Instructional Framework

Carpentry

46.0201.00

This Instructional Framework identifies, explains, and expands the content of the standards/measurement criteria, and, as well, guides the development of multiple-choice items for the Technical Skills Assessment. This document corresponds with the Technical Standards reviewed on July 13, 2025.

Domain 1: Rough Carpentry **Instructional Time: 40 - 50%**	
STANDARD 3.0 USE MATHEMATICS AND MEASUREMENTS	
3.1 Calculate linear feet, square feet, board feet, and area	• Square feet (length x width) • Board feet (length x width x depth)
3.2 Measure and convert measurements to standard and/or metric measurement systems	• Read and identify components of a tape measure to a 16th of an inch/to the millimeter
3.3 Add subtract, multiply, and divide fractions and decimals	• Whole numbers, fractions, and decimals
3.4 Convert decimals, fractions, and percentages	• Convert fractions to decimals • Convert decimals to fractions • Convert percentages to decimals • Convert decimals to percentages
3.5 Use mathematical formulas to solve problems (e.g., 3.4.5 Rule, Pythagorean Theorem, and the Diagonal Method for Solving Square)	• Volume • Area • Perimeter • Angles/Slope
3.6 Explain the use of measuring scales (e.g., architect's scale, metric's scale, and engineer's scale)	• Symbol for inches (″) • Symbol for feet (′) • Not To Scale (N.T.S.) • Types of scale (1⁄4 inch = 1 foot) • Use scales to determine actual size
3.7 Measure horizontal, vertical, and traverse angles	• Framing square • Speed square • Plumb bob • Level

3.8 Calculate supplies, materials, labor, and overhead costs (i.e., job estimates, inventory, labor estimates, etc.)	● Material takeoff list ○ Lumber ○ Hardware ○ Finishing goods ■ Stain ■ Paint ■ Sandpaper ■ Consumables ● Hours ● Hourly wage ● Blanket overhead ○ Rent ○ Insurance ○ Fuel ○ Electricity, etc. ● Profit margin
STANDARD 7.0 DEMONSTRATE BASIC FLOOR FRAMING	
7.1 Explain the key components of basic floor framing (e.g., sill plate, rim joist, floor joists, girders or beams, joist hangers, and subfloor)	● Identifying hardware and anchors ● Purpose/use of component ● Structural support systems ○ Joist vs. truss systems vs. wooden I-joist ○ Strength considerations
7.2 Explain key considerations about floor framing (e.g., spacing, calculating joist size, crown direction, and support for openings such as doorways)	● Proper measurements ● Square ● Following plans
7.3 Differentiate lumber types and materials for flooring (e.g., OSB, plywood, and pressure-treated lumber)	● Environmental considerations ● Code compliance
7.4 Explain the purpose of fasteners used in floor framing according to national, state, and local building codes	● Code compliance ● Hardware ○ Anchors, brackets, hangers, bolts, etc. ● Differentiate between and select the appropriate fasteners ○ Screws, nails, staples, and adhesives
7.5 Explain different floor systems (e.g., cantilever, TGI truss, and conventional)	● Structural considerations
7.6 Lay out and snap sill lines	● Checking for square

	● Finding the start point ○ Exterior walls
7.7 Install sill plates, floor joists, and subfloors (e.g., tongue and groove, and OSB panels)	● Square ● Code compliance ● Fasteners
STANDARD 8.0 DEMONSTRATE FRAMING AND FINISHING WALLS AND CEILINGS	
8.1 Identify different types of wall systems (i.e., load bearing, live and dead walls, stem walls, pony walls, etc.)	● Considerations for various wall systems
8.2 Explain key components of wall systems (i.e., studs, top plate, bottom plate, sill, cripple, header, ceiling joists, etc.)	● Tying walls together/corner construction ● Top- and bottom plate ● Doorways and windows ● Headers ● Layout and proper spacing of studs per wall type ● Structural requirements for window and door openings, etc.
8.3 Identify the tools and materials necessary to frame wall and ceilings (i.e., saw, hammer, nails or screws, tape measure, level, chalk line, power drill, etc.)	● Code considerations ● Hardware ● Fasteners ● Types of material used ● Ply/sheathing/siding
8.4 Measure and mark walls and ceilings (i.e., snap wall lines, including plates, corner posts, door and window openings, partition Ts, and bracing, and plan for installation of fire stops, etc.)	● Chalk line ● Layout ○ Proper marking
8.5 Erect and brace walls and ceiling (e.g., wood and metal)	● Safety ● Methods for lifting and placing wall units ● Rigging methods for lifting wall units with cranes ● Securing wall units to foundations and floor systems ○ J bolts, powder-actuated nail guns, etc. ● Bracing strategies for wall units
8.6 Explain measures to ensure thermal and moisture barriers in walls, flooring, and ceilings (e.g., waterproofing, air and vapor barriers, and sealants and caulks)	● House wraps ● Insulation
8.7 Explain and install interior wall and ceiling finishes to specifications (i.e., drywall, texture, tongue and groove, trim, etc.)	● Fastener placement ○ Tape and corner beads ○ Texture

	○ Skip trowel ○ Orange peel ○ Spray, etc. ● Application technique ● Environmental considerations ● Mud types ● Proper trim cuts (miter, profile, etc.)
8.8 Identify the tools and materials needed to install drywall for wall and ceiling finishes	● Types of drywall (i.e., fire-rated, moisture-rated, size, etc.) ● Knives, hammer, drill, punch saw ● Screws and nails
STANDARD 9.0 DEMONSTRATE FRAMING AND FINISHING A ROOF	
9.1 Identify different types of roof styles and materials (i.e., A-Frame, gabled, hipped, shingles, metal roofing, tiles, etc.)	● Environmental considerations ● Code considerations
9.2 Identify different truss and rafter systems (i.e., scissored, Warren, Pratt, Howe, K Truss, etc.)	● Environmental considerations ● Code considerations ● Load considerations
9.3 Calculate the run, rise, pitch, spacing and length of each truss or rafter	● Speed square ● Level ● Tape measure ● Plumb bob
9.4 Install roof ventilation systems (i.e. soffits, ridge vent, gable vent, other roofing penetrations, etc.)	● Structural considerations ● Placement ● Proper flashing and sealant
9.5 Set a truss or rafter system	● Fasteners ● Physical vs. mechanical lift ● Bracing ● Layout ● Safety considerations
9.6 Install roof sheathing	● Safety considerations ● Fasteners ● Proper tool ● Type of sheathing

Domain 2: Safety and Tools **Instructional Time: 25 - 30%**	
STANDARD 1.0 PRACTICE WORKPLACE SAFETY	
1.1 Comply with Occupation Safety and Health Administration (OSHA), safety and health standards [e.g., safe work attire and personal protective equipment (PPE); fall protection requirements; lifting procedures; stuck-by, caught-in, and caught between hazards; lockout tagout (LOTO) procedure; fire protection plan; emergency plan, and Safety Data Sheets (SDS)]	● Fall safety ○ Ladder safety ○ Scaffolding safety ● Appropriate attire and equipment of PPE
1.2 Describe methods to establish work zone safety according to the Construction Standard, U.S. Code of Federal Regulations 1926 (i.e., danger signs, caution signs, information signs, safety instruction signs, barricades and barriers, etc.)	● Job safety analysis ● Lighting ● Housekeeping ○ Clean work area ○ Clean job site ● Job site exposure hazards ● Hot work hazards ● Confined spaces
1.3 Use hand tools, power tools, and equipment according to job specifications and safety guidelines	● Power and hand tool identification, usage, and safety ○ Corded, cordless, pneumatic, powder-actuated
1.4 Inspect, maintain, and store tools and equipment according to manufacturer guidelines	● Inspect for damaged cords ● Portable Ground Fault Circuit Interrupters (GFCIs) ● Maintain sharpened blades, chisels, and drill bits ● Properly guarded hand and power tools
1.5 Follow good housekeeping procedures (e.g., keeping the work area clean, storing materials properly, eliminating hazards, performing safety checks, and reporting injuries, incidents, and near misses)	● Material handling ● Housekeeping ○ Clean work area ○ Clean job site
STANDARD 5.0 OPERATE HAND TOOLS, POWER TOOLS, AND EQUIPMENT	
5.1 Identify and describe the use of common hand tools (i.e., hammers, chisels and punches, screw drivers, wrenches, saws, utility knives, shovels and picks, etc.)	● Common name and usage of tools ○ Speed square ○ Hammer ○ Chisels ○ Nail set

	○ Hand saws, etc.
5.2 Identify and describe the use of common measurement and layout tools (i.e., steel rule, tape measure wooden folding rule, laser measuring tool, spirit levels, digital levels, laser levels, squares, plumb bob, chalk lines, etc.)	● Common name and usage of measurement and layout tools
5.3 Identify and describe the use of common power tools and accessories [i.e., saws (circular, jigsaws and reciprocating saws, portable band saws, miter and cutoff saws, table saws), power nailers, pneumatic tools, drill bits, saw blades, extension cords, cartridges, hoses, etc.]	● Common name and usage of power tools and accessories

Domain 3: Finish Carpentry
Instructional Time: 15 - 20%

STANDARD 10.0 DEMONSTRATE DOOR AND WINDOW INSTALLATION

10.1 Identify door and window types and uses (i.e., solid core, hollow core, steel, architectural glass, dual pane, double hung, sliding window, etc.)	● Locations of use ● Environmental considerations ● Security considerations
10.2 Identify parts of windows and doors (i.e., header, sill, jamb, apron, etc.)	● Window and door components ● Interior vs. exterior
10.3 Identify the steps and the techniques for door and window installation (i.e., measuring, leveling, plumb, threshold, casing, jamb, shims, etc.)	● Installation sequence ● Alignment ● Set and check plumb, level, and square ● Attach casing/trim ● Troubleshoot
10.4 Install doors and windows	● Doors ○ Rough openings ○ Weather sealing ○ Headers, sill ○ Molding and trim ○ Bypass ○ Bifold ○ Standard ● Windows

	○ Rough opening ○ Weather sealing ○ Headers, sill ○ Molding and trim ○ Types of windows ■ Single hung ■ Sliders ■ Picture ■ Specialty windows
10.5 Install door hardware (i.e., hinges, doorknobs, door locks, etc.)	● Knobs ● Bypass ● Bifold ● Standard ● Exterior and interior doors ● Doorknobs, etc.
STANDARD 11.0 DEMONSTRATE EXTERIOR FINISHES	
11.1 Identify different types and purposes of frieze boards and soffits	● Type of material ● Ventilation ● Insulation
11.2 Install frieze boards or soffit	● Tool selection ● Material ● Hardware
11.3 Identify different exterior finishes (i.e., vinyl siding, wood, stucco, brick, etc.)	● Differentiate between types of exterior finishes ● Environmental considerations
11.4 Install exterior finish (i.e., vinyl siding, stucco, wood, etc.)	● Types and methods of installations ● Common types of siding
11.5 Identify different types of external moldings and trims	● Differentiate between moldings and trims
11.6 Install exterior moldings and trim	● Methods of installation ● Common types of molding and trim

Domain 4: Blueprints, Codes and Layouts **Instructional Time: 10 - 15%**	
STANDARD 2.0 APPLY COMMUNICATION SKILLS	
2.1 Write and speak clearly and concisely, using industry terminology when appropriate	● Proper terminology ● Professional writing ● Giving clear directions ● Professionalism
2.2 Describe the elements of customer service and their impact on a business (e.g., availability, courtesy, consistency, accuracy, responsiveness, and efficiency)	● Proper reputation ● Repeat customers ● Work ethic ● Appearance and attire ● Dependability ● Handling an upset customer
2.3 Use verbal, nonverbal, and listening skills with people of diverse cultures and generations	● Effective communication ● Professionalism ● Active listening
2.4 Describe how electronic communication is used in the workplace (e.g., cell phone, text messaging, and social networking)	● Email and text etiquette ○ Spelling ○ Punctuation ○ Complete sentences ○ Professional signature, etc. ● Professional discretion ● Separation of professional vs. personal
2.5 Read manuals and follow instructions	● Instructional terminology ● Technical language ● Manufacturer's guidelines
STANDARD 4.0 INTERPRET CARPENTRY CONSTRUCTION DOCUMENTS	
4.1 Describe guidelines and details provided by carpentry construction documents (i.e., construction plan or blueprint, diagrams, drawings, specification sheets, site layout plans, cut list, schedule, etc.)	● Blueprint terms/components/symbols ○ Legends ○ Assembly drawing ○ Auxiliary view ○ Title blocks ○ Scheduling

4.2 Identify and explain types of construction blueprints (i.e., architectural, mechanical, electrical, structural, plumbing, etc.)	● Trade-specific symbols ○ Electrical symbols ○ HVAC symbols ○ Plumbing symbols ○ Elevation symbols, etc.
4.3 Interpret blueprint structures and sections (i.e., lines, terms, symbols, scales, drawing dimensions, etc.)	● Symbol for inches (″) ● Symbol for feet (′) ● Not To Scale (N.T.S.) ● Types of scale (1⁄4 inch = 1 foot) ● Use scales to determine actual size ● Line types ● Trade-specific symbols ○ Electrical symbols ○ HVAC symbols ○ Plumbing symbols ○ Elevation symbols, etc.
4.4 Explain the importance of building code compliance [i.e., MasterFormat 2020, International Residential Code (IRC), International Building Code (IBC), and National Fire Protection Association (NFPA 72 and NFPA 70)]	● Local, State, National codes ○ Hierarchy ● Structural safety ● Legal ramifications ● Regulatory compliance ● Environmental considerations
STANDARD 6.0 LAY OUT BUILDING LINES	
6.1 Explain “laying out building lines” for carpentry work (e.g., carpenter uses the architectural plan to mark precise locations of walls, studs, and other framing elements of the building)	● Checking for square ● Finding the start point ○ Control wall ● Load-bearing walls ● Exterior walls ● Utility walls, etc.
6.2 Identify different building lines and explain their uses (i.e., object lines, dimension and extension lines, center line, cutting plane line, etc.)	● Identify and explain building lines on blueprints
6.3 Demonstrate the accurate use of a tape measure (i.e., accuracy and tolerances, calibrated tape, know where zero is on the tape, maintain good alignment, apply correct tape tension, measure horizontally, repeat measurements, etc.)	● Demonstrate tape measure use

6.4 Determine elevations using levels (i.e., builders/transit, laser, etc.)	● 3-4-5 method/Pythagorean theorem ● Laser level