AGRICULTURAL STRUCTURAL SYSTEMS

Curriculum Content Frameworks

Please note: All assessment questions will be taken from the knowledge portion of these frameworks.

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Disseminated by

Career and Technical Education
Office of Assessment and Curriculum
Arkansas Department of Workforce Education

Development/Revision Began: 03/2007

Placed on the Web: 00/0000

Curriculum Content Frameworks

AGRICULTURAL STRUCTURAL SYSTEMS

Grade Levels: 10, 11, 12 Course Code: 491160	Prerequisite: Agriculture Science and Technology Agricultural Mechanics

Course Description: This course will provide instruction to develop skills in agricultural buildings and construction, including planning and drawing, land and construction surveying, and building with wood, roofing materials, concrete and masonry, plumbing, and painting and finishing. It will also include appropriate instruction on safety, FFA, and supervised experience activities.

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Unit 1: Introduction to Agricultural Structures
Hours: 6

Terminology: Architect, Barn, Career development event, Carpenter, Electrician, Equipment shed, General contractor, Milking parlor, Plumber, Proficiency award, Record book, Repair shop, Sub-contractor

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
1.1	Define terminology	1.1.1	Apply/Match terms to correct definition in context	Foundation	Reading	Applies/Understands technical words that pertain to a subject [1.3.6]
1.2	Examine the importance of agricultural construction and structures	1.2.1	List the types of structures used in various areas of agriculture	Foundation	Speaking	Asks questions to obtain information [1.5.4]
		1.2.2	Compare post-frame, wood-frame, metal-frame, concrete/ masonry, and pole	Personal Management	Integrity/Honesty/ Work Ethic	Describes/Explains significance of integrity, honesty, and work ethics [3.2.4]
		1.2.3	Observe materials in a building materials business, exhibit, or other location			
1.3	Identify careers in agricultural construction and structures	1.3.1	List careers in agricultural structures and construction work	Foundation	Speaking	Asks questions to obtain information [1.5.4]
		1.3.2	Research a career in agricultural structures to determine educational requirements, working conditions, and salary			
1.4	Discuss appropriate FFA and supervised experience activities in agricultural construction and structures	1.4.1	List FFA activities and programs of interest to students interested in agricultural construction and structures	Foundation	Listening	Evaluates oral information/presentation [1.2.2]
				Interpersonal	Leadership	Conveys attitudes and values of group to others [2.4.3]
		1.4.2	Describe supervised experience activities and programs of interest to students interested in agricultural structures	Personal Management	Career Awareness, Development, and Mobility	Explores career opportunities [3.1.6]
		1.4.3	Plan and/or expand supervised experiences in agricultural structures and construction			Identifies education and training needed to achieve goals [3.1.8]
						Monitors progress toward goal attainment [3.1.10]
						Sets well-defined and realistic personal/career goals (short-term and long-term) [3.1.11]

Unit 2: Practicing Safety in Agricultural Construction
Hours: 8

Terminology: Fire triangle, Personal Protective Equipment (PPE), Safety colors, Safety goggles, Safety harness, Safety zone

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do			ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	**Application**		**Skill Group**	**Skill**	**Description**
2.1 Define terminology	2.1.1	Apply/Match terms to correct definition in context	Foundation	Reading	Applies/Understands technical words that pertain to a subject [1.3.6]
2.2 Discuss the meaning and importance of safety in agricultural construction work	2.2.1	List factors in the work environment that pose safety hazards	Foundation	Listening	Comprehends ideas and concepts related to safety [1.2.1]
	2.2.2	Identify the frequent causes of accidents in agricultural mechanics laboratories	Personal Management	Integrity/Honesty/ Work Ethic	Complies with safety and health rules in a given work environment [3.2.2]
	2.2.3	Explain ways safety is a matter for all individuals in a work environment	Thinking	Creative Thinking	Makes connections between seemingly unrelated ideas [4.1.6]
	2.2.4	List precautions that may be taken to prevent accidents in agricultural			
2.3 Describe the use of Personal Protective Euipment (PPE)	2.3.1	Identify PPE and indicate when it is used to promote safety	Foundation	Listening	Receives and interprets verbal messages [1.2.8]
			Thinking	Decision Making	Considers risks when making a decision [4.2.3]
	2.3.2	Demonstrate the proper use of PPE in agricultural construction work			
	2.3.3	Develop a safety plan for your school's agricultural mechanics laboratory that includes proper storage and sanitization of PPE			
2.4 Discuss laboratory (shop) organization to promote safety	2.4.1	Identify safety colors associated with the shop	Foundation	Listening	Receives and interprets verbal messages [1.2.8]
			Thinking	Knowing How to Learn	Processes new information as related to workplace [4.3.5]
	2.4.2	Explain how fires and fire extinguishers are classified			
	2.4.3	Illustrate the proper use of a fire extinguisher			

