courses. The infusion unit is not mandatory, and, as such, the tasks/competencies are marked as “optional,” to be taught at the instructor’s discretion. Teachers can find the infusion/unit in the course listing.

### Entrepreneurship Infusion Units

Entrepreneurship Infusion Units may be used to help students achieve additional, focused competencies and enhance the validated tasks/competencies related to identifying and starting a new business venture. Because the unit is a complement to certain designated courses and is not mandatory, all tasks/competencies are marked “optional.” Teachers can find the infusion/unit in the course listing.

### Teacher Resources
The National Center for Construction Education and Research (NCCER) provides competencies and objectives as well as modules and lesson plans. Refer to the carpentry craft page on the NCCER website and access those resources on the right hand side under "Course Planning Tools."
Appendix: Credentials, Course Sequences, and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- Carpentry Assessment
- Carpentry Examination
- Carpentry Level One Entry-Level Assessment
- College and Work Readiness Assessment (CWRA+)
- Construction Technologist Entry-Level Assessment
- Core: Introductory Craft Skills Entry-Level Assessment
- Customer Service Examination
- Customer Service Specialist (CSS) Examination
- HBI/NAHB Residential Construction Academy (RCA) Series Student Certification Assessments
- ICC Certificates of Completion Examinations
- International Code Council Residential Building Inspector (B1) Examination
- National Career Readiness Certificate Assessment
- Pre-Apprenticeship Certificate Training (PACT) Core Examinations
- Professional Communications Certification Examination
- Workplace Readiness Skills for the Commonwealth Examination

Concentration sequences: A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.

- Carpentry I (8601/36 weeks, 140 hours)

Career Cluster: Architecture and Construction

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
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</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Carpenter&lt;br&gt; Construction and Building Inspector&lt;br&gt; Construction Manager&lt;br&gt; Drywall Installer&lt;br&gt; General Contractor&lt;br&gt; Project Manager&lt;br&gt; Roofer</td>
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</table>
## Career Cluster: Architecture and Construction

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
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</thead>
<tbody>
<tr>
<td>Design/Pre-Construction</td>
<td>Building Code Inspector</td>
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<tr>
<td></td>
<td>Cost Estimator</td>
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<tr>
<td>Maintenance and Operations</td>
<td>Construction and Building Inspector</td>
</tr>
<tr>
<td></td>
<td>Construction Manager</td>
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<td></td>
<td>Drywall Installer</td>
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<tr>
<td></td>
<td>General Contractor</td>
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<td></td>
<td>Project Manager</td>
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<tr>
<td></td>
<td>Restoration Technician</td>
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