

Course Title: Construction Framing

Unit 1:	Career Opportunities
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Content Standard(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 1. Compare various career opportunities associated with frame construction. Examples: engineer, draftsman, construction foreman, carpenter
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Learning Objective(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 1. Identify career opportunities in the construction framing industry. (international, national, state, local) 2. Discuss educational requirements for careers in the construction framing industry. 3. Discuss working conditions. 4. Compare benefits in the construction framing field for workers. 5. Fill out application for employment. 6. Write résumé.
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Essential Question(s):	What are some of the opportunities, benefits and requirements of a career in construction framing?
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Content Knowledge	Suggested Instructional Activities Rigor & Relevance Framework (Quadrant)	Suggested Materials, Equipment and Technology Resources
<ol style="list-style-type: none"> I. Identify careers in construction framing. II. Research career opportunities. III. Working conditions IV. Training for construction framing careers V. Fill out application for employment. VI. Write resume. VII. Determine wages for construction framing careers. VIII. Worker benefits associated with construction framing careers IV. Working conditions in the field 	<p>Brainstorming Presentation / Exhibitions Questioning Discussion Class developed list Research by students</p>	<p>PowerPoint Websites Textbook Computer Internet Projector</p>

Unit Assessment:	Participation in discussion, Research Report, Written Test, Performance Task
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Unit/Course CTSO Activity:	Students can develop SAE program. Host a career fair for seniors.
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Unit/Course Culminating Product:	Students develop a career portfolio.
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Course/Program Credential(s): <input checked="" type="checkbox"/> Credential <input type="checkbox"/> Certificate <input checked="" type="checkbox"/> Postsecondary Degree <input checked="" type="checkbox"/> University Degree <input type="checkbox"/> Other: Can lead to NCCER Credential

Course Title: Construction Framing

Unit 2:	Safety
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Content Standard(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 2. Demonstrate safety concepts required in the construction framing industry.
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Learning Objective(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 1. Explain the meaning of safety. 2. Identify high hazard areas. 3. Explain and demonstrate the use of appropriate personal protective equipment. 4. Demonstrate and explain general hand- and power-tool safety. 5. Recall general shop rules to be followed while in the shop. 6. Explain shop safety color-coding system. 7. Demonstrate knowledge of fire prevention and control methods. 8. Demonstrate knowledge of fall restraint systems.
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Essential Question(s):	What are the legal and social reasons for learning how to prevent accidents and how to respond to emergency situations?
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Content Knowledge	Suggested Instructional Activities Rigor & Relevance Framework (Quadrant)	Suggested Materials, Equipment and Technology Resources
<ol style="list-style-type: none"> I. Meaning/Importance of shop safety. II. High hazard areas III. PPE IV. Hand and Power Tool Safety V. Shop Rules VI. Safety Colors VIII. Fire Safety IX. Fall Restraint Systems 	<p>Lecture/demonstration Worksheets Laboratory/shop safety tour Hazard identification tour Safe tool operation demonstration Pretest/Posttest</p>	<p>Guest speaker PowerPoint/ Projector Textbooks Quizzes Web sites Handouts Hand and power tools Videos MSDS PPE Safety Posters</p>

Unit Assessment:	Participation in class discussion, participation in shop hazard identification, and shop safety test (100% mastery)
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Unit/Course CTSO Activity:	Incorporate safety practices into student's SAE project.
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Unit/Course Culminating Product:	Students will master shop safety by identifying mock safety hazards in the shop and by passing the safety portion of the lesson with a 100 on the shop safety test.
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Course/Program Credential(s): <input checked="" type="checkbox"/> Credential <input type="checkbox"/> Certificate <input checked="" type="checkbox"/> Postsecondary Degree <input checked="" type="checkbox"/> University Degree <input type="checkbox"/> Other: Can lead to NCCER Credential

