AGRICULTURAL SCIENCE AND TECHNOLOGY

Curriculum Content Framework

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

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Spring 2006

Curriculum Content Framework
AGRICULTURAL SCIENCE AND TECHNOLOGY

Grade Levels: 9, 10, 11, 12
Course Code: 491150
Prerequisite: None

Course Description: A foundation course for all agriculture programs of study. Topics covered include general agriculture, FFA, leadership, record keeping, supervised agricultural experience, agricultural safety, forestry and natural resources, animal science, plant science, soil science, and agricultural mechanics.

Unit 1: Introduction to Agricultural Science
10 Hours

Terminology: agribusiness, agriculture, agricultural industry, agricultural mechanics, agriscience, aquaculture, biotechnology, EPA, FEMA, horticulture, issue, USDA

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 terms	1.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
1.2	Explain the importance of agriculture in meeting human needs	1.2.1	Create a collage showing how agriculture is a part of your life and meets your needs	Foundation	Speaking	Asks questions to clarify information [1.5.3]
		1.2.2	Keep a record of the agricultural products you use in one week and sort them by plant or animal origin			Asks questions to obtain information [1.5.4]
				Thinking	Creative Thinking	Applies personal style to a drawing [4.1.11]
1.3	List and describe major areas of the agricultural industry: supplies and services, production agriculture, and marketing and processing	1.3.1	Identify local agricultural industry enterprises in each of the major areas	Foundation	Reading	Comprehends written information and applies it to a task [1.3.8]
				Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]
1.4	Discuss changes that have come about in agriculture due to technology	1.4.1	Compare farming techniques in use today with those used 100 years ago	Foundation	Reading	Determines what information is needed [1.3.10]
		1.4.2	Interview a grandparent or other older individual about changes they have seen in agriculture	Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
1.5	Determine the impact of agriculture on the United States' economy	1.5.1	Identify the major agricultural products in the United States and in Arkansas	Foundation	Arithmetic/ Mathematics	Calculates percentages, ratios, proportions, decimals, and common fractions [1.1.10]
		1.5.2	1.5.2 Prepare a short report on the importance of agriculture in Arkansas	Personal Management	Responsibility	Sets high standards for self in completion of a task [3.4.9]
		1.5.3	Conduct a scavenger hunt for prices of common agricultural products and compare them with foreign markets			

1.6	Identify careers related to agriculture and discuss the general nature of the work in the careers	1.6.1	Research a career in agriculture to determine educational requirements, working conditions, and salary	Foundation	Reading	Applies information to job performance [1.3.4]
		1.6.2	Give an oral report on an agricultural career			Uses standard occupational resource materials [1.3.22]
				Personal Management	Career Awareness, Development, & Mobility	Develops skills to locate, evaluate, and interpret career information [3.1.4]
						Explores career opportunities [3.1.6]
1.7	List and explain employer expectations and personal traits for success in agricultural careers	1.7.1	Prepare and give an oral report on the personal traits needed for success in agricultural careers	Foundation	Speaking	Organizes ideas and communicates oral messages to listeners [1.5.7]
		1.7.2	Interview an employer to determine the traits for gaining employment as well as keeping and advancing in employment	Personal Management	Career Awareness, Development, and Mobility	Comprehends ideas and concepts related to agricultural science [3.1.3]
		1.7.3	Develop a personal plan to improve important career success skills			
1.8	Identify and discuss past and present issues in agriculture	1.8.1	Discuss the effect of these on society	Foundation	Reading	Distinguishes between fact and opinion [1.3.11]
		1.8.2	Discuss the pros and cons of these issues			Identifies inaccurate information/entries on written documents [1.3.15]
				Interpersonal	Negotiation	Works to resolve conflict between two or more individuals [2.5.3]
					Teamwork	Contributes to group with ideas, suggestions, and effort [2.6.2]

Unit 2: The FFA
15 Hours

Terminology: CDE, FFA, leadership

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 terms	2.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
2.2	Explain the purpose and benefits of FFA membership	2.2.1	Participate in FFA activities	Foundation	Listening	Receives and interprets verbal messages [1.2.8]
		2.2.2	Gain membership in the FFA	Personal Management	Self-esteem	Presents positive image of personal attitudes and abilities [3.5.7]
2.3	Explain the relationship of the FFA to agricultural education	2.3.1	Analyze the FFA mission statement to reinforce knowledge	Foundation	Reading	Draws conclusions from what is read [1.3.12]
				Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.4	Identify and explain the meaning of the official FFA emblem and colors	2.4.1	Label the parts of the FFA emblem	Foundation	Reading	Locates pertinent information in documents, such as manuals, graphs, and schedules, to perform tasks [1.3.18]
		2.4.2	Discuss the significance of national blue and corn gold		Listening	Listens for content [1.2.3]
				Personal Management	Organizational Effectiveness	Adapts to the organization's goals, values, culture, and traditional modes of operation [3.3.1]
2.5	Outline the history of the FFA	2.5.1	Refer to the FFA chronological timeline in the Official FFA Manual	Foundation	Writing	Communicates thoughts, ideas, or facts in written form in a clear, concise manner [1.6.6]
				Thinking	Knowing How to Learn	Develops personal learning strategies—note taking, clustering related items, flash cards, etc. [4.3.2]
2.6	Discuss official FFA dress and proper use of the FFA jacket	2.6.1	Demonstrate official FFA dress and proper use of the FFA jacket as described in the Official FFA Manual	Foundation	Reading	Comprehends written information for main ideas [1.3.7]
		2.6.2	Identify the source of the FFA jacket and other official items	Personal Management	Self-esteem	Creates self-confidence and positive self-image through proper grooming [3.5.3]
		2.6.3	Determine sizes and ordering costs of an FFA jacket and official items	Foundation	Arithmetic/ Mathematics	Calculates dollar amounts [1.1.7]

