

Construction Academy

Grades 11-12

Units of Credit: One Year (Elective)

Prerequisites: Wood Technology 1 or Building Trades 1 or Consent of Instructor

Course Description:

The Construction Academy is designed to introduce students to the basic principles of commercial and residential construction. Laboratory activities comprise 85 percent of this program and provide practical application of curriculum knowledge, allowing development of the skills required to become an employable carpenter. Due in part to building and remodeling projects, this course offers hands-on training giving students the opportunity to experience some of the facets of the carpentry trade. Current industry standards are introduced. Students develop and use a variety of skills including safe work habits, organization, problem solving, and practical application of construction techniques. Students engage in a variety of learning activities including lecture, note taking, research, individual projects, demonstrations, and performance tasks. Student achievement is measured in a variety of ways including written, oral and performance testing. In addition, student projects and behavior are evaluated using criteria specified by teacher/industry standards.

Topics:

- Measurement Systems
- In-Depth Use of Hand and Power Tools
- Safety
- Advanced Design and Planning
- Plan and Blueprint Interpretation
- Building Codes, Regulations, Zoning, and Contracts
- Site Work and Preparation
- Estimating and Scheduling
- Foundation Systems
- Concrete
- Framing Systems
- Floor Systems
- Wall Systems
- Roof Systems
- Enclosing the Structure
- Plumbing
- Electrical
- HVAC
- Insulation
- Walls and Ceilings
- Drywall and Plaster
- Exterior and Interior Finishes
- Decks and Porches
- Chimneys and Fireplaces
- Windows and Skylights
- Doors
- Stairways
- Molding and Trim
- Cabinets and Countertops
- Air Conditioning
- Interior Finishing
- Exterior Finishing
- Landscaping
- Careers in the Construction Industry

NOTE: Throughout this document, learning target types are identified as knowledge (“K”), reasoning (“R”), skill (“S”), or product (“P”).

STANDARD 1: Students experience various career opportunities and assess personal career pathways.

Benchmark 1:

Explore and identify personal interests, aptitudes, and abilities and develop strategies to achieve tentative career goals.

Learning Targets (Type):

1. I can use Montana Career Information Systems (MCIS) and/or other systems or web resources to investigate and evaluate my personal interests, aptitudes and abilities. (S)
2. I can formulate tentative career goals. (R)
3. I can evaluate approaches for meeting my goals. (R)
4. I can understand the need for career planning. (K)

Benchmark 2:

Utilize local resources to research career plans.

Learning Targets (Type):

1. I can identify local resources to develop career plans. (K)
2. I can contact my school career counselor or teacher to pursue career pathways. (S)

Benchmark 3:

Recognize the interrelationships of family, community, career, and leisure roles.

Learning Targets (Type):

1. I can describe the importance of balance between family and community in regards to career and leisure activities. (K)
2. I can compare and contrast the needs of career and leisure activities and how they relate to and/or affect family and community. (R)

STANDARD 2: Students demonstrate an understanding and apply principles of Resource Management (i.e., financial, time, personal management).

Benchmark 1:

Prepare a budget and keep financial records.

Learning Targets (Type):

1. I can research and report cost of materials and time. (R,S)
2. I can document financial inputs and outputs. (S)
3. I can identify the necessity to maintain accurate financial records. (K)
4. I can stay within a fixed budget. (S,P)

Benchmark 2:

Prioritize, allocate time, prepare and follow schedules to complete a project.

Learning Targets (Type):

1. I can estimate the required time to complete a project. (R)
2. I can prioritize resources, equipment and tasks. (R)
3. I can reflect upon completion. (K)

Benchmark 3:

Apply appropriate time to task.

Learning Targets (Type):

1. I can implement a time schedule for task completion. (S)

Benchmark 4:

Use physical resources wisely to accomplish a goal.

Learning Targets (Type):

1. I can identify the resources necessary to accomplish the task. (*K*)
2. I can maintain the tools of the trade. (*S*)
3. I can maximize the use of my resources. (*S*)

STANDARD 3: Students acquire and utilize personal and leadership skills to become successful, productive citizens.

Benchmark 1:

Demonstrate active leadership skills by participation in group activities and projects.

Learning Targets (Type):

1. I can investigate various leadership styles. (*R*)
2. I can apply leadership styles in group activities and projects. (*R*)
3. I can master a working knowledge of SkillsUSA (CTSO). (*S*)

Benchmark 2:

Demonstrate positive personal and work ethics.