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Unit 3:	Grades & Types of Lumber
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Content Standard(s) and Depth of Knowledge Level(s):	<p>Students will</p> <p>3. Compare applications of hardwood and softwood lumber used in framing structures.</p> <ul style="list-style-type: none"> • Identifying grades of lumber <p>Examples: appearance grade, timber grade, dimension grade</p> <ul style="list-style-type: none"> • Identifying defects that affect lumber grade <p>Examples: knot, wane, split, check, warp</p>
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Learning Objective(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 1. Identify species of lumber used in framing 2. Differentiate various characteristics of hardwood and softwood 3. Identify types and uses of manufactured framing lumber 4. Discuss how to modify construction techniques to facilitate the safe use of lumber with defects 5. Match lumber product grades with typical framing uses
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Essential Question(s):	What criteria does the construction industry use in determining grades and types of lumber used for framing?
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Content Knowledge	Suggested Instructional Activities Rigor & Relevance Framework (Quadrant)	Suggested Materials, Equipment and Technology Resources
<p>I. Characteristics of hardwood and softwood</p> <p>II. Lumber defects and their affects on construction uses</p> <p>III. Lumber grading criteria</p> <p>IV. Strength of lumber</p> <ol style="list-style-type: none"> A. Types B. Grades C. Position and Use <ol style="list-style-type: none"> 1. Vertical 2. Horizontal (span) 3. Diagonal (incline angle or pitch) 4. Use as various framing parts 	<p>Defining terms</p> <p>Live demonstrations in lab</p> <p>Strength test comparing effects of location of defects</p> <p>Strength test comparing lumber framing components in various positions to demonstrate how dimension lumber may be used</p>	<p>PowerPoint/ Projectors</p> <p>Textbooks</p> <p>Charts</p> <p>Web sites</p> <p>Handouts</p> <p>MSDS on wood treatment chemicals</p> <p>Wood samples</p>

Unit Assessment:	Following the format in the “Content Knowledge” section, students will experiment with wood samples to determine the best uses.
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Unit/Course CTSO Activity:	FFA Forestry Team will develop a wood sample display and identify hardwoods and soft wood on campus and adjacent woodlands.
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Unit/Course Culminating Product:	Students will master the selection and use of framing lumber components as evidenced by a hands-on shop activity.
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Course/Program Credential(s): <input checked="" type="checkbox"/> Credential <input type="checkbox"/> Certificate <input checked="" type="checkbox"/> Postsecondary Degree <input checked="" type="checkbox"/> University Degree <input type="checkbox"/> Other: Can lead to NCCER Credential

Course Title: Construction Framing

Unit 4:	Estimating Materials
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Content Standard(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 4. Calculate a bill of materials for the framing of a wood structure.
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Learning Objective(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 1. Define a Bill of Materials. 2. Discuss the purpose of a Bill of Materials. 3. List all components of a Bill of Materials. 4. Use a scale drawing to develop a Bill of Materials. 5. Total lumber for: <ul style="list-style-type: none"> • Floor System • Wall Framing • Ceiling Framing • Stair Construction • Roof Framing • Roofing Materials
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Essential Question(s):	What is a Bill of Materials, it's purpose and how does one calculate the amount of material for a wood frame structure?
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Content Knowledge	Suggested Instructional Activities Rigor & Relevance Framework (Quadrant)	Suggested Materials, Equipment and Technology Resources
<ol style="list-style-type: none"> I. Definition of a Bill of Materials II. Using blueprint to determine the amount of various framing components needed III. Format for a Bill of Materials 	<p>Define a Bill of Materials Display a Bill of Materials Demonstrate how to develop a Bill of Materials</p>	<p>Dry erase board Blueprints Projection screen/computer calculator/CAD blueprints Student calculators PowerPoint</p>

Unit Assessment:	Students will develop a Bill of Materials using a blueprint and calculator.
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Unit/Course CTSO Activity:	FFA Agricultural Construction Team will develop a Bill of Materials in preparation for CDE
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Unit/Course Culminating Product:	Students will develop a Bill of Materials for different blueprints.
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Course/Program Credential(s): <input checked="" type="checkbox"/> Credential <input type="checkbox"/> Certificate <input type="checkbox"/> Postsecondary Degree <input type="checkbox"/> University Degree <input type="checkbox"/> Other: Can lead to NCCER Credential

Course Title: Construction Framing

Unit 5:	Floor Systems
Content Standard(s) and Depth of Knowledge Level(s):	Students will: 5. Compare advantages of concrete flooring systems and wood flooring systems. 6. Design a floor framing system for a structure. <ul style="list-style-type: none">• Describing the purpose of a sill used in structures• Demonstrating the layout of joist headers and floor joists used in structures• Contrasting various subfloor materials used in structures Examples: tongue and groove plywood, plywood, oriented strand board shiplap boards• Demonstrating the installation of a subfloor for a structure
Learning Objective(s) and Depth of Knowledge Level(s):	Students will: 1. Identify different types of framing systems. 2. Read and understand drawings and specifications to determine floor system requirements. 3. Identify floor and sill framing and support members. 4. Name the methods used to fasten sills to the foundation 5. Given specific floor load and span data, select the proper girder/ beam size from a list of available girders/beams. 6. List and recognize different types of floor joist. 7. Given specific floor load and span data, select the proper joist size from a list of available joist. 8. List and recognize different types of bridging. 9. List and recognize different types of flooring materials. 10. Explain the purposes of subflooring and underlayment. 11. Match selected fasteners used in floor framing to their correct uses. 12. Estimate the amount of material needed to frame a floor assembly. 13. Demonstrate the ability to: <ul style="list-style-type: none">• Lay out and construct a floor assembly• Install bridging• Install joist for a cantilever floor• Install a subfloor using butt-joint plywood/OSB panels• Install a single floor system using tongue-and-groove plywood/OSB panels.
Essential Question(s):	How does a designer/engineer of a floor system determine what system components to use for a given structure?