2.7	Explain the significance of the FFA Creed	2.7.1	Recite the FFA Creed from memory	Foundation Personal Management	Speaking Integrity/ Honesty/ Work Ethic	Speaks in a clear, concise manner [1.5.12] Describes/Explains significance of integrity, honesty, and work ethics [3.2.4]
2.8	Identify Career Development Events in which FFA members may participate	2.8.1	List all CDE areas offered at the state and national levels	Foundation Personal Management	Reading Career Awareness, Development, & Mobility	Locates pertinent information in documents, such as manuals, graphs, and schedules, to perform tasks [1.3.18] Sets well-defined and realistic personal/career goals (short-term and long-term) [3.1.11]
2.9	Discuss the duties of FFA Chapter officers	2.9.1	Refer to the duties outlined in the National FFA Manual	Foundation Personal Management	Speaking Responsibility	Interprets nonverbal cues, such as eye contact, posture, and gestures, for meaning [1.5.6] Is punctual to class, school meetings, and work [3.4.6]
2.10	List the degrees an FFA member may earn	2.10.1	Discuss and describe the criteria for each degree that members may earn	Foundation Personal Management	Writing Career Awareness, Development, & Mobility	Writes/Prints legibly [1.6.24] Establishes and implements a plan of action [3.1.5]

Unit 3: Agricultural Leadership
15 Hours

Terminology: extemporaneous speech, minutes, motion, opening/closing ceremony, parliamentary procedure, prepared speech, vote

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 terms	3.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
3.2	Discuss the importance of leadership and describe the attributes of leaders	3.2.1	Identify local citizens who are community leaders and explain why they are leaders	Foundation	Listening	Comprehends ideas and concepts related to leadership [1.2.1]
		3.2.2	Prepare a personal plan to develop leadership skills	Interpersonal	Leadership	Accepts responsibility for others [2.4.1]
		3.2.3	Identify examples of famous national and international leaders			Directs individuals in the performance of a specific task [2.4.5]
3.3	Describe the three major parts of a speech	3.3.1	Prepare a three- to five-minute speech that incorporates the three major parts	Foundation	Speaking	Uses verbal language and other cues, such as body language, appropriate in style, tone, and level of complexity to the audience and the occasion [1.5.14]
		3.3.2	Present the speech to the class		Writing	Produces neat, legible document from typewriter or computer [1.6.15]
3.4	Explain the purpose of parliamentary procedure	3.4.1	Refer to Official FFA manual and discuss the order of business	Foundation	Speaking	Applies/Uses technical terms as appropriate to audience [1.5.2]
		3.4.2	Provide a class demonstration	Personal Management	Organizational Effectiveness	Comprehends the organization's modes of operation [3.3.5]
3.5	Explain the purpose of the opening/closing ceremony	3.5.1	Refer to the Official FFA Manual for the opening and closing ceremony	Foundation	Speaking	Organizes ideas and communicates oral messages to listeners [1.5.7]
		3.5.2	Provide a class demonstration of the opening and closing ceremony			Speaks effectively, using appropriate eye contact, gestures, and posture [1.5.11]

Unit 4: Supervised Experience
9 Hours

Terminology: entrepreneurship, placement, production, record book, supervised agricultural experience (SAE)

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 terms	4.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
4.2	Explain the difference between the types of SAEs: exploratory, entrepreneurship, research/ experimentation, and placement	4.2.1	List examples of appropriate SAEs by type and match with FFA activities	Foundation	Speaking	Asks questions to clarify information [1.5.3]
		4.2.2	Discuss possible examples available in the local community			Asks questions to obtain information [1.5.4]
				Thinking	Problem Solving	Draws conclusions from observations, evaluates conditions, and gives possible solutions [4.4.5]
4.3	Explain the benefits of SAE participation	4.3.1	Identify upper-level students or alumni who have carried out SAEs and describe their SAEs as related to educational and career pursuits	Foundation	Writing	Summarizes written information [1.6.17]
				Personal Management	Career Awareness, Development, and Mobility	Analyzes impact of work on individual and family life [3.1.1]
4.4	Describe how to plan and manage SAE	4.4.1	Develops initial and long-range SAE plans	Foundation	Writing	Completes form accurately [1.6.7]
		4.4.2	Tell how to evaluate SAE and make adjustments to programs	Personal Management	Responsibility	Exerts a high level of effort and perseverance towards goal attainment [3.4.4]
4.5	Explain the purpose of the SAE record book	4.5.1	Complete the preliminary pages of the record book	Foundation	Arithmetic/ Mathematics	Enters figures/calculations from one form of chart to another [1.1.21]
				Thinking	Seeing Things in the Mind's Eye	Imagines the flow of work activities from narrative descriptions [4.6.1]
4.6	Explain the relationship between SAEs and the FFA Proficiency Award program	4.6.1	Analyze a Proficiency Award application to determine the information it should contain	Foundation	Arithmetic/ Mathematics	Applies addition, subtraction, multiplication, and division to real-world situations [1.1.1]
				Personal Management	Career Awareness, Development, & Mobility	Monitors progress toward goal attainment [3.1.10]

Unit 5: Safety
6 Hours

Terminology: hazard, OSHA, PPE, risk, safety

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 terms	5.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
5.2	Discuss the meaning and importance of safety and safe work environment in agriculture	5.2.1	Relate examples of safety hazards in agriculture	Foundation	Reading	Distinguishes between fact and opinion [1.3.11]
		5.2.2	Have students name examples of accidents that have occurred in the local agricultural industry		Speaking	Asks questions to obtain information [1.5.4]
5.3	Identify mechanical, chemical, and other hazards in agriculture	5.3.1	Survey hazardous situations in laboratories, work sites, homes, and other locations and prescribe the appropriate safety measures to be taken and propose ways of eliminating or reducing the risk of these hazards	Foundation	Reading	Analyzes and applies what has been read to specific task [1.3.2]
		5.3.2	List emergency contact numbers and other information for use in case of an accident			
5.4	Describe the importance of personal safety	5.4.1	Identify and properly use appropriate PPE	Foundation	Arithmetic/ Mathematics	Calculates dollar amounts [1.1.7]
		5.4.2	Calculate the cost of PPE for an individual involved in an area of agriculture	Interpersonal	Negotiation	Works to resolve conflict between two or more individuals [2.5.3]

Unit 6: Forestry and Natural Resources
8 Hours

Terminology: conservation, forestry, natural resources, non-renewable resource, renewable resource, water, wildlife

