Arkansas CTE

Agricultural Structural Systems: Grades 10, 11, 12

Adopted 2007

Introduction to Agricultural Structures

1.1 Define terminology

1. Apply/Match terms to correct definition in context 1.1.1

1.2 Examine the importance of agricultural construction and structures

1. List the types of structures used in various areas of agriculture 1.2.1
2. Compare post-frame, wood-frame, metal-frame, concrete/masonry, and pole 1.2.2
3. Observe materials in a building materials business, exhibit, or other location 1.2.3

1.3 Identify careers in agricultural construction and structures

1. List careers in agricultural structures and construction work 1.3.1
2. Research a career in agricultural structures to determine educational requirements, working conditions, and salary 1.3.2

1.4 Discuss appropriate FFA and supervised experience activities in agricultural construction and structures

1. List FFA activities and programs of interest to students interested in agricultural construction and structures 1.4.1
2. Describe supervised experience activities and programs of interest to students interested in agricultural structures 1.4.2
3. Plan and/or expand supervised experiences in agricultural structures and construction 1.4.3

Practicing Safety in Agricultural Construction

2.1 Define terminology

1. Apply/Match terms to correct definition in context 2.1.1

2.2 Discuss the meaning and importance of safety in agricultural construction work

1. List factors in the work environment that pose safety hazards 2.2.1
2. Identify the frequent causes of accidents in agricultural mechanics laboratories 2.2.2
3. Explain ways safety is a matter for all individuals in a work environment 2.2.3
4. List precautions that may be taken to prevent accidents in agricultural 2.2.4

2.3 Describe the use of Personal Protective Equipment (PPE)

1. Identify PPE and indicate when it is used to promote safety 2.3.1
2. Demonstrate the proper use of PPE in agricultural construction work 2.3.2
3. Develop a safety plan for your school's agricultural mechanics laboratory that includes proper storage and sanitization of PPE 2.3.3

2.4 Discuss laboratory (shop) organization to promote safety

1. Identify safety colors associated with the shop 2.4.1
2. Explain how fires and fire extinguishers are classified 2.4.2
3. Illustrate the proper use of a fire extinguisher 2.4.3

Planning and Drawing Agricultural Structures

3.1 Define terminology

1. Apply/Match terms to correct definition in context 3.1.1

3.2 Discuss factors to consider in planning a structure

1. List features needed in a useful structure that will serve appropriate needs 3.2.1
2. List cost considerations in planning a structure 3.2.2
3. Identify site requirements for a structure 3.2.3

3.3 Describe the meaning and use of plans

1. Explain the meaning and use of graphic applications in agricultural structures 3.3.1
2. Label common drawing symbols and line types 3.3.2
3. Identify the components of floor, plumbing, and electrical plans 3.3.3
4. Identify symbols used in construction plans 3.3.4

3.4 Discuss the preparation of a plan for an agricultural structure

1. Explain the uses of common drawing tools 3.4.1
2. Interpret an object or small structure with a simple sketch 3.4.2
3. Demonstrate the use of a T-square, triangle, protractor, compass, divider, and 3.4.3
4. Demonstrate the use of a scale in preparing the drawing of a simple structure 3.4.4
5. Demonstrate the use of lettering guides with a simple drawing 3.4.5

3.5 Explain the meaning and importance of a bill of materials in figures

1. Prepare a bill of materials for a simple structure or project 3.5.1
2. Calculate a cost estimate for constructing the structure or project 3.5.2

Surveying Land and Structures

4.1 Define terminology

1. Apply/Match terms to correct definition in context 4.1.1

4.2 Discuss the meaning and importance of land and structural surveying

1. List the characteristics of land, emphasizing those related to the need for surveying 4.2.1
2. Define structural surveying and list why it is used 4.2.2

4.3 Discuss the equipment and tools used in surveying land and structures

1. Identify equipment used in surveying land and structures 4.3.1
2. Demonstrate the use of equipment in surveying land and structures 4.3.2
3. Explain the meaning of field notes 4.3.3

4.4 Explain the general procedures followed in leveling and mapping

1. Define and list uses of differential and profile leveling and mapping 4.4.1
2. Demonstrate the process of differential leveling 4.4.2
3. Create a short contour map of an area near the school 4.4.3

4.5 Discuss the use of computers and laser-based equipment in land and structural surveying

1. Identify laser equipment used in structural surveying 4.5.1
2. Use survey or laser leveling equipment to layout a simple structure 4.5.2

4.6 Discuss the meaning and importance of survey systems and legal land descriptions

1. List reasons for using legal land descriptions 4.6.1
2. Identify the legal boundaries of a small property 4.6.2
3. Identify the local government office where legal land descriptions are filed 4.6.3

Identifying Materials, Quantities and Pricing in Agricultural Construction

5.1 Define terminology

1. Apply/Match terms to correct definition in context 5.1.1

5.2 Discuss materials commonly used in agricultural structures

1. List and identify common wood materials used in agricultural structures, including lumber, plywood, and wafer board 5.2.1
2. List advantages of using dressed and seasoned wood products 5.2.2
3. Identify how wood products are dimensioned, including lumber and 5.2.3
4. List and identify common fasteners used in agricultural structures, including nails, screws, and bolts 5.2.4

5.3 Discuss how building materials are measured

1. Explain the meaning of board feet 5.3.1
2. Explain the meaning of linear feet 5.3.2
3. Explain the meaning of square feet and sheets 5.3.3
4. Explain how nails, screws, and bolts are sized and shaped 5.3.4

5.4 Discuss how costs of building materials are calculated

1. Calculate the cost of wood materials for a small project or structure 5.4.1
2. Calculate the quantity and cost of fastener materials for a project or structure 5.4.2