Content Knowledge	Suggested Instructional Activities Rigor & Relevance Framework (Quadrant)	Suggested Materials, Equipment and Technology Resources
<p>I. Compare advantages of concrete flooring systems and wood flooring systems.</p> <p>II. Design a floor framing system for a structure.</p> <p>A. Describe the purpose of a sill used in structures.</p> <p>B. Demonstrate the layout of joist headers and floor joists used in structures.</p> <p>C. Contrast various subfloor materials used in structures. Examples: tongue and groove plywood, plywood, oriented strand board shiplap boards</p> <p>D. Demonstrate the installation of a subfloor for a structure.</p>	<p>Field trip to view and discuss concrete floor systems and wood flooring system on local structures under construction.</p> <p>Hands-on lab activities</p>	<p>PowerPoint/ Projectors</p> <p>Textbooks</p> <p>Charts</p> <p>Web sites</p> <p>Handouts</p> <p>Hands-on demonstrations</p>

Unit Assessment:	Students will construct wood flooring system.
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Unit/Course CTSO Activity:	FFA Agricultural Construction Career Development Event
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Unit/Course Culminating Product:	Students will gain an understanding of how to properly frame a structure.
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Course/Program Credential(s): <input checked="" type="checkbox"/> Credential <input type="checkbox"/> Certificate <input checked="" type="checkbox"/> Postsecondary Degree <input checked="" type="checkbox"/> University Degree <input type="checkbox"/> Other: Can lead to NCCER Credential

Course Title: Construction Framing

Unit 6:	Wall Framing
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Content Standard(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 7. Design a wall framing system for a structure. <ul style="list-style-type: none"> • Comparing the use of wood and metal wall framing component • Describing the use of a sole plate in structures • Demonstrating the construction of corner posts with and without blocking • Demonstrating the use and installation of full, cripple, and trimmer studs • Demonstrating the installation of a double top plate in structures • Demonstrating the installation of rough openings for doors and windows, including headers • Demonstrating techniques for bracing a wall 8. Compare various wall sheathing materials for structures. <p style="margin-left: 40px;">Examples: foam board, oriented strand board, insulating board, plywood</p> 9. Explain the importance of vapor barriers used in wall framing. <ul style="list-style-type: none"> • Comparing the advantages of using plastic and building felt as vapor barriers in walls
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Learning Objective(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 1. Identify the components of a wall layout. 2. Describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window openings, partition Ts, bracing, and firestops. 3. Describe the procedure for assembling and erecting an exterior wall. 4. Describe the common materials and methods used for installing sheathing on walls. 5. Layout, assemble, erect, and brace exterior walls for a frame structure. 6. Describe wall framing techniques used in masonry construction. 7. Explain the use of metal studs in wall framing. 8. Estimate the materials required to frame walls.
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Essential Question(s):	How do you properly frame the walls of a structure?
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Content Knowledge	Suggested Instructional Activities Rigor & Relevance Framework (Quadrant)	Suggested Materials, Equipment and Technology Resources
I. Design a wall framing system for a structure. <ol style="list-style-type: none"> A. Compare the use of wood and metal wall framing components. 	View scale framing model and discuss purpose of parts Field trip to job sites of wood and metal wall construction and view stud wall erection	PowerPoint/ Projector Textbooks Charts CAD