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 terms	6.1.1	Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
6.2 List natural resources and describe their importance	6.2.1 Prepare an inventory of natural resources in the local community or county and threats to their long-term use	Foundation	Science	Analyzes environmental issues [1.4.2]
		Thinking	Decision Making	Comprehends ideas and concepts related to forestry and natural resources [4.2.2]
6.3 Explain the importance of soil and water conservation	6.3.1 Discuss the role of conservation laws and the agencies that regulate them	Foundation	Science	Analyzes environmental issues (ecology, pollution, waste management) [1.4.2]
	6.3.2 Identify examples of erosion in the local community and actions that could be taken to reduce the soil loss	Personal Management	Integrity/Honesty/ Work Ethic	Chooses ethical course of action [3.2.1]
6.4 Discuss the importance of forestry	6.4.1 Identify major species of trees in the local area	Foundation	Speaking	Organizes ideas, and communicates oral messages to listeners [1.5.7]
	6.4.2 List major forestry products	Thinking	Knowing How to Learn	Uses available resources to acquire new skills or improve skills [4.3.4]
6.5 List the major species of wildlife in Arkansas	6.5.1 Identify important species of wildlife in the local area	Foundation	Writing	Writes/Prints legibly [1.6.24]
	6.5.2 Install a bird feeder near the school or other location where students can observe the activities of birds	Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
	6.5.3 Identify laws related to hunting and fishing in Arkansas			
6.6 Discuss recreational uses of natural resources	6.6.1 Highlight natural resources in Arkansas and the roles of these resources in the economy	Foundation	Listening	Listens for content [1.2.3] Listens for long-term contexts [1.2.7]
	6.6.2 Use a map of Arkansas to identify parks, refuges, and other locations where natural resources are protected yet made available for recreational use	Personal Management	Responsibility	Exhibits enthusiasm in approaching and completing tasks [3.4.3]

Unit 7: Plant Science
12 Hours

Terminology: annual, biennial, dicot, fertilizer, monocot, perennial, photosynthesis, plant science, respiration, soil, transpiration

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 terms	7.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
7.2	List the products obtained from plants and name the species that produce them	7.2.1	Identify important agricultural plants in the local community or county	Foundation	Science	Acquires and processes scientific data [1.4.1]
		7.2.2	Tour a greenhouse or nursery and identify important ornamental plants	Thinking	Decision Making	Comprehends ideas and concepts related to plant science [4.2.2]
7.3	Identify the four major parts of a plant and their functions	7.3.1	On a drawing, label the root, stem, leaf, and flower	Foundation	Science	Describes/Explains scientific principles related to plant functions [1.4.14]
		7.3.2	Using plant specimens, discuss differences in plant growth and development, including root structure, leaf arrangement, and reproduction	Thinking	Knowing How to Learn	Locates appropriate learning resources to acquire or improve knowledge and skills [4.3.3]
7.4	Distinguish between photosynthesis and respiration	7.4.1	Explain the chemical processes that are involved and how they sustain the plant	Foundation	Science	Describes/Explains scientific principles related to photosynthesis [1.4.14]
		7.4.2	Write the chemical equation for photosynthesis	Thinking	Seeing Things in the Mind's Eye	Visualizes a system's operation from schematics [4.6.3]
7.5	Compare monocot and dicot plants	7.5.1	Conduct a germination experiment to compare the seed leaves of monocots and dicots	Foundation	Science	Acquires and processes scientific data [1.4.1]
		7.5.2	Dissect monocot and dicot seed to observe structural differences	Thinking	Knowing How to Learn	Uses available resources to acquire new skills or improve skills [4.3.4]
7.6	Identify requirements for plant growth	7.6.1	Discuss the 18 essential nutrients	Foundation	Reading	Follows written directions [1.3.13]
		7.6.2	Identify nutrient deficiencies by observing evidence in plant growth	Interpersonal	Teamwork	Works effectively with others to reach a common goal [2.6.6]
7.7	Describe the importance and nature of soil	7.7.1	Identify properties of soil in the local community or county	Foundation	Science	Chooses appropriately from a variety of scientific methods and techniques to complete a task [1.4.8]
		7.7.2	Have students use the ribbon test to "feel" the difference in soil based on texture	Personal Management	Responsibility	Maintains a high level of concentration in completion of a task [3.4.7]
7.8	Explain the role of fertilizers and their importance	7.8.1	Conduct a soil sample analysis and interpret results	Foundation	Science	Solves practical problems using scientific methods and techniques [1.4.22]

	7.8.2 Observe labels on fertilizer containers to determine its nutrient analysis			

Unit 8: Animal Science
15 Hours

Terminology: animal science, artificial insemination, breed, gestation, lactation, nonruminant, polled, ruminant, vaccination

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 terms	8.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
8.2	List the products obtained from animals and identify the species that produce these products	8.2.1	Develop a chart that lists animal products by species	Foundation	Writing	Organizes information into an appropriate format [1.6.10]
		8.2.2	Keep a weekly log of the products used of animal origin	Thinking	Problem Solving	Comprehends ideas and concepts related to animal science [4.4.1]
8.3	Discuss digestive systems of common classes of agricultural animals	8.3.1	Compare the digestive tracts of ruminants, nonruminants (monogastrics), and poultry	Foundation	Reading	Draws conclusions from what is read [1.3.12]
		8.3.2	Compare the kinds of feeds that can be consumed by an animal based on its digestive system	Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
8.4	List and discuss the importance of the major classes of nutrients	8.4.1	Discuss the role of nutrients in livestock health	Foundation	Writing	Uses technical words and symbols [1.6.20]
		8.4.2	List the problems that occur when an animal does not receive adequate nutrition	Thinking	Problem Solving	Draws conclusions from what is read and gives possible solutions [4.4.4]
		8.4.3	Identify feedstuffs that are good nutrient sources			
8.5	Discuss gender and sexual classification terminology of beef and dairy cattle, swine, sheep, goats, horses, and poultry	8.5.1	Identify gender and sexual classification of animals	Foundation	Reading	Draws conclusions from what is read [1.3.12]
		8.5.2	Explain the advantages and disadvantages of altering the gender of animals	Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
8.6	Identify retail cuts of beef, pork, and poultry	8.6.1	Relate finish and gender of animal to quality of retail cuts	Foundation	Speaking	Organizes ideas, and communicates oral messages to listeners [1.5.7]
		8.6.2	Prepare a chart that compares cuts of beef based on marbling and cost		Arithmetic/ Mathematics	Creates tables, graphs, diagrams, and charts to convey quantitative information [1.1.18]