Unit 3: Planning and Drawing Agricultural Structures
Hours: 16

Terminology: Architect's scale, Bill of material, Building site, Drainage, Drawing triangle, Measuring tape, Plot plan, Prevailing wind direction, Sketch, Square footage, T-square

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		**ACADEMIC and WORKPLACE SKILLS** What the Instruction Should Reinforce		
Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
3.1 Define terminology	3.1.1 Apply/Match terms to correct definition in context	Foundation	Reading	Applies/Understands technical words that pertain to a subject [1.3.6]
3.2 Discuss factors to consider in planning a structure	3.2.1 List features needed in a useful structure that will serve appropriate needs	Foundation	Arithematic/ Mathematics	Makes precision measurements using a rule [1.1.27]
	3.2.2 List cost considerations in planning a structure	Thinking	Problem Solving	Comprehends ideas and concepts related to planning an agricultural structure [4.4.1]
	3.2.3 Identify site requirements for a structure			Demonstrates logical reasoning in reaching a conclusion [4.4.2] Draws conclusions from observations, evaluates conditions, and gives possible solutions [4.4.5]
3.3 Describe the meaning and use of plans	3.3.1 Explain the meaning and use of graphic applications in agricultural structures	Foundation	Listening	Evaluates oral information/presentation [1.2.2]
	3.3.2 Label common drawing symbols and line types	Thinking	Problem Solving	Revises plan of action indicated by findings [4.4.9]
	3.3.3 Identify the components of floor, plumbing, and electrical plans		Seeing Things in the Mind's Eye	Organizes and processes images -- symbols, pictures, graphs, objects, etc. [4.6.2]
	3.3.4 Identify symbols used in construction plans			

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
3.4	Discuss the preparation of a plan for an agricultural structure	3.4.1	Explain the uses of common drawing tools	Foundation	Arithmetic/ Mathematics	Applies mathematical principles related to the selection and use of drawing tools [1.1.4]
		3.4.2	Interpret an object or small structure with a simple sketch			Makes precision measurements using a scale [1.1.27]
		3.4.3	Demonstrate the use of a T-square, triangle, protractor, compass, divider, and		Speaking	Applies/Uses technical terms as appropriate to audience [1.5.2]
		3.4.4	Demonstrate the use of a scale in preparing the drawing of a simple structure			Communicates a thought, idea, or fact in spoken form [1.5.5]
		3.4.5	Demonstrate the use of lettering guides with a simple drawing		Writing	Writes/Prints legibly [1.6.24]
				Personal Management	Responsibility	Pays close attention to details [3.4.8]
3.5	Explain the meaning and importance of a bill of materials in figures	3.5.1	Prepare a bill of materials for a simple structure or project	Foundation	Arithmetic/ Mathematics	Applies a mathematical formula to solve a problem [1.1.3]
		3.5.2	Calculate a cost estimate for constructing the structure or project	Interpersonal	Coaching	Helps others learn new skills [2.1.3]
				Thinking	Reasoning	Uses logic to draw conclusions from available information [4.5.6]

Unit 4: Surveying Land and Structures
Hours: 14

Terminology: Backsight, Baseline, Benchmark, Foresight, Laser level, Leveling, Plumb bob, Section, Surveying, Township, Transit, Tripod

