

Agricultural Structures

Curriculum Guide: *Agricultural Structures*

Unit: III. Building Construction

Unit Objective:

Students will demonstrate an understanding of correct building construction procedures by laying out joists and rafters, applying roofing skills, and answering questions about roofing materials.

Show-Me Standards: 1.10, MA2

References:

Agricultural Structures. University of Missouri-Columbia, Instructional Materials Laboratory, 1999.

Agriculture Publications. MU Extension. University of Missouri-Columbia. Accessed August 25, 2003, from <http://muextension.missouri.edu/explore/agguides/>.

CEV Multimedia. Accessed December 4, 2003, from <http://www.cev-inc.com/>.

Cook, J. B., & Nickolaus, G. F. *Basic Procedures in Administration of Zoning Regulations: Appeals*. MU Extension. University of Missouri-Columbia. Accessed December 2, 2003, from <http://muextension.missouri.edu/explore/commdm/dm7613.htm>.

Cook, J. B., & Nickolaus, G. F. *Basic Procedures in Administration of Zoning Regulations: Making Applications*. MU Extension. University of Missouri-Columbia. Accessed December 2, 2003, from <http://muextension.missouri.edu/explore/commdm/dm7612.htm>.

Local regulatory agencies, such as the planning and development department, public works department, and county board of commissioners

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Instructional Strategies/Activities:

- Students will engage in study questions in lessons 1 through 9.
- Students will complete AS 1.1, Safety on the Construction Site; AS 2.1, Identifying Building Designs; AS 3.1, Construction Materials; AS 4.1, Identifying Fasteners; AS 5.1, Diagramming Flooring; JS 5.1, Joist Layout; AS 6.1, Wall Construction; JS 7.1, Rafter Layout; AS 8.1, Applying Roofing Materials; and AS 10.1, Heating, Cooling, and Ventilation Needs.
- Additional activities that relate to the unit objective can be found under the heading “Other Activities” in the following locations: p. III-4, p. III-15, p. III-25 (1), p. III-37, p. III-71, p. III-88, and p. III-113 (1, 2).

Performance-Based Assessment:

Students will lay out joists and rafters, use roofing skills to apply model shingles, and answer key questions about applying roofing materials.

Assessment will be based on the ability to safely and correctly perform the assigned procedures and to answer questions about applying roofing materials.

Unit III—Building Construction Instructor Guide

The instructor should distribute the student handouts at the beginning of the unit and assign the performance-based assessment activities in conjunction with the relevant lesson material as indicated in the instructor guide. Students will complete the activities as they progress through the unit lessons.

1. Emphasize the importance of following local building codes and zoning laws when building new structures or making repairs. Discuss relevant local building codes and zoning laws.
 - a. Information regarding building codes and zoning laws is available from local regulatory agencies, such as the planning and development department, public works department, and county board of commissioners.
 - b. General information about Missouri building codes and zoning laws is also available from the MU Extension, University of Missouri-Columbia, accessed December 3, 2003, from <http://muextension.missouri.edu/explore/agguides/>.
2. Use JS 5.1, Joist Layout, to assess student competency at laying out joists for floor framing. Students will lay out and assemble an 8' x 10' section of floor joists. For a complete description of the activity, see JS 5.1, p. III-65. **NOTE: This activity calls for students to use hand and power tools. Students should only complete this performance-based activity if they have mastered all the relevant competencies and have the instructor's permission to perform the activity.**
3. Use JS 7.1, Rafter Layout, to assess student competency at laying out rafters. Students will lay out the ridge cut, seat cut, and tail cut for a rafter on boards, paper, or cardboard. For a complete description of the activity, see JS 7.1, p. III-107.
4. Use AS 8.1, Applying Roofing Materials, to assess student competency at applying shingles. Students will use appropriate roofing techniques to apply paper shingles to a desk or shop table. They will also answer three key questions about applying roofing materials.
 - a. For a complete description of the activity, see AS 8.1, pp. III-125-III-126.
 - b. Answers for the activity are located on p. III-114.
5. The student handout for this performance-based assessment activity is a checklist based on these activity sheets that students can use to evaluate their work.

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6. The student handout and scoring guide can also be adapted for use with students' class projects, if desired.
7. The final assessment score will be based on the ability to safely and correctly perform the assigned procedures and to answer questions about applying roofing materials.
8. **ADDITIONAL ACTIVITIES:**
 - a. Have students make models of building styles and building substructures discussed in the unit, such as a shed with a hip or gable roof, a truss, and a stud frame wall with a door and window opening. Small wood stock such as strips of balsa or Popsicle sticks would be suitable for these projects.
 - b. As an alternative to a larger class project, have students build a smaller project, such as a dog house, that requires them to apply many of the same construction skills.

**Unit III—Building Construction
Student Handout**

Complete the activities below; use the checklists to evaluate your work.

JS 5.1, Joist Layout

1. Use the procedure outlined in JS 5.1 to lay out floor joists.
2. Follow all assigned safety procedures. You can lose points for not following safety precautions and other assigned procedures.
3. Check your work and make any necessary changes.
 - Measurements and cuts are accurate.
 - Joists are centered.
 - Joists fit well and are fastened for optimum strength.
 - Project is square and straight.
4. Have the instructor check your work. Due date _____.
5. Your final assessment score will be based on your ability to safely and correctly lay out floor joists.

JS 7.1, Rafter Layout

1. Use the procedure outlined in JS 7.1 to lay out the ridge cut, seat cut, and tail cut for a rafter on a board or piece of paper.
2. Check your work and make any necessary changes.
 - Measurements are correct.
 - Ridge cut, seat cut, and tail cut are accurately laid out.
3. Have the instructor check your work. Due date _____.
4. Your final assessment score will be based on your ability to correctly lay out rafters.

AS 8.1, Applying Roofing Materials

1. Use the procedure outlined in AS 8.1 to apply model three-tab shingles.
2. Check your work and make any necessary changes.
 - Measurements are accurate.
 - Cuts are accurate.
 - Courses are properly staggered.
 - Courses are properly overlapped.
 - Shingles are square and run straight.
 - Cap shingles are properly overlapped.
 - Cap shingles are running the right direction.
3. Have the instructor check your work. Turn in your completed activity questions. Due date _____.
4. Your final assessment score will be based on your ability to correctly apply roofing material and on your responses to the activity questions.

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Unit III—Building Construction Scoring Guide

Name _____

Activity	Criteria	Points Possible	Points Earned	Comments
Joist Layout	<ul style="list-style-type: none"> <input type="checkbox"/> Measurements and cuts are accurate <input type="checkbox"/> Joists are centered, square, and straight <input type="checkbox"/> Student followed all safety precautions <input type="checkbox"/> Student followed all assigned procedures 			
Rafter Layout	<ul style="list-style-type: none"> <input type="checkbox"/> Measurements are correct <input type="checkbox"/> Ridge cut, seat cut, and tail cut are accurately laid out 			
Applying Roofing Materials	<ul style="list-style-type: none"> <input type="checkbox"/> Measurements and cuts are accurate <input type="checkbox"/> Courses are correctly staggered and overlapped <input type="checkbox"/> Shingles are square and run straight <input type="checkbox"/> Cap shingles are properly overlapped and running in the right direction <input type="checkbox"/> Activity questions are answered correctly 			

Total Points Earned _____