<p>B. Describe the use of a sole plate in structures.</p> <p>C. Demonstrate the construction of corner post assemblies with and without blocking.</p> <p>D. Demonstrate the use and installation of full, cripple, and trimmer studs.</p> <p>E. Demonstrate the installation of a double top plate in structures.</p> <p>F. Demonstrate the installation of rough openings for doors and windows, including headers.</p> <p>G. Demonstrate techniques for bracing a wall.</p> <p>II. Compare various wall sheathing materials for structures. Examples: foam board, oriented strand board, insulating board, plywood</p> <p>III. Explain the importance of vapor barriers used in wall faming.</p> <p>IV. Compare the advantages of using plastic and building felt as vapor barriers in walls.</p>	<p>Layout and construct stud wall with corner, intersection, openings and doubled top plate</p>	<p>Web sites Handouts Hands-on demonstrations Framing model</p>
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<p>Unit Assessment:</p>	<p>Students will be graded on projects, demonstrations, and written exams</p>
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<p>Unit/Course CTSO Activity:</p>	<p>FFA Agricultural Construction Career Development Event</p>
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<p>Unit/Course Culminating Product:</p>	<p>Students will lay out and assemble a typical stud wall with window and door openings.</p>
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<p>Course/Program Credential(s): <input checked="" type="checkbox"/> Credential <input type="checkbox"/> Certificate <input checked="" type="checkbox"/> Postsecondary Degree <input checked="" type="checkbox"/> University Degree <input type="checkbox"/> Other: Can lead to NCCER Credential</p>
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Course Title: Construction Framing

Unit 7:	Ceiling Framing
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Content Standard(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <p>10. Design a ceiling framing system for a structure.</p> <ul style="list-style-type: none"> • Demonstrating the installation of ceiling joists • Explaining the use of headers in two-story structures • Demonstrating the installation of rough openings for stairs, attic access, and chimneys
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Learning Objective(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 1. Identify the components of a ceiling layout. 2. Describe the procedure for laying out ceiling joists on the doubled top plate of the wall assembly. 3. Describe the procedure for erecting the ceiling joists. 4. Layout and erect ceiling joists. 5. Describe the method for installing ceiling joists on masonry walls. 6. Cut and install ceiling joists. 7. Estimate the materials required for ceiling joists for a given structure.
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Essential Question(s):	What is the proper way to install a ceiling in a structure?
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Content Knowledge	Suggested Instructional Activities Rigor & Relevance Framework (Quadrant)	Suggested Materials, Equipment and Technology Resources
<p>I. Design a ceiling framing system for a structure.</p> <ol style="list-style-type: none"> A. Demonstrate the installation of ceiling joists. B. Explain the use of headers in two-story structures. C. Demonstrate the installation of rough openings for stairs, attic access, and chimneys. 	<p>Field trip to view and discuss ceiling joist systems under construction</p> <p>Hands-on shop activities</p>	<p>PowerPoint/ Projector</p> <p>Textbooks</p> <p>Charts</p> <p>Web sites</p> <p>Handouts</p> <p>Hands-on demonstrations</p>

Unit Assessment:	Students will be graded on scale model, written exam, hands-on demonstration
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Unit/Course CTSO Activity:	FFA Agricultural Construction Career Development Event, Habitat for Humanity
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Unit/Course Culminating Product:	Students will construct a scale model of a building.
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Course/Program Credential(s): <input checked="" type="checkbox"/> Credential <input type="checkbox"/> Certificate <input checked="" type="checkbox"/> Postsecondary Degree <input checked="" type="checkbox"/> University Degree <input type="checkbox"/> Other: Can lead to NCCER Credential

Course Title: Construction Framing

Unit 8:	Stair Construction
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Content Standard(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 11. Identify types of stairs used in structures. <ul style="list-style-type: none"> • Comparing materials used in stair construction • Calculating the total rise, number and size of risers, and treads for a stairway 12. Demonstrate the procedure for laying out and cutting stringers for stair construction. 13. Demonstrate the procedure for installing handrails to stairs.
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Learning Objective(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 1. Match stair design type with structure 2. Match form and function 3. Determine material selection criteria for stairs 4. Calculate treads, risers and run using framing square and using a calculator 5. Layout a stair stringer 6. Demonstrate handrail installation
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Essential Question(s):	What are the determining factors in the selection of stair type, materials, and design for a stair system for a given structure?
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Content Knowledge	Suggested Instructional Activities Rigor & Relevance Framework (Quadrant)	Suggested Materials, Equipment and Technology Resources
<ol style="list-style-type: none"> I. Identification of stairs and stair components II. Selection of stair construction materials III. Stair layout IV. Handrail layout and installation 	<p>Field trip to view stair installation Hands on shop activities Student demonstration of mastery of concepts</p>	<p>PowerPoint/ Projectors Textbooks Charts CAD Web sites Handouts Hands-on demonstrations</p>

Unit Assessment:	Student demonstrations of mastery of concepts
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**Unit/Course
CTSO Activity:**

FFA Agricultural Construction Career Development Event, Habitat for Humanity

**Unit/Course
Culminating
Product:**

Students will build a scale model of a building.