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
4.1 Define terminology	4.1.1 Apply/Match terms to correct definition in context	Foundation	Reading	Applies/Understands technical words that pertain to a subject [1.3.6]
4.2 Discuss the meaning and importance of land and structural surveying	4.2.1 List the characteristics of land, empahsizing those related to the need for surveying	Personal Management	Career Awareness/ Development/and Mobility	Establishes and implements a plan of action [3.1.5]
	4.2.2 Define structural surveying and list why it is used			
4.3 Discuss the equipment and tools used in surveying land and structures	4.3.1 Identify equipment used in surveying land and structures	Foundation	Listening	Receives and interprets verbal messages [1.2.8]
			Reading	Reads and follows instructions to operate technical equipment [1.3.19]
	4.3.2 Demonstrate the use of equipment in surveying land and structures			
	4.3.3 Explain the meaning of field notes			
4.4 Explain the general procedures followed in leveling and mapping	4.4.1 Define and list uses of differential and profile leveling and mapping	Foundation	Reading	Reads and follows instructions to operate technical equipment [1.3.19]
	4.4.2 Demonstrate the process of differential leveling	Personal Management	Organizational Effectiveness	Applies Knowledge Statement to implement work-related system or practice [3.3.4]
	4.4.3 Create a short contour map of an area near the school	Thinking	Decision Making	Generates options/alternatives [4.2.6]
4.5 Discuss the use of computers and laser-based equipment in land and structural surveying	4.5.1 Identify laser equipment used in structural surveying	Foundation	Science	Uses equipment and techniques [1.4.23]
		Interpersonal	Leadership	Organizes group in planning and performing a specific task [2.4.9]
	4.5.2 Use survey or laser leveling equipment to layout a simple structure			
		Thinking	Problem Solving	Draws conclusions from what is read and gives possible solutions [4.4.4]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
4.6 Discuss the meaning and importance of survey systems and legal land descriptions	4.6.1 List reasons for using legal land descriptions 4.6.2 Identify the legal boundaries of a small property 4.6.3 Identify the local government office where legal land descriptions are filed	Foundation	Listening Reading	Evaluates oral information/presentation [1.2.2] Listens for content [1.2.3] Applies information and concepts derived from printed materials [1.3.3]

Unit 5: Identifying Materials, Quantities and Pricing in Agricultural Construction
Hours: 10

Terminology: Anchor bolt, Board foot, Bolt, Common nail, Dressed lumber, Finishing nail, Hardware ,Hinge, Insulation, Linear foot, Lumber, Nail, Plywood, Roofing, Screw, Square foot, Treated lumber, Truss, Wafer board,

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		**ACADEMIC and WORKPLACE SKILLS** What the Instruction Should Reinforce		
Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
5.1 Define terminology	5.1.1 Apply/Match terms to correct definition in context	Foundation	Reading	Applies/Understands technical words that pertain to a subject [1.3.6]
5.2 Discuss materials commonly used in agricultural structures	5.2.1 List and identify common wood materials used in agricultural structures, including lumber, plywood, and wafer board	Foundation	Arithmetic/ Mathematics	Uses basic numerical concepts in practical situations [1.1.32]
			Listening	Comprehends ideas and concepts related to building materials [1.2.1]
	5.2.2 List advantages of using dressed and seasoned wood products			
			Reading	Interprets drawings to obtain factual information [1.3.17]
	5.2.3 Identify how wood products are dimensioned, including lumber and			
			Science	Applies scientific principles related to wood identification and qualities [1.4.5]
	5.2.4 List and identify common fasteners used in agricultural structures, including nails, screws, and bolts	Interpersonal	Teamwork	Works effectively with others to reach a common goal [2.6.6]
		Thinking	Problem Solving	Comprehends ideas and concepts related to the selection of building materials [4.4.1]
5.3 Discuss how building materials are measured	5.3.1 Explain the meaning of board feet	Foundation	Arithmetic/ Mathematics	Applies computation skills to building materials calculations [1.1.5]
	5.3.2 Explain the meaning of linear feet			Demonstrates mathematical calculation [1.1.19]
	5.3.3 Explain the meaning of square feet and sheets	Personal Management	Responsbility	Pays close attention to details [3.4.8]
	5.3.4 Explain how nails, screws, and bolts are sized and shaped			

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
5.4	Discuss how costs of building materials are calculated	5.4.1	Calculate the cost of wood materials for a small project or structure	Foundation	Arithmetic/ Mathematics	Calculates different units of measurement [1.1.6]
		5.4.2	Calculate the quantity and cost of fastener materials for a project or structure			Calculates dollar amounts [1.1.7]
				Thinking	Decision Making	Comprehends ideas and concepts related to quantities and costs of building materials [4.2.2]

Unit 6: Laying Out and Constructing a Foundation
Hours: 14

Terminology: 6-8-10 triangle method, Batter board, Crawl space foundation, Footing, Form, Foundation, Reinforcing rod, Slab on grade foundation