Laying Out and Constructing a Foundation

6.1 Define terminology

1. Apply/Match terms to correct definition in context 6.1.1

6.2 Discuss the meaning and importance of a properly designed foundation

1. List roles and characteristics of good foundations 6.2.1
2. Identify materials used in constructing strong and lasting foundations 6.2.2
3. Identify characteristics of kinds of foundations, including slab on grade, crawl space, and basement 6.2.3

6.3 Describe how to prepare a foundation for a small agricultural building or other structure

1. Demonstrate how to lay out a foundation for a small agricultural structure 6.3.1
2. Demonstrate use of the 6-8-10-triangle method 6.3.2
3. Demonstrate the placement and functions of batter boards 6.3.3
4. Demonstrate how forms are prepared, reinforcement materials used, and concrete is placed for a foundation 6.3.4
5. Explain the importance of curing before a structure is placed on a concrete foundation 6.3.5

Framing, Sheathing, Roofing, and Insulating Agricultural Structures

7.1 Define terminology

1. Apply/Match terms to correct definition in context 7.1.1

7.2 Discuss the meaning and functions of the framing and sheathing of an agricultural

1. Identify the major parts of an agricultural structure, including framing and sheathing 7.2.1
2. List characteristics of quality framing and sheathing materials and structures 7.2.2
3. Relate structural design to function, materials, and cost 7.2.3
4. List factors to consider in selecting a roof style 7.2.4

7.3 Explain how framing materials are measured, cut, and attached

1. Explain how sills, joists (floor and ceiling), studs, plates, braces, and rafters are assembled in framing a structure 7.3.1
2. Identify structural features for windows and doors 7.3.2
3. Demonstrate the selection and installation of appropriate flooring material for an agricultural structure 7.3.3
4. Label various styles of roofs 7.3.4

7.4 Describe the role and use of sheathing

1. List the kinds of materials that may be used as sheathing 7.4.1
2. Identify the features of good sheathing 7.4.2
3. Demonstrate measuring, cutting, fitting, and attaching sheathing 7.4.3
4. Explain the functions and uses of flashing 7.4.4

7.5 Discuss the kinds, uses, and installation of roofing materials

1. List kinds and advantages of various roofing materials, including metal and asphalt 7.5.1
2. Compare roofing materials for durability and cost 7.5.2
3. Explain the role and use of felt in roofing installation 7.5.3
4. Demonstrate the installation of roofing materials 7.5.4

7.6 Discuss the kinds, uses, and installation of insulation

1. List the kinds or forms of insulation material, including batt, sheet, and loose 7.6.1
2. Demonstrate the use of R-value in selecting insulation material 7.6.2
3. Identify the qualities of properly installed insulation material 7.6.3

Plumbing Agricultural Structures

8.1 Define terminology

1. Apply/Match terms to correct definition in context 8.1.1

8.2 Discuss the meaning and uses of plumbing in agricultural structures

1. List uses of plumbing in agriculture, including water, gas, air, and wastewater/sewage 8.2.1
2. Identify and demonstrate skills commonly needed in plumbing, including measuring, cutting, fitting, and installing plumbing materials 8.2.2
3. List common sizes of pipes and fittings 8.2.3
4. Demonstrate correct use of plumbing tools, including those for PVC, copper, and steel pipe 8.2.4

8.3 Describe the installation of plumbing materials

1. Identify common materials used to manufacture plumbing, including plastics, copper, and iron 8.3.1
2. Identify common fittings used in plumbing, including the: elbow, Tee, adapter, bushing, reducer, coupling, union, plug, and cap 8.3.2
3. Distinguish between hot and cold supply water and wastewater pipes/conduits 8.3.3
4. Demonstrate proper installation and connection of PVC and other pipes, fittings, and fixtures, as appropriate, in an agricultural structure 8.3.4

Installing Electrical Service in Agricultural Structures

9.1 Define terminology

1. Apply/Match terms to correct definition in context 9.1.1

9.2 Discuss the meaning and importance of electrical service in agricultural structures

1. List important safety practices with electricity 9.2.1
2. Identify the uses of electricity in agricultural structures 9.2.2
3. List skills or tasks performed when installing wiring and making electrical connections in agricultural structures 9.2.3

9.3 Describe the planning and installation of electrical service

1. Identify standard electrical symbols used in drawn structural plans 9.3.1
2. List electrical materials used in wiring and otherwise providing service in an agricultural structure 9.3.2
3. Identify the structure and sizing of electrical cable and wire 9.3.3
4. Diagram an electrical circuit to meet a need in an agricultural structure, including the location of circuit breaker, outlet boxes, switches, and receptables 9.3.4
5. Demonstrate proper construction of splices, including end, tap, and rattail splices 9.3.5
6. Run an electrical circuit, including running cable and installing boxes, switches, and outlets 9.3.6
7. Demonstrate appropriate procedures for testing an electrical circuit to assure proper service and safety 9.3.7

Painting Agricultural Structures

10.1 Define terminology

1. Apply/Match terms to correct definition in context 10.1.1

10.2 Discuss the meaning and importance of coatings

1. List the functions served by coatings 10.2.1
2. List and distinguish between kinds of coatings, including paint, varnish, sealer, and preservative and drying features 10.2.2
3. Identify the features of an appropriate coating, including interior and exterior use, preservative characteristics, and pigmentation 10.2.3

10.3 Discuss the application of coatings

1. Identify tools and equipment used in applying coatings 10.3.1
2. Calculate volumes of coatings needed for particular uses 10.3.2
3. List factors in caring for coating application equipment, including cleaning 10.3.3
4. Demonstrate the preparation of a surface for a coating 10.3.4
5. Demonstrate the preparation of a coating material for application 10.3.5
6. Demonstrate the application of a coating to a surface 10.3.6