Course/Program Credential(s): Credential Certificate Postsecondary Degree University Degree
 Other: Can lead to NCCER Credential

Course Title: Construction Framing

Unit 9:	Roof Framing
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Content Standard(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <p>14. Identify types of roofs used on structures Examples: hip, gable, gambrel, shed</p> <p>15. Compare conventional and truss roof systems for structures.</p> <ul style="list-style-type: none"> • Laying out common, hip, and valley rafters • Laying out a truss using a framing square • Demonstrating the installation of rough openings for vents, skylights, and chimneys <p>16. Compare various decking materials for roof systems. Examples: tongue and groove plywood, plywood, oriented strand board</p>
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Learning Objective(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 1. Understand the terms associated with roof framing. 2. Identify the roof framing members used in gable and hip roofs. 3. Identify the methods used to calculate the length of a rafter. 4. Identify the various types of trusses used in roof framing. 5. Use a rafter framing square, speed square, and calculator in laying roof framing. 6. Identify various types of sheathing used in roof construction. 7. Frame a gable roof with vent openings. 8. Frame a roof opening for a dormer. 9. Frame a gable dormer. 10. Construct a frame roof, including hips, valleys, commons, jack rafter and sheathing. 11. Erect a gable roof using trusses. 12. Estimate the materials used in framing and sheathing a roof.
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Essential Question(s):	What are the different types of roofs that can be used on a structure and how do they vary?
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Content Knowledge	Suggested Instructional Activities Rigor & Relevance Framework (Quadrant)	Suggested Materials, Equipment and Technology Resources
<p>I. Lay out rafter locations on a top plate.</p> <p>II. Layout, cut, and erect rafters for a gable roof.</p> <p>III. Frame a gable end with vent openings.</p> <p>IV. Frame a roof opening.</p>	<p>Field trip to view and discuss stair systems under construction in local area or view stair framing where available</p> <p>Hands-on shop activities</p> <p>Student demonstrations of their ability in stair</p>	<p>PowerPoint/ Projectors</p> <p>Textbooks</p> <p>Charts</p> <p>CAD</p> <p>Websites</p>

V. Apply roof sheathing. VI. Layout, cut, and erect rafters for and intersecting hip roof with valley. VII. Erect trusses for a gable roof.	layout and construction	Handouts Hands-on demonstrations
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Unit Assessment:	Student performance on content objectives
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Unit/Course CTSO Activity:	FFA Agricultural Construction Career Development Event, Habitat for Humanity
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Unit/Course Culminating Product:	Students will build a scale model of a structure.
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Course/Program Credential(s): <input checked="" type="checkbox"/> Credential <input type="checkbox"/> Certificate <input checked="" type="checkbox"/> Postsecondary Degree <input checked="" type="checkbox"/> University Degree <input type="checkbox"/> Other: Can lead to NCCER Credential

Course Title: Construction Framing

Unit 10:	Roofing Materials
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Content Standard(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <p>17. Describe types of materials used for roof systems. Examples: felt, shingles, metal roofing, roll roofing</p> <p>18. Demonstrate the installation of roofing materials.</p>
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Learning Objective(s) and Depth of Knowledge Level(s):	<p>Students will:</p> <ol style="list-style-type: none"> 1. Select roofing materials for various roof systems. 2. Install various roofing materials.
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Essential Question(s):	What roofing materials can be used to cover a building?
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Content Knowledge	Suggested Instructional Activities Rigor & Relevance Framework (Quadrant)	Suggested Materials, Equipment and Technology Resources
<p>I. Description of types of materials used for roof systems Examples: felt, shingles, metal roofing, roll roofing</p> <p>II. Demonstration of the installation of roofing materials</p>	<p>Field trip to view and discuss new roofs being installed in local area</p> <p>Hands-on shop activities</p> <p>Student demonstrations of their ability to install various roofing materials</p>	<p>PowerPoint/ Projectors</p> <p>Textbooks</p> <p>Charts</p> <p>CAD</p> <p>Web sites</p> <p>Handouts</p> <p>Hands-on demonstrations</p>

Unit Assessment:	Test and students' hands on performance
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Unit/Course CTSO Activity:	FFA Community Service Projects involving construction and FFA Agricultural Construction Career Development Event
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**Unit/Course
Culminating
Product:**

Students constructing structures.

Examples: storage facility structures, Habitat for Humanities Houses, remodels, additions etc.

Course/Program Credential(s): Credential Certificate Postsecondary Degree University Degree
 Other: Can lead to NCCER Credential