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do			ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	**Application**		**Skill Group**	**Skill**	**Description**
6.1 Define terminology	6.1.1	Apply/Match terms to correct definition in context	Foundation	Reading	Applies/Understands technical words that pertain to a subject [1.3.6]
6.2 Discuss the meaning and importance of a properly designed foundation	6.2.1	List roles and characteristics of good foundations	Foundation	Listening	Listens to follow directions [1.2.6]
				Science	Applies knowledge to complete a practical task [1.4.3]
	6.2.2	Identify materials used in constructing strong and lasting foundations			
			Interpersonal	Leadership	Organizes group in planning and performing a specific task [2.4.9]
	6.2.3	Identify characteristics of kinds of foundations, including slab on grade, crawl space, and basement			
			Personal Management	Responsibility	Pays close attention to details [3.4.8]
6.3 Describe how to prepare a foundation for a small agricultural building or other structure	6.3.1	Demonstrate how to lay out a foundation for a small agricultural structure	Foundation	Arithmetic/ Mathematics	Applies computation skills to layout a foundation [1.1.5]
	6.3.2	Demonstrate use of the 6-8-10-triangle method			Calculates percentages, ratios, proportions, decimals and common fractions [1.1.10]
	6.3.3	Demonstrate the placement and functions of batter boards		Science	Applies scientific principles related to load bearing capacity of a foundation [1.4.5]
	6.3.4	Demonstrate how forms are prepared, reinforcement materials used, and concrete is placed for a foundation	Personal Management	Responsibility	Maintains a high level of concentration in completion of a task [3.4.7]
				Problem Solving	Devises and implements a plan of action to resolve problem [4.4.3]
	6.3.5	Explain the importance of curing before a structure is placed on a concrete foundation			
			Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]

Unit 7: Framing, Sheathing, Roofing, and Insulating Agricultural Structures
Hours: 20

Terminology: Asphalt roofing, Ceiling joist, Flashing, Floor joist, Frame, Galvanized steel, Insulation, Lumber frame, Pole frame, Rafter, Rise, Run, Sheathing, Span, Stud wall, Top plate

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		**ACADEMIC and WORKPLACE SKILLS** What the Instruction Should Reinforce		
Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
7.1 Define terminology	7.1.1 Apply/Match terms to correct definition in context	Foundation	Reading	Applies/Understands technical words that pertain to a subject [1.3.6]
7.2 Discuss the meaning and functions of the framing and sheathing of an agricultural	7.2.1 Identify the major parts of an agricultural structure, including framing and sheathing	Foundation	Listening	Receives and interprets verbal messages [1.2.8]
	7.2.2 List characteristics of quality framing and sheathing materials and structures	Thinking	Knowing How to Learn	Applies new
	7.2.3 Relate structural design to function, materials, and cost		Seeing	Organizes and
	7.2.4 List factors to consider in selecting a roof style			
7.3 Explain how framing materials are measured, cut, and attached	7.3.1 Explain how sills, joists (floor and ceiling), studs, plates, braces, and rafters are assembled in framing a structure	Foundation	Listening	Listens for content [1.2.3]
		Thinking	Creative Thinking	Makes connections between seemingly unrelated ideas [4.1.6]
	7.3.2 Identify structural features for windows and doors			
	7.3.3 Demonstrate the selection and installation of appropriate flooring material for an agricultural structure			
	7.3.4 Label various styles of roofs			
7.4 Describe the role and use of sheathing	7.4.1 List the kinds of materials that may be used as sheathing	Foundation	Listening	Comprehends ideas and concepts related to roofing materials [1.2.1]
	7.4.2 Identify the features of good sheathing	Interpersonal	Cultural Diversity	Comprehends ideas and concepts related to basic carpentry [2.2.1]
	7.4.3 Demonstrate measuring, cutting, fitting, and attaching sheathing	Personal Management	Responsibility	Pays close attention to details [3.4.8]
	7.4.4 Explain the functions and uses of flashing			

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
7.5	Discuss the kinds, uses, and installation of roofing materials	7.5.1	List kinds and advantages of various roofing materials, including metal and asphalt	Foundation	Listening	Listens for content [1.2.3]
					Reading	Identifies relevant details, facts and specifications [1.3.16]
		7.5.2	Compare roofing materials for durability and cost		Science	Applies scientific principles related to structural soundness and ability to withstand weather factors [1.4.5]
		7.5.3	Explain the role and use of felt in roofing intallation			
		7.5.4	Demonstrate the installation of roofing materials	Personal Management	Responsibility	Comprehends ideas and concepts related to structural framing and roofing [3.4.2]
7.6	Discuss the kinds, uses, and installation of insulation	7.6.1	List the kinds or forms of insulation material, including batt, sheet, and loose	Foundation	Arithmetic/ Mathematics	Applies computation skills to R-value of insulation [1.1.5]
		7.6.2	Demonstrate the use of R-value in selecting insulation material		Reading	Comprehends written information and applies it to a task [1.3.8]
		7.6.3	Identify the qualities of properly installed insulation material	Thinking	Decision Making	Evaluates information/data to make the best decision [4.2.5]