		8.6.3	Calculate cost comparisons between selected grades and cuts of meat products	Thinking	Creative Thinking	Makes connections between seemingly unrelated ideas [4.1.6]
8.7	Describe gestation characteristics of cattle, swine, sheep, goats, and horses	8.7.1	Relate date of breeding (conception) to date of giving birth	Foundation	Reading	Draws conclusions from what is read [1.3.12]
		8.7.2	Calculate breeding dates for selected species to assure birth of young at a given time		Arithmetic/ Mathematics	Uses basic numerical concepts in practical situations [1.1.32]
				Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
8.8	Identify common breeds of beef and dairy cattle, swine, sheep, goats, horses, and poultry	8.8.1	Select breeds that best meet needs and goals of a producer	Foundation	Reading	Draws conclusions from what is read [1.3.12]
		8.8.2	Prepare a one-page written report on a selected breed		Writing	Communicates thoughts, ideas, or facts in written form in a clear, concise manner
				Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
8.9	Discuss management practices with beef and dairy cattle, swine, sheep, goats, horses, and poultry	8.9.1	Develop a production cycle management plan for a preferred species	Foundation	Reading	Draws conclusions from what is read [1.3.12]
		8.9.2	Identify needed production inputs for a large animal enterprise and calculate the annual cost of maintaining an animal		Arithmetic/ Mathematics	Applies computation skills to calculate animal production costs [1.1.8]
				Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
8.10	Discuss the importance of animal health and well-being	8.10.1	8.10.1 Identify the economic impact of animal diseases	Foundation	Reading	Draws conclusions from what is read [1.3.12]
		8.10.2	List the signs of animal health and disease		Arithmetic/ Mathematics	Applies addition, subtraction, and division to real-world situations [1.1.1]
		8.10.3	Invite a veterinarian to speak to your class about diseases in the animal community		Science	Describes/explains scientific principles related to animal health and well-being [1.4.13]
		8.10.4	Evaluate a sick animal and diagnose the disease	Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]

Unit 9: Orientation to Agricultural Power and Mechanics
20 Hours

Terminology: agricultural equipment, agricultural mechanization, agricultural power, agricultural structures, compound machine, mechanical advantage, shop (lab), simple machine, tractor

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 terms	9.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
9.2	Discuss the role of agricultural power and mechanical devices in the agricultural industry	9.2.1	Prepare a report on the amount of work in a day when agricultural power and mechanical devices are used	Foundation	Writing	Communicates thoughts, ideas, or facts in written form in a clear, concise manner [1.6.6]
		9.2.2	Investigate the use of mechanical devices on farms and ranches and in agribusinesses		Reading	Comprehends written information and applies it to a task [1.3.8]
9.3	Discuss the role of simple machines and mechanical advantage in agricultural power	9.3.1	Identify simple machines found in agricultural mechanics shops	Foundation	Science	Describes/Explains scientific principles related to simple machines and mechanical advantage [1.4.13]
		9.3.2	Identify the use of simple machines in making compound machines	Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
		9.3.3	Investigate how simple and compound machines contribute to mechanical advantage			
9.4	Explain areas of agricultural mechanics	9.4.1	Identify areas of agricultural mechanics in a shop (lab)	Thinking	Problem Solving	Draws conclusions from observations, evaluates conditions, and gives possible
		9.4.2	Determine careers in agricultural mechanics and education needed to enter and advance in the careers	Personal Management	Career Awareness, Development, and Mobility	Explores career opportunities [3.1.6]
9.5	Discuss the use of tractors and equipment in the agricultural industry	9.5.1	Identify kinds of tractors and equipment	Personal Management	Organizational Effectiveness	Applies knowledge to implement work-related system or practice [3.3.4]
		9.5.2	Tour a farm machinery show or dealership display and prepare a report on findings	Foundation	Speaking	Organizes ideas and communicates oral messages to listeners [1.5.7]

9.6	Identify and compare sources of power in the agricultural industry	9.6.1	Prepare a report on the kinds of engines used in the agricultural industry	Foundation	Writing	Organizes information into an appropriate format [1.6.10]
		9.6.2	Investigate the role of hydraulics and pneumatics in agricultural power		Science	Applies knowledge to complete a practical task [1.4.3]
9.7	Discuss the protection and storage of agricultural power and equipment	9.7.1	List ways exposure to the weather damages agricultural power and equipment	Foundation	Writing	Presents answers/conclusions in a clear and understandable form [1.6.13]
		9.7.2	Prepare a plan for storing equipment during the off season		Arithmetic/ Mathematics	Calculates/Estimates equipment storage space requirements [1.1.8]
		9.7.3	Investigate the storage facilities for various agricultural power and equipment			
		9.7.4	Develop a plan for proper disposal of wastes, including materials and equipment			

Unit 10: Safety in Agricultural Mechanics
10 Hours

Terminology: ground fault circuit interrupter (GFCI), operator's manual

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 terms	10.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
10.2	Describe the role and importance of an operator's manual in safety	10.2.1	Review operator's manuals for agricultural equipment	Foundation	Reading	Applies/Understands technical words that pertain to safety in agricultural mechanics [1.3.6]
		10.2.2	Locate the safety information in an operator's manual			
10.3	Discuss the importance of properly maintaining and using safety devices	10.3.1	Test a GFCI in an agricultural mechanics shop	Foundation	Listening	Evaluates oral information/presentation [1.2.2]
		10.3.2	Locate safety shields and other devices on shop equipment	Personal Management	Integrity/Honesty/ Work Ethic	Complies with safety and health rules in a given work environment [3.2.2]
10.4	Discuss general shop safety practices	10.4.1	Locate ventilation devices in a shop	Foundation	Writing	Organizes information into an appropriate format [1.6.10]
		10.4.2	Locate cabinets with safety equipment in a shop	Personal Management	Integrity/Honesty/ Work Ethic	Describes desirable worker characteristics [3.2.3]
		10.4.3	Prepare and display a list of shop safety rules			Follows established rules, regulations, and policies [3.2.5]
		10.4.4	Explain steps to take should an accident occur in agricultural mechanics work			
		10.4.5	Gain a satisfactory score on a general shop safety test			
		10.4.6	Get checked out on all equipment before using it			

Unit 11: Hand and Power Tools
15 Hours

Terminology: blade balance, board feet, circular saw, common nail, concave bevel, convex bevel, crosscut, crosscut hand saw, dado, double inclined plane, finishing nail, high speed drill, hollow ground, hone, kerf, kickback, rabbet, rip, rip hand saw, revolutions per minute (RPM), single inclined plane, twist drill

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**
11.1 Define terms	11.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
11.2 Discuss the importance, use, and maintenance of hand and power tools in agricultural mechanics	11.2.1	Identify common hand and power tools used in agricultural mechanics	Foundation	Listening	Listens for content [1.2.3]
	11.2.2	Select hand tools needed for a particular job and determine the cost of acquiring such tools		Reading	Comprehends written information and applies it to a task [1.3.8]
	11.2.3	Properly store tools when not in use		Arithmetic/ Mathematics	Calculates dollar amounts [1.1.7]
			Thinking	Knowing How to Learn	Processes new information as related to workplace [4.3.5]
11.3 Explain the use of hand tools in woodworking	11.3.1	Demonstrate safety practices for hand tool woodworking	Thinking	Decision Making	Accepts responsibility for decision [4.2.1]
	11.3.2	Select and use appropriate personal protective equipment			
11.4 Demonstrate using common measuring devices	11.4.1	Use a tape measure, combination square, and framing square	Thinking	Reasoning	Determines which conclusions are correct when given a set of facts and a set of conclusions [4.5.3]
11.5 Describe common fasteners used in woodworking	11.5.1	Display and label common fasteners	Foundation	Arithmetic/ Mathematics	Chooses appropriately from a variety of mathematical techniques [1.1.11]
	11.5.2	Identify conditions for use each kind of fastener	Thinking Skills	Problem Solving	Devises and implements a plan of action to resolve problem [4.4.3]
	11.5.3	Determine how fasteners are sold and calculate the amount and cost for a given job			
	11.5.4	Practice using each fastener			
11.6 Demonstrate the use of woodworking hand tools	11.6.1	Use a hammer, hand saw, chisel, and plane	Thinking	Seeing Things in the Minds Eye	Visualizes a finished product [4.6.4]
	11.6.2	Follow all safety practices, including the use of PPE with demonstrations	Personal Management	Responsibility	Pays close attention to detail [3.4.8]
11.7 Determine correct safety procedures for using power tools	11.7.1	Practice power tool safety	Thinking	Decision Making	Accepts responsibility for a decision [4.2.1]

		11.7.2	Use appropriate personal protective equipment	Personal Management	Responsibility	Pays close attention to detail [3.4.8]
11.8	Identify different classes of power tools	11.8.1	Match power tool to correct class: stationary or portable	Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]
11.9	Identify parts of power tools	11.9.1	Identify parts of a portable circular saw	Thinking	Reasoning	See relationship between two or more ideas, objects, or situations [4.5.5]
		11.9.2	Identify parts of a sabre saw			
		11.9.3	Identify parts of a hand drill			
11.10	Protect tools from environmental hazards and misuse	11.10.1	Identify environmental hazards and tool misuse	Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]
11.11	Describe basic tool service techniques	11.11.1	Get checked-out in the use of a grinder to sharpen tools	Thinking	Knowing How to Learn	Applies new knowledge and skills to sharpen tools [4.3.1]
		11.11.2	Sharpen a cold chisel	Personal Management	Integrity/Honesty/ Work Ethic	Complies with safety and health rules in a given work environment [3.2.2]
		11.11.3	Sharpen lawn mower blade			
		11.11.4	Sharpen wood chisel			

Unit 12: Electricity
5 Hours

Terminology: amp, circuit, conduit, electricity, ground, romex, switch, volt, watt

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**
12.1	Define terms associated with electricity	12.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
12.2	Determine correct safety procedures in the electricity area	12.2.1	Practice proper electrical safety	Foundation	Science	Follows safety guidelines [1.4.15]
		12.2.2	Uses appropriate personal protective equipment for electrical work		Reading	Applies information and concepts derived from printed materials [1.3.3]
				Thinking	Reasoning	Applies rules and principals to a new situation [4.5.1]
12.3	Identify basic electrical symbols	12.3.1	Recognize the symbols for single pole switch, three way switch, four-way switch, convenience outlet, 240 volt outlet, and lighting outlet	Thinking	Knowing How to Learn	Processes new information as related to workplace [4.3.5]
12.4	Identify basic electrical tools and devices	12.4.1	Match tools and devices with proper names	Thinking	Decision Making	Evaluates information/data to make the best decision [4.2.4]
12.5	Evaluate different wire colors (black, red, white, and green)	12.5.1	Match wire colors with use	Thinking	Decision Making	Comprehends ideas and concepts related to NEC color coding [4.2.2]
12.6	Perform basic electrical skills	12.6.1	Demonstrate attaching a wire nut, bending a hook end in wire, and making a pigtail splice	Thinking	Seeing Things in the Minds Eye	Organizes and processes images-symbols, pictures, graphs, objects, etc [4.6.2]

Unit 13: Metals Fabrication
15 Hours

Terminology: acetylene, alloy, alternating current, amperage, anneal, bead, brazing, carburizing flame, direct current, electrode, ferrous, flux, fusion weld, gauge, neutral flame, non-ferrous, oxidizing flame, oxygen, polarity, shielded metal arc welding, solder, tempering, welding, working pressure

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**
13.1	Define terms	13.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
13.2	Determine correct safety practices in metal technology area	13.2.1	Practice proper safety precautions	Thinking	Decision Making	Accepts responsibility for a decision [4.2.1]
		13.2.2	Use appropriate personal protective equipment			
13.3	Identify metal working hand tools	13.3.1	Match tools to their correct name	Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]
		13.3.2	Properly store tools when not in use			
13.4	Identify different metal shapes	13.4.1	Match metal shapes with names	Thinking	Reasoning	See relationship between two or more ideas, objects, or situations [4.5.5]
13.5	Identify marking and measuring devices	13.5.1	Lay out a project design using marking and measuring tools	Thinking	Knowing How to Learn	Locates appropriate learning resources to acquire or improve knowledge and skills [4.3.3]
13.6	Describe methods of using metal fasteners: solder, rivets, bolts, screws	13.6.1	Attach metals using various methods	Foundation	Science	Applies scientific principles related to fastening metal objects [1.4.5]
		13.6.2	Follow safety practices in use of fasteners			
13.7	Discuss proper arc welding safety procedures	13.7.1	Demonstrate safety procedures while performing arc welding skills	Thinking	Decision Making	Accepts responsibility for decision about using proper safety equipment [4.2.1]
		13.7.2	Use appropriate personal protective equipment			
		13.7.3	Get checked out in the use of an arc welder			
13.8	Identify arc welding tools and equipment	13.8.1	Associate tools with their proper use	Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]
		13.8.2	Properly store welding tools when not in use			

13.9	Set up arc welding equipment	13.9.1	Adjust welder	Personal Management	Organizational Effectiveness	Applies knowledge to implement work-related system or practice [3.3.4]
		13.9.2	Select supplies and materials			
		13.9.3	Get checked out on use of arc welding equipment			
13.10	Strike and hold an arc	13.10.1	Establish and hold an arc	Thinking	Knowing How to Learn	Uses available resources to apply new skills [4.3.6]
		13.10.2	Follow all safety practices in use of arc welding equipment			
13.11	Describe procedures to run a bead	13.11.1	Run a bead in the flat position on steel	Foundation	Speaking	Communicates a thought, idea, or fact in spoken form. [1.5.5]
		13.11.2	Use care to assure safety with hot metal			
13.12	Describe proper gas welding safety practices	13.12.1	Demonstrate proper safety practices while using gas welding equipment	Thinking	Decision Making	Accepts responsibility for decision [4.2.1]
		13.12.2	Use appropriate personal protective equipment			
		13.12.3	Get checked out in the use of oxyacetylene equipment			
13.13	Identify the parts of an oxyacetylene torch outfit	13.13.1	Set up and assemble an oxyacetylene welding outfit	Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]
		13.13.2	Properly store equipment when not in use			
13.14	Discuss proper procedures to turn on and adjust an oxyacetylene welding outfit	13.14.1	Light and adjust the carburizing, neutral and oxidizing flames	Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]
13.15	Describe methods to construct fusion welds with and without filler rod	13.15.1	Weld fusion bead with and with out filler rod	Foundation	Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
13.16	Describe methods of cutting with an oxyacetylene torch	13.16.1	Perform a cutting and piercing exercise	Foundation	Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]

Unit 14: Agricultural Graphics
5 Hours

Terminology: borderline, drawing, extension line, hidden line, object line, scale, sketch

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**
14.1	Define terms	14.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
14.2	Recite the names and functions of drawing equipment	14.2.1	Identify drawing equipment	Thinking	Decision Making	Comprehends ideas and concepts related to drawing [4.2.2]
		14.2.2	Properly store drawing equipment when not in use			
14.3	Define drawing symbols	14.3.1	Match drawing symbols with their definitions	Thinking	Knowing How to Learn	Applies new knowledge and skills to drawing.[4.3.1]
14.4	Interpret drawings of simple objects	14.4.1	Interpret the drawing of a simple object	Thinking	Creative Thinking	Creates new design by applying specified criteria [4.1.3]
		14.4.2	Use dimension information in making interpretations	Foundation	Arithmetic/ Mathematics	Applies mathematical principles related to interpretation of dimensions on drawings
14.5	Describe the making of an orthographic drawing	14.5.1	Make an orthographic drawing of a simple object	Thinking	Seeing Things in the Minds Eye	Visualize a finished product [4.6.4]

Unit 15: Plumbing
5 Hours

Terminology: fitting, inside diameter (ID), outside diameter (OD), pipe, plumbing, ream, threading

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**
15.1	Define terms	15.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
15.2	Describe the importance and use of plumbing	15.2.1	Identify examples of plumbing used in greenhouses, chicken houses, and other agriculture structures			
15.3	Identify basic plumbing tools	15.3.1	Match tools with proper names	Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]
		15.3.2	Properly store all tools when not in use			
		15.3.3	Illustrate safety in handling and using plumbing tools and materials			
15.4	Determine and evaluate different kinds of pipe and fixtures	15.4.1	Select uses of pipes and fixtures based on the materials used in their manufacture	Foundation	Arithmetic/ Mathematics	Applies mathematical principles related to plumbing [1.1.4]
		15.4.2	Select appropriate pipe and fittings for a plumbing job	Thinking	Reasoning	Comprehends ideas and concepts related to pipe fitting. [4.5.2]
		15.4.3	Estimate costs of supplies for a plumbing job			

Unit 16: Concrete and Masonry
5 Hours

Terminology: aggregate, concrete, form, masonry, mix, mortar, Portland cement, ratio

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**
16.1 Define terms	16.1.1		Thinking	Knowing How to Learn	Processes new information as related to workplace [4.3.5]
16.2 Select materials for concrete	16.2.1	Identify safety rules associated with concrete and masonry work	Thinking	Problem Solving	Draws conclusions from observations, evaluates conditions, and gives possible solutions [4.4.4]
	16.2.2	Demonstrate ability by making a poured concrete object			
16.3 Estimate the amount of concrete needed for a job	16.3.1	Calculate the amount of concrete needed for a job in terms of cubic ft and cubic yards	Foundation	Arithmetic/ Mathematics	Calculates/Estimates concrete needed [1.1.8]
			Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
16.4 Mix and place concrete	16.4.1	Measure and mix appropriate Portland cement, aggregate, and water for a small job	Foundation	Arithmetic/ Mathematics	Calculates/Estimates ingredients needed to mix concrete [1.1.8]
	16.4.2	Properly place, finish, and cure concrete	Personal Management	Integrity/Honesty/ Work Ethic	Follows established rules, regulations, and policies [3.2.5]

Unit 17: Small Engines
5 Hours

Terminology: carburetor, compression power, exhaust stroke, horsepower, ignition, intake, power stroke

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**
17.1	Define terms	17.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
17.2	Determine the correct safety procedures in small engine shops	17.2.1	Practice proper safety procedures in a small engine shop	Thinking	Decision Making	Accepts responsibility for decision [4.2.1]
		17.2.2	Use appropriate personal protective equipment			
17.3	Identify tools used in working with small engines	17.3.1	Match tools with proper names	Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]
		17.3.2	Properly store tools when not in use			
17.4	Describe the strokes and functions of small gasoline engines	17.4.1	List strokes and analyze functions of two and four cycle engines	Foundation	Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
17.5	Identify major parts and systems of internal combustion engines	17.5.1	Locate major engine parts on an engine or line drawing of an engine	Foundation	Speaking	Pronounces words correctly [1.5.9]

Unit 18: Surveying
5 Hours

Terminology: backsight reading, benchmark, foresight reading, height of instrument, level, surveying rod

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**
18.1	Define terms	18.1.1		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
18.2	Discuss safety practices associated with surveying	18.2.1	Follow safety practices involved with surveying	Thinking	Decision Making	Accepts responsibility for decisions [4.2.1]
		18.2.2	Select and use appropriate personal protective equipment			
18.3	Identify surveying equipment	18.3.1	Identify basic surveying equipment	Thinking	Knowing How to Learn	Processes new information as related to workplace. [4.3.5]
		18.3.2	Properly store surveying equipment when not in use			
18.4	Describe the process of pacing	18.4.1	Demonstrate pacing to determine an approximate distance	Thinking	Reasoning	Uses logic to draw conclusions from available information [4.5.6]
18.5	Describe the proper procedure to make horizontal measurements	18.5.1	Determine the distance between two points using the proper method	Thinking	Problem Solving	Revises plan of action indicated by findings [4.4.9]
18.6	Identify the process of setting up a level and taking a reading	18.6.1	Set up a level and take a rod reading	Thinking	Knowing How to Learn	Uses available resources to acquire new skills or improve skills [4.3.4]

Glossary
Unit 1: Introduction to Agricultural Science

1. agribusiness—non-farm work or processes in the agricultural industry
2. agricultural industry—all of the activities in producing and marketing food, fiber, and forestry products to consumers
3. agricultural mechanics—design, construction, repair, and maintenance of tractors, machinery, and other structures used in the agricultural industry
4. agriculture—the science of producing crops and raising livestock
5. agriscience—using new technologies in the production of food, fiber, and shelter
6. aquaculture—the science of producing aquatic plants and animals
7. biotechnology—the management of biological systems for the benefit of humans, including cloning, gene transfer, and other technologies
8. EPA—the Environmental Protection Agency; an agency of the Federal government focused on environmental quality
9. FEMA—the Federal Emergency Management Agency; an agency focused on responding to natural and other disasters
10. issue—a matter on which differences of opinion exist; a dispute
11. horticulture—the science of producing fruits, vegetables, and ornamental plants
12. USDA—the United States Department of Agriculture; the main agency of the Federal government that oversees agriculture

Unit 2: The FFA

1. Career Development Event (CDE)—a hands-on team competition designed for FFA members to develop career-related skills

2. FFA—a national organization for students enrolled in agriculture education that promotes leadership, growth, and career success

3. leadership—the ability to direct and guide others to accomplish a goal

Unit 3: Agricultural Leadership

1. extemporaneous speech—a type of speech in which the speaker prepares ideas but does not memorize exact words

2. minutes—the official written record of a business meeting

3. motion—a basic proposal that brings business before the assembly

4. opening/closing ceremony—a traditional contest designed to emphasize the purpose of meetings and duties of officers

5. parliamentary procedure—a method of conducting meetings in an orderly manner

6. prepared speech—a type of speech in which the speaker prepares the speech completely beforehand

7. vote—to give members the right to express approval of or opposition to a particular action

Unit 4: Supervised Experience

1. entrepreneurship—a student-owned business that serves as an SAE

2. placement—an SAE in which students are employed in an agriculture-related field

3. production—an SAE in which students learn to raise and manage crops and livestock

4. record book—the proper place to record all SAE inventory, deposits, and expenditures

5. supervised agriculture experience (SAE)—an opportunity for students designed to develop knowledge and skills in agriculture-related fields while in supervised settings

Unit 5: Safety

1. hazard—a danger or the potential of danger

2. OSHA—the Occupational Safety and Health Administration; an agency of the Federal government that oversees safety and health of workers in their jobs

3. PPE—personal protective equipment; equipment worn to protect from injury including goggles, ear plugs, face shields, boots, gloves, and respirators

4. risk—the possibility of being injured or losing something

5. safety—taking steps or actions to prevent loss or injury

Unit 6: Forestry and Natural Resources

1. conservation—the control and preservation of natural resources for present and future use

2. forestry—the production and management of trees for lumber and other related commodities

3. natural resources—resources found in nature that support life and produce fuel

4. nonrenewable resource—a resource provided by nature that cannot replace itself

5. renewable resource—a resource provided by nature that can replace itself

6. water—a colorless, odorless liquid essential for all forms of life

7. wildlife—nondomesticated animals that thrive in natural environments

Unit 7: Plant Science

1. annual—a plant that completes its life cycle in one year or less
2. biennial—a plant that needs two years to complete its life cycle
3. dicot—a plant with two seed leaves
4. fertilizer—a material that supplies nutrients to plants
5. monocot—a plant with one seed leaf
6. perennial—a plant that needs more than two years to complete its life cycle
7. photosynthesis—the food-making process of plants
8. plant science—the science of plant growth, care, and management
9. respiration—the process by which plants convert food to energy
10. soil—the outer layer of the earth’s crust that supports plant growth
11. transpiration—the process by which a plant loses water vapor

Unit 8: Animal Science

1. animal science—the science of animal growth, care, and management

2. artificial insemination—reproduction by means other than natural mating

3. breed—a group of animals having similar physical characteristics that are passed on to their offspring

4. gestation—length of pregnancy

5. lactation—period of time when mammals are producing milk

6. nonruminant—a simple-stomached animal

7. polled—genetically without horns

8. ruminant—an animal that has a stomach with more than one compartment

9. vaccination—an agent administered to prevent disease

Unit 9: Orientation to Agricultural Power and Mechanics

1. agricultural equipment—implements used in the agricultural industry to produce plants, animals, and other products
2. agricultural mechanization—the use of complex machines, often powered, to do work in the agricultural industry
3. agricultural power—the use of engines, motors, and other sources of power to do work in the agricultural industry
4. agricultural structures—facilities used in the agricultural industry, including barns, poultry houses, grain elevators, earthen structures such as ponds, and other kinds of structures
5. compound machine—a machine, often large, that is comprised of many simple machines
6. mechanical advantage—the amount that a machine increases force, such as a lever increases force
7. shop—a building in which mechanical work is performed; sometimes called an agricultural mechanics laboratory
8. simple machine—a device or machine that has only one or two parts such as a wheel and axle
9. tractor—a moving vehicle, usually with wheels or tracks, with an engine that provides power for other equipment

Unit 10: Safety in Agricultural Mechanics

1. ground fault circuit interrupter (GFCI)—safety device that prevents ground faults (electrical shock) when operating power tools and using electricity

2. operator’s manual—a written description of how to safely use and maintain equipment; provided by manufacturer

Unit 11: Hand and Power Tools

1. blade balance—a device used to balance a lawn mower blade to prevent excess vibration during operation
2. board foot—a wood measurement of 144 cubic inches; board dimensions of 12 inches by 12 inches by 1 inch
3. circular saw—a motor-driven power hand saw with round blade
4. common nail—a kind of nail with a flat head that is used in general construction
5. concave bevel—a bevel which is hollowed or curved inward
6. convex bevel—a bevel which is raised or curved outward
7. crosscut—to cut across the grain of wood
8. crosscut hand saw—a saw with small teeth (more teeth per inch) for cutting across the grain of wood
9. dado—a square or rectangular groove in the face of a board
10. double inclined plane—a plane made by two bevels creating a point similar to that of an axe
11. finishing nail—a slender nail with a small head used for interior trim work
12. high speed drill—twist drill made tempered specially to drill holes in steel
13. hollow ground—a single inclined plane which is concave ground
14. hone—the process of finely sharpening a cutting edge with a bench stone or hand stone
15. kerf—opening in board made by the cutting of a saw blade; also referred to as saw kerf
16. kickback—a safety hazard that results when a saw blade binds in the material being cut resulting in uncontrollable throwing of the material or saw
17. rabbet—a cut or groove at the end of a board made to receive another board and form a joint
18. rip—to cut along the grain of wood
19. rip hand saw—a saw with larger teeth (fewer teeth per inch) for cutting with the grain of wood
20. revolutions per minute (RPM)—the number of times a rotating shaft or blade turns or rotates in sixty (60) seconds
21. single incline plane—a type of bevel with one edge; used on wood chisels and plane irons
22. twist drill—common drill bit used for making round holes in wood and metal

Unit 12: Electricity

1. amp—the measurement of electrical flow in a conductor

2. circuit—an electrical source and wires connected to a light, heater, or motor

3. conduit—metal tube with individually insulated wires

4. electricity—flow of electrons in a conductor

5. ground—making an electrical connection between a piece of electrical equipment and the earth

6. romex—sheathed cable containing individually insulated electrical wires

7. switch—a device used to stop the flow of electrical current; used in controlling devices

8. volt—the measurement of electrical pressure

9. watt—the measurement of electrical power (W= V x A)

Unit 13: Metals Fabrication

1. acetylene—gas fuel used in acetylene welding
2. alloy—a mixture of two or more metals
3. alternating current—current that reverses itself sixty (60) times per second
4. amperage—the measurement of electrical flow in a conductor
5. anneal—to cool steel slowly so as to make it soft and malleable
6. bead—continuous and uniform line of filler metal
7. brazing—bonding with metals and alloys that melt above 840 degrees F when capillary action occurs
8. carburizing flame—a flame with an excess of acetylene in the mixture
9. direct current (DC)—current that flows in one direction continuously
10. electrode—a metal welding rod coated with flux used in electric arc welding
11. ferrous—metal that is made with iron ore
12. flux—material on an arc welding rod that cleans the metal, aids in proper cooling, and produces a gas shield for the weld
13. fusion weld—to join parts by melting them together
14. gauge—with sheet metal, a thickness scale used to identify the thickness of metal under one-fourth inch
15. neutral flame—a flame with a balance of oxygen and acetylene
16. non-ferrous—metals that do not contain iron
17. oxidizing flame—a flame with an excess of oxygen
18. oxygen—gas in the atmosphere that supports combustion; used in some kinds of welding to promote burning of a hot flame
19. polarity—the direction of electrical flow in the arc welding circuit (positive and negative)
20. shielded metal arc welding—welding with electrical power as a source of heat using rods and flux that forms a gaseous shield around the molten metal until it solidifies
21. solder—a mixture of tin and lead used to fasten together sheet metal and electrical connections
22. temper—the process of heating tool-grade steel followed by carefully controlled cooling to gain the desired degree of hardness
23. welding—fusing two pieces of material using a heat process; most commonly used with metal and plastics
24. working pressure—a continuous regulated pressure supplied to the oxyacetylene torch assembly

Unit 14: Agricultural Graphics

1. borderline—heavy solid black line drawn close to the outer edge of paper used to draw plans

2. drawing—a picture or likeness made with pencil, pen, chalk, crayon or other instruments

3. extension line—solid lines showing the exact area specified by the dimensions

4. hidden line—a series of dashes that indicate unseen edges

5. object line—solid line in a drawing that shows the visible edge of an object

6. scale—an instrument with all the increments shortened according to proportion; numbers and graduations on measuring tools; a rigid steel rule or measuring device; the size of a plan compared with that of the object that it represents

7. sketch—a rough drawing of an idea, object or procedure

Unit 15: Plumbing

1. fitting—a part used to connect pieces of pipe or other pieces to pipe

2. inside diameter (ID)—measurement used to size a pipe; based on a measurement taken from the interior walls of the pipe

3. outside diameter (OD)—measurement used to size pipe; based on a measurement taken from the exterior walls of the pipe

4. pipe—rigid tube-like material

5. plumbing—planning, installing, and maintaining systems of pipes and fixtures

6. ream—removing the burrs from the inside edge of cut pipe

7. treading—the process of cutting threads on pipe

Unit 16: Concrete and Masonry

1. concrete—a mixture of stone aggregates, sand, Portland cement, and water that hardens as it dries

2. form—a metal or wooden structure that contains concrete until it hardens

3. masonry—anything made of brick, stone, tile, or concrete units held in place by masonry cement

4. mix—Ratio of materials in concrete or mortar

5. mortar—mixture of Portland cement, finishing lime, and sand

6. Portland cement—a dry powder made by burning limestone and clay followed by grinding and mixing

7. ratio—proportion of one component to another by weight or volume

Unit 17: Small Engines

1. carburetor—provides fuel and air to the engine in appropriate proportions and volume

2. compression stroke—movement of an engine's piston to squeeze or compress the fuel-air mixture

3. exhaust stroke—movement of the piston which expels burned gases from the cylinder

4. horsepower—force needed to lift 550 pounds one foot in one second; rating system of engine power displacement

5. ignition—a spark that ignites the fuel and air mixture

6. intake stroke—engine process of taking fuel and air into the combustion chamber

7. power stroke—the engine process in which burning fuel expands rapidly but evenly to drive the piston downward

Unit 18: Surveying

1. backsight reading—a reading taken on a point of known elevation

2. benchmark—a point of predetermined elevation

3. foresight reading—a reading taken on a point of unknown elevation

4. height of instrument—back site plus elevation

5. level—the surveying instrument

6. surveying rod—a measuring device to determine vertical distances in making a land survey or contour map