Learning Targets (Type):

1. I can arrive on time for class and work. (*S*)
2. I can develop personal and work related goals. (*K,P*)
3. I can describe ethical behavior in the workplace. (*K*)
4. I can and do understand the importance of employability and work habits. (*K*)
5. I can and do understand the need for career planning. (*K*)

Benchmark 3:

Demonstrate skills to be a productive citizen.

Learning Targets (Type):

1. I can develop professional relationships with community members. (*S*)
2. I can contribute to my community in a positive manner. (*S,P*)

Benchmark 4:

Apply self-esteem building practices.

Learning Targets (Type):

1. I can define and provide evidence of my strengths in my career interest areas. (*K,S*)
2. I can persevere through set backs and stay focused on my goals. (*S*)

Benchmark 5:

Demonstrate appreciation for diverse perspective needs and characteristics.

Learning Targets (Type):

1. I can develop a working relationship with diverse populations. (*K,S*)
2. I can demonstrate communication skills that contribute to positive relationships. (*S*)
3. I can work to understand diverse points of view. (*R*)

Benchmark 6:

Practice several methods of effective communication.

Learning Targets (Type):

1. I can demonstrate good listening skills. (*S*)
2. I can effectively communicate verbally through collaborative projects. (*S,P*)
3. I can develop quality written professional communications. (*S*)

STANDARD 4: Students acquire and demonstrate current technical skills leading to an occupation.

Benchmark 1:

Practice technical skills and procedures required for an occupation.

Learning Targets (Type):

1. I can construct and install building components according to industry standards. (S)
2. I can install platform floor framing. (S)
3. I can construct exterior wall framing. (S)
4. I can install gable-style roof framing. (S)
5. I can install rough openings in framing. (S)
6. I can install manufactured roof system. (S)
7. I can lay out a foundation. (S)
8. I can demonstrate knowledge of concrete installation. (S)
9. I can install exterior finishes according to industry standards. (S)
10. I can install exterior doors. (S)
11. I can install windows. (S)
12. I can install vertical/horizontal siding. (S)
13. I can install fiberglass shingle roof system. (S)
14. I can install exterior cornice. (S)
15. I can install interior finishes. (S)
16. I can install interior doors. (S)
17. I can install trim and hardware. (S)
18. I can install paneling. (S)
19. I can construct and install stair stringers. (S)
20. I can install and finish drywall. (S)
21. I can install fiberglass shingle roof system (shingles, felt, drip edge) and identify and install: Roofing felt, Drip edge, Starter strip, Shingle, Cap. (S)
22. I can install platform floor framing and also identify and install: Sill sealer, Sill plate, Header joist/band, Floor joist, Bridging, Fasteners, Sub flooring. (S)
23. I can square up floor framing and accurately measure materials. (S)
24. I can identify and install: Sole plate, Top plate, Double top plate, Studs, Trimmer/jack studs, Rough sill, Cripple stud, Header, Corner assembly, Partition backup, Exterior sheathing. (S)
25. I can install gable-style roof framing. (S)
26. I can identify and install: Common rafter, Ridge board, Gable stub, Collar tie, Ceiling joist roof sheathing. (S)
27. I can identify door style, check rough openings, position door unit, plumb, level, and jack units, check unit operation and gaps, then completely fastening unit. (S)
28. I can install and finish drywall. (S)
29. I can identify and install: Drywall, Cornerbead, Fasteners. (S)
30. I can construct and install staircase. (S)
31. I can identify and install: Stringer, Treads, Risers, Railing, Newel post, Balusters. (S)
32. I can install horizontal siding - identify and install: Outside corner, Inside corner, Starter strip, Siding, Undersill, J-channel, F-channel, Soffit, Rake, Fascia. (S)

Benchmark 2:

Practice safe and appropriate use of technology.

Learning Targets (Type):

1. I can determine safe procedures using industry and government standards. (K,R,S)
2. I can demonstrate general lab/work site safety habits. (S)
3. I can demonstrate safe use of tools and equipment. (S)
4. I can observe safety procedures. (S)
5. I can utilize correct techniques for proper handling of hazardous materials. (K,R,S)
6. I can demonstrate knowledge of concepts and skills related to health and safety in the workplace. (K,S)
7. I can comply with safety rules for working with carpentry program. (K,S)
8. I can have chemical manufacturers provide a material safety data sheet (MSDS) for each chemical they produce. (K,S)
9. I can store chemicals in properly labeled containers. (K,S)
10. I can identify the gases encountered in the carpentry program and the hazards they present. (K,S)
11. I can identify the hazards and control of asbestos dust. (K,S)

Benchmark 3:

Select the appropriate tools, equipment, and procedures for the task.

Learning Targets (Type):

1. I can demonstrate skills and knowledge of current equipment, materials, and processes used in related careers. (K,S)
2. I can identify and measure metric and standard fasteners. (K,S)
3. I can correctly identify and use basic hand tools. (K,S)
4. I can identify and demonstrate the use of basic measuring tools (accurate to 1/32 or 1mm). (K,S)
5. I can use reference manuals or information systems to find service procedures and specifications. (K,S)
6. I can check blueprints and specifications and interpret manufacturer's instructions and specifications. (K,S)
7. I can recognize a door and window schedule. (K,S)
8. I can use and apply basic carpentry program processes in an industrial environment as applied by NBAS or NCCERF Certification. (K,S)
9. I can allocate and evaluate time, materials, facilities, and resources to set and achieve goals. (K,R,S)
10. I can assess skills and distribute work accordingly, evaluate performance, and provide feedback toward the accomplishment of personal and team goals. (K,R,S)

Benchmark 4:

Manage and maintain technological tools and follow troubleshooting protocol.

Learning Targets (Type):

1. I can estimate materials. (S)
2. I can calculate: Board feet, Percentage, Linear feet square feet, Cubic feet, Dimensions on blueprints. (S)
3. I can estimate: Footer package, Foundation package, Floor frame package, Wall frame package, Roof frame package, Roofing materials package, Exterior finish package, Interior finish package, Squares of materials. (S)
4. I can square up walls, Plumb walls and brace and fasten walls. (S)

5. I can define related terminology, and identify and install fasteners. (S)
6. I can calculate: Total rise, Total run, Unit rise, Unit run, Head run, Tread thickness. (S)

Benchmark 5:

Apply technical information to a variety of sources.

Learning Targets (Type):

1. I can read and interpret plot plan. (R,S)
2. I can read and interpret foundation plan. (R,S)
3. I can define foundation layout terms. (S)
4. I can read and interpret blueprints. (R,S)
5. I can estimate materials. (R,S)
6. I can accurately measure. (S)
7. I can define foundation layout terms. (S)
8. I can identify and install: Rake, Fascia, Soffit, Boxed cornice. (S)
9. I can define cornice terms. (S)
10. I can demonstrate knowledge of concrete installation. (S)
11. I can define concrete and reinforcement materials. (S)
12. I can define concrete handling and placing practices. (S)
13. I can define forming and flatwork practices. (S)
14. I can define roofing material terms. (S)
15. I can define floor framing terms. (S)
16. I can crown material. (S)
17. I can identify lumber characteristics. (S)
18. I can define wall framing terms. (S)
19. I can apply appropriate math skills (degrees, angles, Pythagorean theorem). (S)
20. I can define vertical siding terms. (S)
21. I can define drywall terms. (S)
22. I can read and interpret blueprints. (S)
23. I can identify and read: Scales, Alphabet of lines, Plot plans, Foundation plans, Floor plans, Elevations, Sections, Details, Window and door schedules, Symbols, abbreviations and notes, Specifications, Define related terminology. (S)

STANDARD 5: Students know and demonstrate the requirements of the workplace through authentic application.

Benchmark 1:

Practice and demonstrate academic and technical skills to a workplace setting.

Learning Targets (Type):

1. I can practice, and demonstrate my technical workplace skills in my school lab. (S)
2. I can research, write and present on the technical content utilizing academic skills found in workplace settings. (R,S,P)

Benchmark 2:

Apply the concepts of entrepreneurship.

Learning Targets (Type):

1. I can explain the concepts of entrepreneurship. (K)
2. I can demonstrate the concepts of entrepreneurship through a unique project. (R,S)
3. I can present my unique project to an authentic audience. (S,P)

Benchmark 3:

Identify possible outcomes and consequences of decisions.

Learning Targets (Type):

1. I can identify possible consequences of carelessness and horseplay. (*K*)
2. I can explain potential outcomes of not following directions, (i.e. safety, guidelines, rubrics). (*R*)

Benchmark 4:

Use acceptable industry standard equipment in a school setting.

Learning Targets (Type):

1. I can successfully use acceptable industry standard equipment to produce an authentic product within budget constraints. (*S,R,P*)