Unit 8: Plumbing Agricultural Structures
Hours: 12

Terminology: Chlorinate Polyvinyl Chloride pipe (CPVC), Compression fitting, Elbow, Flaring tool, Pipe die, Pipe reamer, Polyvinyl Chloride pipe (PVC), PVC cement, PVC cleaner, Sanitary tee, Sweating, Union

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
8.1 Define terminology	8.1.1 Apply/Match terms to correct definition in context	Foundation	Reading	Applies/Understands technical words that pertain to a subject [1.3.6]
8.2 Discuss the meaning and uses of plumbing in agricultural structures	8.2.1 List uses of plumbing in agriculture, including water, gas, air, and wastewater/sewage	Foundation	Arithmetic/ Mathematics	Applies mathematical principles related to plumbing materials [1.1.4]
			Listening	Receives and interprets verbal messsages [1.2.8]
	8.2.2 Identify and demonstrate skills commonly needed in plumbing, including measuring, cutting, fitting, and installing plumbing materials		Reading	Comprehends written information and applies it to a task [1.3.8]
			Science	Follows safety guidelines [1.4.15]
	8.2.3 List common sizes of pipes and fittings			
	8.2.4 Demonstrate correct use of plumbing tools, including those for PVC, copper, and steel pipe	Interpersonal	Teamwork	Contributes to group with ideas, suggestions and effort [2.6.2]
8.3 Describe the installation of plumbing materials	8.3.1 Identify common materials used to manufacture plumbing, including plastics, copper, and iron	Foundation	Science	Applies knowledge to complete a practical task [1.4.3]
		Personal Management	Responsibility	Maintains a high level of concentration in completion of a task [3.4.7]
	8.3.2 Identify common fittings used in plumbing, including the: elbow, Tee, adapter, bushing, reducer, coupling, union, plug, and cap	Thinking	Decision Making	Comprehends ideas and concepts related to plumbing [4.2.2]
	8.3.3 Distinguish between hot and cold supply water and wastewater pipes/conduits		Reasoning	Applies rules and principles to a new situation [4.5.1]
	8.3.4 Demonstrate proper installation and connection of PVC and other pipes, fittings, and fixtures, as appropriate, in an agricultural structure		Seeing	Visualizes a system's operation from schematics [4.6.3]

Unit 9: Installing Electrical Service in Agricultural Structures
Hours: 10

Terminology: Ampere, Cable, Cable jacket, Circuit breaker, Duplex receptacle, Fuse, Ground, Ground Fault Circuit Interrupter (GFCI), Junction box, Multi-purpose tool, National Electrical Code (NEC)®, Non-metallic wire covering, Ohm, Single-pole switch, Solderless connector, Splice, Three-way switch

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		**ACADEMIC and WORKPLACE SKILLS** What the Instruction Should Reinforce		
Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
9.1 Define terminology	9.1.1 Apply/Match terms to correct definition in context	Foundation	Reading	Applies/Understands technical words that pertain to a subject [1.3.6]
9.2 Discuss the meaning and importance of electrical service in agricultural structures	9.2.1 List important safety practices with electricity	Foundation	Arithmetic/ Mathematics	Calculates/Estimates electrical demand for a circuit [1.1.8]
	9.2.2 Identify the uses of electricity in agricultural structures		Reading	Follows written directions [1.3.13]
			Science	Follows safety guidelines [1.4.16]
	9.2.3 List skills or tasks performed when installing wiring and making electrical connections in agricultural structures	Personal Management	Responsibility	Maintains a high level of concentration in completion of a task [3.4.7]
				Pays close attention to details [3.4.8]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do			ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	**Application**		**Skill Group**	**Skill**	**Description**
9.3 Describe the planning and installation of electrical service	9.3.1	Identify standard electrical symbols used in drawn structural plans	Foundation	Arithmetic/ Mathematics	Performs basic computations [1.1.31]
	9.3.2	List electrical materials used in wiring and otherwise providing service in an agricultural structure		Listening	Receives and interprets verbal messages [1.2.8]
				Reading	Interprets drawings to obtain factual information [1.3.17]
	9.3.3	Identify the structure and sizing of electrical cable and wire	Interpersonal	Teamwork	Comprehends ideas and concepts related to installing electrical service [2.6.1]
	9.3.4	Diagram an electrical circuit to meet a need in an agricultural structure, including the location of circuit breaker, outlet boxes, switches, and receptables	Personal Management	Integrity/Honesty/ Work Ethic	Complies with safety and health rules in a given work environment [3.2.2]
				Responsibility	Sets high standards for self in completion of task [3.4.9]
	9.3.5	Demonstrate proper construction of splices, including end, tap, and rattail splices	Thinking	Creative Thinking	Combines ideas or information in a new way [4.1.2]
	9.3.6	Run an electrical circuit, including running cable and installing boxes, switches, and outlets		Problem Solving	Devises and implements plan of action to resolve problem [4.4.3]
	9.3.7	Demonstrate appropriate procedures for testing an electrical circuit to assure proper service and safety			

