

Construction Trades Foundation

Exam Information	Description
Exam number 510 Items 65 National Career Cluster Architecture & Construction Certification available Yes	The Construction Trades Foundation industry certification exam assesses foundational skills in construction trades. Learners demonstrate basic safety skills, basic math skills, and their ability to recognize and demonstrate the use of various hand tools and power tools. They also read and explain blueprints, and explain and demonstrate basic rigging techniques and concepts.

Exam Blueprint and Performance Skills

Standard	Percentage of exam score
1. Shop Safety	12.77%
2. Tools & Equipment	10.64%
3. Construction Math	14.89%
4. Sustainability	8.51%
5. Pre-Build Processes	4.26%
6. Building Systems & Structures	4.26%
7. Construction Trade Exploration	4.26%
8. Career Pathways	29.79%

*Includes performance skill evaluation.

Standard 1 - Shop Safety

Candidates will learn and practice basic construction safety skills.

Objective 1 Identify potential safety hazards in a construction site or shop space.

1. Power tools
2. Hand tools
3. Shop/Site Behavior
4. Chemicals

Objective 2 Explain ways to mitigate safety concerns in a construction site or shop space.

1. Training
2. Procedures
3. Cleanliness
4. Personal Protective Equipment

Optional: Standard performance evaluations on the final page of this document

Standard 2 - Tools & Equipment

Candidates will explore classifications of tools and their applications in construction.

Objective 1 Explain the uses of common construction tools and equipment.

1. Hand tools
2. Portable power tools
3. Stationary tools
4. Mobile equipment/machinery

Objective 2 List the proper care and maintenance procedures for common construction tools and equipment.

1. Hand tools
2. Portable power tools
3. Stationary tools
4. Mobile equipment/machinery

Objective 3 Discuss the types of power sources for tools and equipment.

1. Corded
2. Battery
3. Pneumatic
4. Hydraulic
5. Combustion

Optional: Standard performance evaluations on the final page of this document

Standard 3 - Construction Math

Candidates will use various construction measuring devices to accurately measure, calculate, and mark projects.

Objective 1 Demonstrate basic measurements in relation to construction

1. Square footage (flooring, sheetrock, etc.)
2. Cubic yards (concrete, dirt, etc.)
3. Conversions (feet, yards, inches, etc.)

Objective 2 Demonstrate use of measuring devices and methodologies.

1. Traditional measuring tools (tape, optical transit, etc.)
2. Electronic measuring tools (laser, GPS, etc.)
3. Squaring tools (speed, framing, etc.)
4. Leveling tools (bubble, laser, plumbob, etc.)

Optional: Standard performance evaluations on the final page of this document

Standard 4 - Sustainability

Candidates will explore concepts, certifications, and practices for sustainable construction.

Objective 1 Recognize the permanence of construction and the built environment.

1. Material processes
2. Procedures
3. Certifications

Objective 2 Recognize common sustainability certificates and discuss the benefits and drawbacks of each.

1. Energy star
2. LEED
3. Other Certifications

Objective 3 Explore various sustainable energy sources

1. Solar (including passive and thermal mass)
2. Wind
3. Geothermal
4. Hydroelectric
5. Off-grid building (gray water, compost toilets, etc.)
6. Building management systems / smart homes
7. Engineered & recyclable building materials
8. Natural gas

Objective 4 Explore various sustainable energy efficient building practices and the impact on the quality of human life.

1. Framing
2. Insulation types
3. Passive solar
4. R-values
5. U-values

Objective 5 Discuss how sustainability regulations impact the cost of various building structures.

Optional: Standard performance evaluations on the final page of this document

Standard 5 - Pre-Build Processes

Candidates will explore the general structure of the construction process.

Objective 1 Compare between the various types of construction.

1. New

2. Existing
3. Residential
4. Commercial
5. Heavy civil
6. Industrial

Objective 2 Identify zoning and permits required for construction.

1. City / county regulations (CCR, HOA, etc.)
2. Codes and standards (IRC, NEC, UBC, IPC, etc.)

Objective 3 Recognize the needed infrastructure required for a build.

1. Site planning (utility hookups)
2. Surveying (offsets, boundaries, etc.)
3. Building design / engineering

Objective 4 Identify common types of inspections (soils, foundation, framing, plumbing, electrical, etc.).

1. Municipality differences

Objective 5 Discuss how regulations impact the cost of various building structures.

Standard 6 - Building Systems and Structure

Candidates will understand the basic organization, function, and structure of a single family dwelling.

Objective 1 Illustrates the general organization of mechanical systems in a single family home.

1. Plumbing (pipes, faucets, drains)
2. Electrical (switches, outlets, breakers)
3. HVAC (furnace, air conditioner, thermostat)

Objective 2 Explore blueprints and their uses in the construction of a single family home.

1. Site plans
2. Floor plans

3. Elevations
4. Sections
5. Detail drawings
6. Mechanical, electrical, and plumbing (MEP) drawings
7. Structural

Objective 3 Identify the general structural components of a single family home.