Unit 10: Painting Agricultural Structures
Hours: 10

Terminology: Coating, Enamel, Exterior paint, Interior paint, Latex-based paint, Paint, Pigment, Preservative, Sealer, Solvent, Thinner, Varnish

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
10.1 Define terminology	10.1.1 Apply/Match terms to correct definition in context	Foundation	Reading	Applies/Understands technical words that pertain to a subject [1.3.6]
10.2 Discuss the meaning and importance of coatings	10.2.1 List the functions served by coatings	Foundation	Reading	Comprehends written information and applies it to a task [1.3.8]
	10.2.2 List and distinguish between kinds of coatings, including paint, varnish, sealer, and preservative and drying features		Science	Applies scientific principle related to the use of coatings on agricultural structures [1.4.5]
	10.2.3 Identify the features of an appropriate coating, including interior and exterior use, preservative characteristics, and pigmentation	Personal Management	Responsibility	Pays close attention to details [3.4.8]
		Thinking	Problem Solving	Comprehends ideas and concepts related to choosing appropriate coatings materials [4.4.1]
10.3 Discuss the application of coatings	10.3.1 Identify tools and equipment used in applying coatings	Foundation	Arithmetic/ Mathematics	Calculates/Estimates amount of paint needed for a specific job [1.1.8]
	10.3.2 Calculate volumes of coatings needed for particular uses			Chooses appropriately from a variety of mathematical techniques [1.1.11]
	10.3.3 List factors in caring for coating application equipment, including cleaning		Listening	Listens to follow directions [1.2.6]
			Science	Follows safety guidelines [1.4.15]
	10.3.4 Demonstrate the preparation of a surface for a coating	Personal Management	Integrity/Honesty/ Work Ethic	Follows established rules, regulations, and policies [3.2.5]
	10.3.5 Demonstrate the preparation of a coating material for application		Responsibility	Sets high standards for self in completion of task [3.4.9]
	10.3.6 Demonstrate the application of a coating to a surface	Thinking	Knowing how to Learn	Applies new knowledge and skills to preparing surfaces and applying coating materials [4.3.1]

Glossary
Unit 1: Introduction to Agricultural Structures

1. Architect – a skilled professional responsible for designing and drawing plans for buildings
2. Barn – a building where animals are housed, and/or hay and feed are stored
3. Career development event – an activity in which ffa members demonstrate their skills in competition
4. Carpenter – an occupation or trade involving the construction or repair of structures made of wood
5. Electrician – an occupation or skilled trade involving the installation of electrical service systems
6. Equipment shed – a building in which machinery is stored
7. General contractor – the person responsible for overseeing all of the steps necessary to build a building
8. Milking parlor – a building in which dairy cattle are brought to be milked and milk is stored
9. Plumber – an occupation or skilled trade involving the installation of pipes, fittings, and fixtures for water lines and other uses
10. Proficiency award – a program that allows ffa members to achieve honors for success through supervised experience
11. Record book – a printed booklet or computer-based system for keeping account of supervised experience activities, including income and expense
12. Repair shop – a building where equipment is brought to be repaired
13. Sub-contractor – a person such as a plumber or electrician who performs one part of the entire construction project

Unit 2: Practicing Safety in Agricultural Construction

1. Fire triangle – a representation of the three essential components of a fire
2. Personal Protective Equipment (PPE) – equipment worn to protect an individual from injury
3. Safety colors – a system developed by O.S.H.A. that uses colors to indicate danger zones, safety equipment, etc.
4. Safety goggles – equipment used to protect the eyes from flying objects and particles
5. Safety harness – equipment used to prevent workers from being injured from falls when working in high places
6. Safety zone – the area around a piece of machinery inside which a person is in some degree of danger

Unit 3: Planning and Drawing Agricultural Structures

1. Architect's scale – an instrument used for measuring when drawing building plans that converts measurements to different scales
2. Bill of material – a list of all the building materials needed to complete a building project
3. Building site – the location in which the construction of a structure will take place
4. Drainage – the natural removal of water from the building site
5. Drawing triangle – drawing tools that are used with a t-square to draw 30, 45, or 60 degree angles or can be used in combination to draw other angles
6. Measuring tape – a retractable rule used by construction workers to measure various components when building
7. Plot plan – a general plan of the building site with legal descriptions and perimeter dimensions
8. Prevailing wind direction – the direction from which the wind normally blows
9. Sketch – a simple drawing that gives major features of objects
10. Square footage – the area size of a building expressed by width times length
11. T-square – a drafting tool that is used with a drawing board, architect's scale, and triangles to draw horizontal and vertical lines in a plan

Unit 4: Surveying Land and Structures

1. Backsight – a transit reading made from a known elevation
2. Baseline – a true east/west line
3. Benchmark – a point of reference for which elevation is known or assumed
4. Foresight – a reading taken on a new point to determine its elevation
5. Laser level – a device for leveling the foundation of a structure that uses a thin, intense beam of light
6. Leveling – determining the difference in elevation between points
7. Plumb bob – a device used to locate a vertical point
8. Section – an area of land measuring one square mile and containing 640 acres
9. Surveying – a procedure of measuring and mapping land
10. Township – an area of land measuring six square miles and containing 36 sections; 6 miles by 6 miles square
11. Transit – a device used to find differences in elevation and in vertical angles
12. Tripod – a three-legged device to which a level is securely attached

Unit 5: Identifying Materials, Quantities and Pricing in Agricultural Construction

1. Anchor bolt – a bolt used to fasten the frame of building to its foundation
2. Board foot – a unit of lumber measuring 1 inch thick, 12 inches wide, and 1 foot long
3. Bolt – a threaded metal rod fastener that fits into a nut
4. Common nail – an ordinary nail; medium-size head; sized by length or d (penny); sizes range from 2d to 60d
5. Dressed lumber – lumber of uniform dimensions that is smooth and free of splinters
6. Finishing nail – a slender nail with a small head that is often used to attach trim or other thin, small wood pieces
7. Hardware – devices used to hold other materials together in useful ways
8. Hinge – a jointed device used to attach parts that rotate or turn, as a gate is attached to a post
9. Insulation – material that serves as a barrier to heat; in electricity, insulation is material that is not a good conductor of electricity
10. Linear foot – length of lumber in feet regardless of width and thickness
11. Lumber – wood products that have been made by sawing from logs
12. Nail – a metal rod with a point on one end and a head on the other used as a fastener with wood and other products
13. Plywood – wood material made by gluing alternating grain layers of thin wood together; typically in 4 by 8 foot sheets; thickness varies but is typically ¼- to ¾-inch
14. Roofing – material used to protect a structure and its contents from rain and other weather conditions
15. Screw – a modified inclined plan on the shank of a small metal rod with spiral threads, a tapered shank and a head with a slot
16. Square foot – an area that is 1 foot by 1 foot
17. Treated lumber – lumber that has been soaked or coated with a material to resist decay
18. Truss – an assemblage of lumber or metal to form a rigid framework; often used as rafters
19. Wafer board – wood material made by gluing wood chips into sheets similar to plywood

Unit 6: Laying Out and Constructing a Foundation

1. 6-8-10 triangle method – a mathematical method for squaring a structure when it is being laid out
2. Batter board – temporary wooden frames used to guide foundation construction for a structure
3. Crawl space foundation – using piers and walls to form a footing under the frame of a structure with space remaining between the floor and ground
4. Footing – a solid base constructed in the ground for locating a structure
5. Form – a frame or mold that holds fluid concrete until it has hardened
6. Foundation – the base on which a structure is built
7. Reinforcing rod – steel bars placed in forms into which concrete is poured to provide additional strength for the concrete
8. Slab on grade foundation – a flat, poured concrete foundation that is just a few inches above the surface of the ground

Unit 7: Framing, Sheathing, Roofing, and Insulating Agricultural Structures

1. Asphalt roofing – a roofing material produced as a byproduct of petroleum refining; maybe in shingles or rolls
2. Ceiling joist – a timber used to support the ceiling of a structure; usually made of lumber
3. Flashing – roofing material installed in valleys and otherwise between roof surfaces and walls
4. Floor joist – a timber used to support the floor of a structure; usually made of lumber or engineered wood products
5. Frame – the overall skeleton or structure onto which sheathing, decking, or other materials are attached
6. Galvanized steel – flat or corrugated pieces of thin steel that have been coated with zinc to resist rust
7. Insulation – material that serves as a barrier to keep the desired environment in a building or other structure
8. Lumber frame – a structure frame that has been constructed of lumber
9. Pole frame – a structure frame that has been constructed of poles mounted in the ground
10. Rafter – the sloping frame that supports the sheathing and/or roofing of a structure
11. Rise – the vertical distance or increase in elevation between the top of the plate and the ridge of a building
12. Run – one half the span of a building
13. Sheathing – layer of material attached to the outer studs, joists, or rafters to provide strength and serve as a base for exterior weatherproof cladding
14. Span – the distance from the outside edge of one wall plate to the outside edge of the opposite wall plate; the width of a building
15. Stud wall – the vertical framing component of a structure that is usually built from 2" x 4" or 2" x 6" lumber
16. Top plate – the uppermost horizontal component on a stud wall that supports the ceiling joists

Unit 8: Plumbing Agricultural Structures

1. Chlorinate Polyvinyl Chloride pipe (CPVC) – rigid plastic pipe used for hot or cold water supply lines
2. Compression fitting – a fitting made with a tapered or threaded nut that has a compression collar that grips copper or steel tubing when forced into place
3. Elbow – a connecting pipe fitting which allows a run of pipe to change directions at 22½, 30, 45 and 90 degree angles
4. Flaring tool – a device used to create a cone-shaped enlargement at the end of a piece of tubing to accept a flare fitting
5. Pipe die – a device used to cut threads on pipe
6. Pipe reamer – a cone-shaped device used to remove the burr remaining inside a pipe following use of a pipe cutter
7. Polyvinyl Chloride pipe (PVC) – plastic pipe made from polyvinyl chloride that is used mainly for drains because of its chemical resistance
8. PVC cement – a volatile, fluid material used on PVC pipe and fittings to cause them to bind or adhere when being installed
9. PVC cleaner – a fluid material used on PVC pipe and fittings to remove dirt and assure a clean surface for PVC cement
10. Sanitary tee – a fitting in a plumbing system that allows a branch line to be connected at a 90 degree angle to the main line with a sweeping curve to handle solid waste
11. Sweating – joining copper fittings and tubing using molten solder
12. Union – a three-piece fitting that joins two sections of pipe but allows them to be disconnected without cutting the pipe; used primarily with steel pipe

Unit 9: Installing Electrical Service in Agricultural Structures

1. Ampere – unit of electrical current measurement equal to 6.24 billion electrons per second
2. Cable – wire covered with insulation used in making electrical connections
3. Cable jacket – the exterior of electric cable that holds individual wires in a bundle and may serve as insulation
4. Circuit breaker – an overload protection device used in distribution panels; can be reset after tripping due to overload or short circuit
5. Duplex receptacle – receptacles with two outlets; usually rated at 15 amps and wired at 115 volts
6. Fuse – an overload protection device; available in small sizes to protect individual equipment
7. Ground – an object that makes an electrical connection with the earth
8. Ground Fault Circuit Interrupter (GFCI) – an overload protection device to prevent electric shock; used in kitchens, bathrooms and around other water sources or faucets
9. Junction box – electrical outlet box with a blank cover that contains wire splices
10. Multi-purpose tool – an electrician's tool with several uses including cutting wire, stripping wire, crimping terminals, and cutting small screws
11. National Electrical Code (NEC)® – guidelines on wire sizes and other standards for safe, efficient electrical installations; updated every three years and published by the national fire protection association
12. Non-metallic wire covering – nonmetallic cable with a plastic used for interior wiring that is commonly referred to as Romex, which is a trade name
13. Ohm – unit of measurement of electrical resistance
14. Single-pole switch – a switch with two terminals used to control lights or other devices from one location
15. Solderless connector – a plastic, cone-shaped device used to connect wires without solder
16. Splice – a connection or joining of two or more electrical wires
17. Three-way switch – a switch that has three terminals and used for circuits to control lights from two locations

Unit 10: Painting Agricultural Structures

1. Coating – a substance, such as paint, applied to a surface to gain desired benefits such as color or protection from deterioration
2. Enamel – a kind of paint that produces a glossy or semiglossy finish
3. Exterior paint – paint made for outdoor use
4. Interior paint – paint made for indoor use
5. Latex-based paint – a kind of paint made with water and finely-ground plastic or synthetic rubber
6. Paint – material that colors and protects surfaces
7. Pigment – the substance that gives paint its color
8. Preservative – a material that protects and prevents deterioration
9. Sealer – a material used to coat surfaces to keep out moisture
10. Solvent – the liquid in paint such as water or oil
11. Thinner – a fluid substance added to reduce viscosity
12. Varnish – transparent liquid material used to coat surfaces for protection and enhancement