1. Foundation
2. Floor (sill plates, floor joists, subfloor, sheathing, bracing)
3. Walls (top/bottom plates, studs)
4. Window/door framing
5. Roof (rafters, trusses, sheathing)

Objective 4 Discuss the differences of building practices for single family homes.

1. Wood frame
2. Concrete masonry unit (CMU)
3. Insulated concrete forms (ICF)
4. Timber frame

Objective 5 Discuss the uses of common finishes.

1. Interior (cabinetry, trim, textures, paints, flooring, tile, etc.)
2. Exterior (roofing, siding, masonry, stucco, stonework, landscaping, etc.)

Optional: Standard performance evaluations on the final page of this document

Standard 7 - Construction Trade Exploration

Candidates will explore various construction trades through basic hands-on projects and system main maintenance activities.

Objective 1 Discuss the importance of regular inspections to maintain the function of a home.

Objective 2 Identify methods for documenting and tracking maintenance routines.

Objective 3 Discuss basic maintenance routines to help ensure efficient operation of an HVAC system.

1. Change air filter
2. Check thermostat settings

3. Clean vents and registers

Objective 4 List safe procedures for working with electrical systems.

1. Turn off power source (de-energize equipment, lockout/tagout)
2. Use proper tools and equipment
3. Wear PPE
4. Avoid water and moisture
5. Verify absence of voltage
6. Maintain safe distances
7. Follow proper wiring practices

Objective 5 Discuss basic maintenance routines to prevent plumbing issues.

1. Fix leaks
2. Keeps drains cleared
3. Water heater

Objective 6 Illustrate methods for maintaining masonry.

1. Repairing cracks
2. Replacing bricks
3. Applying mortar

Objective 7 Identify methods for repairing a wall

1. Spackling
2. Patching
3. Painting

Optional: Standard performance evaluations on the final page of this document

Standard 8 - Career Pathways

Candidates will investigate career opportunities in the construction industry.

Objective 1 Explore occupations related to the construction industry.

1. Subcontractors (framer, plumber, electrician, finish carpenter, tile setter, dry wall, roofer, etc.)
2. Paver/Surfacers
3. Heavy Equipment Operator
4. Geotechnical Engineers
5. Architect

6. Interior designer
7. Mechanical engineer
8. Electrical engineer
9. Structural engineer
10. Civil engineer
11. Landscape designer
12. Surveyor
13. Project manager
14. Estimator
15. Home inspector
16. Consultants
17. Realtors
18. Loan originators
19. Manufacturer
20. Commercial driver
21. Safety Manager

Objective 2 Describe different types of occupational training related to the construction industry.

1. Apprenticeships (electrical, plumbing, carpentry, etc.)
2. Manufacturer certification (glaziers, countertops, specialized light fixtures, etc.)
3. Operator certification (forklift, crane, CDL, manlift, etc.)
4. Safety certification (OSHA, Certified Safety Professional (CSP)
5. Management Certifications (Certified Construction Manager (CCM), Certified Associate Constructor(CAC), etc.)
6. Technical Certifications (LEED Professional Credentials, Certified Welding Inspector (CWI), etc.
7. Specialized Certifications (Concrete Field Testing Technician, Stormwater Management Certification, etc.)
8. University degree programs (architect, engineer, project management, etc.)

Performance Skills Evaluation

Exam name: Residential Construction 1

Candidate Name: _____

Performance assessments may be completed and evaluated any time before the certification is issued. The following performance skills can be used in connection with the associated standards and exam. The evaluator will function as the subject matter expert to determine if the candidate meets the skills requirements with a Yes/No for passing.

Standard 1 – Shop Safety - Perform a shop or site safety audit and report recommended solutions to potential hazards. - Demonstrate safety practices and procedures based on regulations and requirements when working on a site or constructing a project.	Pass:
Standard 2 – Tools and Equipment - Demonstrate safe and appropriate use of common construction tools and equipment when working on projects. - Demonstrate proper care and maintenance of tools and equipment when working on projects. - Pass relevant safety test(s) with 100% accuracy.	Pass:
Standard 3 – Construction Math - Accurately measure and mark within 1/16". - Accurately add, subtract, and divide measurements. - Accurately convert between inches, feet, and yards. - Accurately calculate volumes and areas. - Accurately square a project using various methods.	Pass:
Standard 6 – Building Systems & Structure Construct a three-dimensional construction project (virtual or physical) from a two-dimensional design.	Pass:
Standard 7 – Construction Trade Exploration - Perform one or more of the following HVAC maintenance tasks: - Change an air filter - Perform basic maintenance cleaning	Pass:

- Perform one or more of the following electrical tasks:
- Remove and install a light fixture
- Remove and install an outlet
- Reset, open, and close of an electrical circuit breaker.
- Reset and test of GFCI receptacle
- Perform one or more of the following plumbing tasks:
- Fix a leaky faucet.
- Remove and replace a plumbing fixture
- Clean or clear a clogged drain
- Winterize part of a plumbing system
- Perform one or more of the following general maintenance tasks:
- Prep surfaces for painting
- Paint walls and trim (techniques)
- Repair a piece of furniture
- Install shelves or other hardware
- Patch/repair drywall

Evaluator Name:

Date: