

AGRICULTURE, FOOD, AND NATURAL RESOURCES

CONTENT STANDARDS AND BENCHMARKS FOR NEW MEXICO

**AGRICULTURE, FOOD, AND NATURAL RESOURCES
STANDARDS DEVELOPMENT COMMITTEE:**

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AGRICULTURE, FOOD, AND NATURAL RESOURCES:

Planning, managing and performing agricultural production, and horticulture and landscaping services, and related professional and technical services, and managing and conserving natural resources and related environmental services.

Agricultural Education is based on the following principles:
1. Agriculture is the foundation of our society and an important economic industry.
2. Agriculture is the nation's largest employer with more than 22 million people working in some phase - from growing food and fiber to selling at the supermarket.
3. Because America's agricultural industry utilizes the most modern technology for production, Americans spend 10.9% of their income on food, the lowest percentage in the world.
4. Agriculture in the United States produces sufficient quantities of food and fiber to be the nations leading exporter.
5. Agricultural education courses take mathematical, reading, language arts, social studies, and science skills taught in core classes and provide realistic hands-on applications of these skills.
6. Agriculture is an applied science. Plant and animal life cycles, the nutritional composition of feed, the genetic characteristics of plants and animals, and soil chemistry properties are examples of science concepts included in the curriculum.
7. The balancing of rations, financial analysis, record keeping, and calculations of fertilizer costs and area applications are examples of course content that involves the development of math skills.
8. Leadership activities provided by the FFA component develop a student's level of responsibility, citizenship, and cooperation. Parliamentary procedure and public speaking are examples of curriculum components.
9. Agricultural education is composed of three interwoven parts: classroom and laboratory instruction. Supervised Agricultural Experience (SAE), and leadership development through the FFA.
10. The unique nature of agricultural education constitutes an effective educational delivery system for those students with an interest in the broad area of agriculture.
11. Agricultural education is a community-based educational program that depends on strong industry involvement.
12. Achievement of AFNR CLUSTER STANDARDS AND BENCHMARKS is necessary to successfully enter the work force.
13. Achievement of academic, occupational, employability and entrepreneurial skills are necessary to successfully enter the workforce.
14. Employment and job opportunities for students are in the broad base of agriculture and range from the traditional entry -level positions in farming and ranching to positions in agribusiness and financial management, horticulture, natural resource management, forestry, scientific research and public relations.

AGRICULTURE, FOOD, AND NATURAL RESOURCES

The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fiber, wood products, natural resources, horticulture and other plant and animal products/resources.

SAMPLE CAREER SPECIALITIES AND OCCUPATIONS					
Food Scientists, Meat Processor-Toxicologist, Biochemists, Nutritionists-Dieticians, Food Brokers, Food Inspectors, Meat Cutters, Meat Graders, Cheese Makers, Microbiologists, Bacteriologists, Food & Drug Inspectors, Produce Buyers, Bioengineers, Food Processors, Quality Control Specialists, USDA Inspectors	Plant Breeders-Geneticists, Crop Farm Managers, Soil and Water Specialists, Plant Pathologists, Tree Surgeons, Grain Operations Superintendents, Custom Hay/Silage Operators, Forest Geneticists, Botanists, Golf Course Superintendents, Greenhouse Managers-Growers, Farmers, Florists	Livestock Producers, AI Technicians, Aqua-culturists, Animal Caretakers, Veterinarians, Feedlot Specialists, Embryo Transfer Technician, Feed Sales Representatives, Wildlife Biologist, Animal Nutritionists, Livestock Inspectors, Dairy Technicians, Veterinary Assistants, Equine Managers, Pet Shop Operators	Machine Operators, Agricultural Engineers, Heavy Equipment Operators, Welders, Heavy Equipment Maintenance Technician, Electricians, GPS Technicians, Agricultural Extension Engineering Specialist, Equipment/Parts Manager, Recycling Technicians, Irrigation Specialist	Range Technicians, Ecologists, Park Managers, Fish and Game Officers, Soil Geology Technicians, Water Monitoring Technician, Fish Hatchery Manager, Hydrologist, Environmental Sampling and Analysis Technician, Water Quality Manager, Log Graders, Wildlife Managers, Forestry Technician	Agricultural Sales, Banker/Loan Officer, Field Representative for Bank, Insurance Company or Government Program, Agricultural Commodity Broker, Agricultural Economist, Feed and Supply Store Manager, Farm Investment Manager, Dairy Herd Supervisor, Produce Commission Agent, Agricultural Chemical Dealer
PATHWAY STRANDS					
Food Products and Processing Systems (Food Processing and Preserving, Packaging, Distribution, Government Monitoring & Regulation)	Plant Systems (Agronomic, Horticulture, Forestry, Turf, Viticulture, Pomology, Olericulture, & Soils)	Animal Systems (Livestock, Dairy, Small Domesticated Animals, Equine, Wildlife, and Research Animals)	Power, Structural & Technical Systems (Power, Structures, Controls, Geospatial Technology, Computer Systems, Electronics, Hydraulics, and Pneumatics)	Natural Resources & Environmental Service Systems (Habitat Conservation, Forest Products, Parks & Recreation, Fisheries, Water & Air Quality, and Soil Conservation)	Agribusiness Systems (Sales, Services, Farm & Ranch Management, Entrepreneurship, Marketing, and Economics)
CLUSTER STRANDS					
Academic Foundations – Communications – Problem Solving and Critical Thinking – Information Technology – Systems – Safety, Health and Environment – Leadership and Teamwork – Ethics and Legal Responsibilities – Employability and Career Development – Technical Skills					

AGRICULTURE, FOOD, AND NATURAL RESOURCES ACCOUNTABILITY DATA SYSTEM COURSES

6th/7th/8th Grades

0131
Agricultural Explorations

0132
Agri-Science

9th/10th Grade

0141
Horticultural Science

0133
Introduction to Agriculture

0151
Introduction to Agricultural Mechanics

10th/11th/12th Grade - Pathways

PLANT SYSTEMS

0142
Plant/Crop Science

0143
Greenhouse/Nursery
Operations

0144
Landscape

0145
Floriculture

0184
Hydroponics

**POWER, STRUCTURAL
& TECHNICAL
SYSTEMS**

0152
Agricultural Structures &
Construction

0153
Metal Fabrication for the
Agricultural Industry

0154
Agricultural Power and
Machinery

**ANIMAL
SYSTEMS**

0161
Animal Science

0162
Science of
Small Animals

0163
Science of
Large Animals

**AGRIBUSINESS
SYSTEMS**

0171
Agricultural
Economics & Business
Management

0172
Agricultural
Marketing / Sales

**FOOD PRODUCTS
PROCESSING
SYSTEM**

0173
Food Products &
Processing

0174
Animal Production &
Processing

**NATURAL RESOURCES
& ENVIRONMENTAL
SYSTEMS**

0129
Environmental Science /
Natural Resources

0130
Forestry / Wildlife
Management

0183
Aquaculture Science

ALL PATHWAYS

0134 Comprehensive Agricultural Production	0135 Agricultural Industry & Technology	0136 Applied Agriculture	0137 Agricultural Leadership /Communication	0191 Agricultural Internship /OJT/COOP	0192 Agricultural Entrepreneurship
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Agriculture, Food, and Natural Resources

This subject area encompasses courses that prepare learners for careers in the planning, implementation, production, management, processing, and/or marketing of agricultural commodities and services, including food, fiber, wood products, natural resources, horticulture, and other plant and animal products. All courses should adhere to the complete program model incorporating 1) classroom and laboratory instruction, 2) Supervised Agricultural (Occupational) Experience, and 3) participation in leadership, knowledge and skill development activities provided through FFA.

The course number, common field number, and subject field numbers should be keyed in the following order:

Course Classification	Common Field Level	Subject Fields		
		#1	#2	#3
A (4 digits)	B	C	D	E

Course Numbers [A]

- 0131 Agricultural Explorations** - Surveys a wide array of topics within the agricultural industry, exposing students to the many and varied types of agricultural career opportunities and to those in related fields. As the name implies, these courses serve simply to introduce the agricultural field, providing students the opportunity to identify and focus for continued study. Primarily designed for seventh and/or eighth grade.
- 0132 Agri-science** - Introduction of the scientific principles upon which the agricultural industry is based. Subject matter includes the physiological processes of agriculturally important plants and animals, taxonomy and classification systems, soil and water chemistry, ecology and entomology.
- 0133 Introduction to Agriculture** - The local, national, and global definitions, history, and scope of agriculture in society is covered in this course. It also covers plant and animal sciences, production and processing; agricultural mechanics, including tool and machine operation; business and natural resource management; management of food and fiber systems; soil characteristics, formation and properties; and development of leadership and communication skills.
- 0134 Comprehensive Agricultural Production** - The course covers the global market place, development of a Program of Activities, and leadership development. Animal science emphasis is on the selection, reproduction and genetics of breeds of beef, sheep, swine, dairy cattle, horses, poultry, and specialty animals. Plant science emphasis on the structure and function of plant parts; identification of common pasture and range plants; plant growth and development; sexual and asexual reproduction of plants. Soil science topics include nutrients, fertilizers, and organic matter; conservation practices and sampling techniques.

- 0135 Agricultural Industry and Technology** - Topics covered in this course include animal science with emphasis on the feeding and management of breeds of livestock, digestive systems, classes of feed and feed additives. Entomology topics are characteristics, development and physiology of insects, and integrated pest management. Introduction to forestry, range, and wildlife management are also included in this course.
- 136 Applied Agriculture** - Specific subject matter covered in this course includes current issues relevant to the agricultural industry, marketing and sales techniques. Disease and parasites effecting the various breeds of livestock. Animal welfare and relationship to the human environment. May include the horticultural practices of greenhouse management; fruit, nut and vegetable production; and landscaping principles. Forest fire prevention and reforestation techniques, public and private land forests. Wildlife mammals, waterfowl, freshwater fish, and game management.
- 0137 Agricultural Leadership/Communication** - Course is designed to strengthen students' personal and group leadership skills. Topics such as public speaking, effective communication, human relations, parliamentary law, and group dynamics are covered. Also covered is the development of Programs of Activity and Service Learning, including program planning in the areas of student development, chapter development, and community development.
- 0141 Horticultural Science** - The focus of this course is on the science of plants (botany). Specific topics include photosynthesis and respiration, analysis of the difference of plant and animal cell structure, genetics, taxonomy and classification. Also included are topics covering entomology, soil chemistry, and plant diseases; virus and bacteria life cycles and effects on plant growth. Focus is on horticultural crops including greenhouse, landscape and floral plants.
- 0142 Plant/Crop Science** - The focus of this course is on the science of plants (botany). Specific topics include photosynthesis and respiration, analysis of the difference of plant and animal cell structure, genetics, taxonomy and classification. Also included are topics covering entomology, soil chemistry, and plant diseases; virus and bacteria life cycles and effects on plant growth. Focus is on food/ fiber crops and pasture/range plants.
- 0143 Greenhouse/Nursery Operations** - This course covers greenhouse/nursery operation and management. Plant propagation including grafting, budding, and layering. Students are often involved in the planning, management, and marketing associated with the school greenhouse/nursery.
- 0144 Landscape** - Introduction to landscape design, construction, and maintenance. Irrigation systems for the landscape including water conservation and use and xeriscape plants. Drawing instruments and symbols used in designing the landscape plan. Identification and selection of landscape ground covers, shrubs, trees, and other construction materials. Cost estimates and landscaped proposals are also covered in this course.
- 0145 Floriculture** - Focus is on the floriculture industry including plant production, processing and marketing. Principles of floral design. Students are often involved in a simulated floral shop on the school grounds. Interior plant-scaping may also be included in this course.
- 0151 Introduction to Agricultural Mechanics** - Course provides for the skill and knowledge development applicable to the tools and equipment used in the agricultural industry. In learning to apply basic industrial knowledge and skills (engines, power, welding, and carpentry), a broad range of topics may be explored, including the operation, mechanics, and care of tools and machines; the construction and repair of structures. Introduction to electricity and power. Procedures for safe operations in the agricultural laboratory.

- 0152 Agricultural Structures and Construction** - Topics include surveying, concrete and masonry, plumbing, drafting, carpentry and electrical wiring. Use of bids and billing information to develop a complete materials list and project cost estimate. Use of measurement and layout tools. Laboratory safety procedures.
- 0153 Metal Fabrication for the Agricultural Industry** - Topics include oxyacetylene and mig welding techniques including cutting, brazing, and welding. Fabrication techniques and project design including estimating and developing materials list. Tool room management and safety procedures are essential to the course.
- 0154 Agricultural Power and Machinery** - The course includes maintenance and troubleshooting, and repair of small gas engines, auto and farm equipment maintenance. Identification and comparison of energy sources. Troubleshoot problems and evaluate performance to service and repair components of internal combustion engines. Follow manufacturers' guidelines to service and repair power transmission systems. Utilize maintenance manuals to service and repair hydraulic systems. Utilize schematics to service vehicle electrical systems.
- 0161 Animal Science** - Course imparts information about the care and management of domesticated animals. Animal nutrition, health, reproduction, genetics, facilities, and marketing are all possible topics. Study of anatomy and physiology of livestock and other domesticated animals. Examination of developmental stages and analysis of feed rations for different parts of an animal's life cycle. Identification of environmental factors that effect an animal's performance. Recognition of animal behaviors to facilitate working with animal safely.
- 0162 Science of Small Animals** - Course imparts information about the care and management of domesticated animals. Animal nutrition, health, reproduction, genetics, facilities, and marketing are all possible topics. Study of anatomy and physiology of livestock and other domesticated animals. Examination of developmental stages and analysis of feed ration for different parts of an animal's life cycle. Identification of environmental factors that effect an animal's performance. Recognition of animal behaviors to facilitate working with animal safely. Specific focus of this course is on small animals including rabbits, fowl, dogs, and cats.
- 0163 Science of Large Animals** - Course imparts information about the care and management of domesticated animals. Animal nutrition, health, reproduction, genetics, facilities, and marketing are all possible topics. Study of anatomy and physiology of livestock and other domesticated animals. Examination of developmental stages and analysis of feed ration for different parts of an animal's life cycle. Identification environmental factors that effect an animal's performance. Recognition of animal behaviors to facilitate working with animal safely. Specific focus of this course is on dairy cattle and equine.
- 0171 Agricultural Economics and Business Management** - Course provides students with the information and skills necessary for career success in agribusiness and in the operation of entrepreneurial ventures. Topics include economic principles, budgeting, risk management, finance, business law, insurance and resource management. Other possible topics are development of a business plan, employee/employer relations, problem solving and decision making, using computers. A survey of the careers within the agricultural industry is also incorporated.

- 0172 Agricultural Marketing/Sales** - Course focuses specifically on the marketing and promotional strategies for agricultural products. Students will develop a marketing plan for a specific product including target audience research and presentation skills. Agricultural sales techniques for products will also be covered.
- 0173 Food Products and Processing** - Course imparts the knowledge and skill needed to bring animal and plant products to market. Processing topics will include quality selection and preservation, equipment care and sanitation, government regulations, and consumer trends.
- 0174 Animal Production and Processing** - Course imparts the knowledge and skill needed to bring animal products to market. Processing topics will include quality selection and preservation, equipment care and sanitation, government regulations, and consumer trends. Animal processing courses may impart an overview of several types of animal products, or may specialize in particular products, such as meat, leather, wool, and dairy products.
- 0181 Environmental Science/Natural Resources** — Course combines the fields of ecology and conservation with planning for the efficient use and preservation of land, water, wildlife, and forests. Within this course may be topics covering environmental factors affecting water, water pollution, water and land use management, alternative energy resources, metals and minerals.
- 0182 Forestry/Wildlife Management** - Course provide the information necessary for the cultivation and care of forests or timberlands. Forestry topics covered are the processes of regeneration and reforestation, conservation of natural resources, erosion control, trail development and maintenance, mapping and surveying, operation of forestry tools, government regulations, and recreational uses. Wildlife topics include land and ecological systems that enable non-domesticated animal to thrive. Emphasize on how humans and animals may both take advantage of the same land, how to gain economic benefits from the land while not degrading its natural resources or depleting the plant and animal populations.
- 0191 Agricultural Internship/OJT/Coop** - Through these courses, work experience is gained within the agricultural industry. Goals are set for the employment period. Classroom experience may involve further study in the field, improvement of employability and career readiness skills.
- 0192 Agricultural Entrepreneurship** - Through this course the student will gain knowledge in the development of a business enterprise. Financial and resource management is an important aspect of this course. Classroom experience may involve further study in the field, improvement of responsibility and career readiness skills.
- 0199 Agriculture Other** - Course provides knowledge and skills in specific areas of the agricultural industry and is designed to adapt to the needs of the local community.

NEW MEXICO CONTENT STANDARDS FOR AGRICULTURE, FOOD, AND NATURAL RESOURCES

Definitions: Strand - Description title for a specific content area included in Agriculture, Food, and Natural Resources.
Content Standards - A broad description of the knowledge and skills students should acquire in a particular subject area.
Benchmarks - A statement of what students should know and be able to do in a content area.
Performance Standards - Concrete examples of what students have to know and be able to do to demonstrate that such students are proficient in the skills and knowledge framed in the content standard.

Acronyms: AFNR Agriculture, Food, and Natural Resources
ADS Accountability Data System (State Department of Education software program for collecting data)
STARS
SAE Supervised Agricultural Experience (work experience or entrepreneurship program for individual students)
PALS Partners in Active Learning Support (mentoring program for elementary school students)
CDE Career Development Event (competitive events which address student knowledge in the content area)
POA Program of Activities (document stating activities that are planned for a year by a local program)
EDGE Experiencing Discovery, Growth, and Excellence (leadership development program designed for 7th & 8th grade)
MFE Made For Excellence (leadership development program designed for 9th & 10th grade)
ALD Advanced Leadership Development (leadership development program designed for 11th & 12th grade)
WLC Washington Leadership Conference (advanced leadership conference held in our nations' capital)

The New Mexico Content Standards for Agriculture, Food, and Natural Resources are divided into three sections:

- Section 1: Agriculture, Food, and Natural Resource K-6 Content Standards address degree or quality of student performance. Standards are designed to be taught and infused throughout current curriculums in grades K-6.
- Section 2: Agricultural, Food, and Natural Resource Cluster Content Standards are designed to be taught in all agricultural education content courses included in the STARS accountability system. Cluster Standards identify basic knowledge and skills necessary for success in the workplace. Instructors with credentials for instruction in secondary agricultural education must teach courses. Address degree or quality of student performance in grades 7-12.
- Section 3: Agricultural, Food, and Natural Resource Pathway Content Standards are designed for specific content areas contained in the AFNR cluster. The Pathway Content Standards are addressed in specific courses that address a specific pathway included in the STARS accountability system. Address degree or quality of student performance in grades 6-12.

The Agriculture, Food, and Natural Resources Standards have been cross-referenced to the New Mexico Standards for Career Readiness, Language Arts, Math, and Science.

Codes: CR - Career Readiness Standards
LA - Language Arts Standards
MA - Math Standards
SC - Science Standards
SS - Social Studies

AFNR K-6 Content Standards

- Understanding Food & Fiber Systems
- History, Geography, & Culture Science,
- Technology & Environment
- Business & Economics
- Food, Nutrition & Health

AGRICULTURE, FOOD, AND NATURAL RESOURCES: K-6

STRAND: FOOD AND FIBER SYSTEMS, AND THE HUMAN ENVIRONMENT

CURRICULUM RESOURCES AND ASSISTING PROGRAMS

FFA’s “Food for America” program
 New Mexico Farm and Livestock Bureau “Ag in the Classroom”
 Extension Service “Kids, Kows, and More”
 Extension Service 4-H programs
 New Mexico Soil and Water Conservation Service
 New Mexico Department of Agriculture

STANDARD I: Understanding Food and Fiber Systems

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	COURSES ADDRESSING STANDARD AND BENCHMARK
I-A Understand Food and Fiber Systems	<u>K-3</u> 1. Identify the natural resources agriculture uses to provide people's basic needs of food, clothing, and shelter. 2. Match and/or illustrate a product and its origin. 3. Identify regional agricultural products and the basic needs they fulfill. <u>4-6</u> 1. Examine why agriculture is the oldest, largest, and most-essential industry.	CR 1,3 LA 1,2,3 SS 1	0131
I-B Identify types of farms and ranches and other agricultural industry.	<u>K-3</u> 1. Describe the journey of an agricultural product from the farm to the consumer. 2. Match different kinds of farms to their products. 2. Label the sequence of steps a food or fiber product takes from production, processing, marketing, and distribution to the consumer. <u>4-6</u> 1. Determine that households, businesses and agriculture share resources, such as water and land. 2. Describe examples of multiple uses for land and water resources.	CR 1 LA 1,2 MA 1 SS 13	0131

STANDARD I: Understanding Food and Fiber Systems cont.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	COURSES ADDRESSING STANDARD AND BENCHMARK
<p>I-C Understand Food and Fiber Systems' relation to society.</p>	<p><u>K-3</u> 1. Identify Food and Fiber Systems products and the people who work within those systems. 2. Give examples of agricultural products they use. 3. Recognize people in the community who provide food, clothing and shelter. <u>4-6</u> 1. Identify major agricultural commodities produced in their state. 2. Compare commodity output at state and national levels.</p>	<p>CR 1,2,3 LA 1,2 MA 1 SS 1,10</p>	<p>0131</p>
<p>I-D Understand the local, national, and international importance of Food and Fiber Systems.</p>	<p><u>K-3</u> 1. Identify local Food and Fiber Systems businesses. 2. Match these businesses to agricultural products. <u>4-6</u> 1. Explain how traders, explorers, and colonists influenced the availability of plants and animals. 2. Identify native agricultural products available.</p>	<p>CR 1 LA 1,2 SS 1,10,12</p>	<p>0131</p>
<p>I-E Understand Food and Fiber Systems careers.</p>	<p><u>K-3</u> 1. Identify and generate a list of Food and Fiber Systems careers. 2. Research characteristics of agricultural careers. 3. Interact with a local agriculturist. <u>4-6</u> 1. Recognize that agricultural inventions, discoveries, and technological advances produce and effect opportunities. 2. Identify agricultural careers, traditional and non-traditional and how they have changed over time.</p>	<p>CR 1,3,5 LA 1,2 SS 4,13</p>	<p>0131</p>

STANDARD II: History, Geography and Culture

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	COURSES ADDRESSING STANDARD AND BENCHMARK
<p>II-A Understand Food and Fiber Systems' role in the evolution of civilization.</p>	<p><u>K-3</u> 1. Illustrate how agriculture provides food, clothing and shelter. 2. Classify agricultural products as food, clothing, or shelter. 3. Identify an early civilization and illustrate agriculture's role in sustaining that society. <u>4-6</u> 1. Determine agriculture's role in the development of multi-cultural civilizations. 2. Analyze how early inhabitants relied on hunting and gathering. 3. Compare nomadic life to farming and settlements. 4. Identify innovations that increased the availability of food, clothing, and shelter.</p>	<p>CR 1,3 LA 1,2,3 SS 1,4,11,12,13</p>	<p>0131</p>
<p>II-B Understand Food and Fiber System's role in societies throughout world history.</p>	<p><u>K-3</u> 1. Illustrate how events, such as seasonal festivals, focus on Food and Fiber Systems. 2. Identify agricultural based celebrations and/or festivals. <u>4-6</u> 1. Explain how agriculture is the foundation of civilizations. 2. Identify individual experience and involvement with Food and Fiber Systems.</p>	<p>CR 2,3 LA 1,2,3 SS 1,4,11,12,13</p>	<p>0131</p>

STANDARD II: History, Geography and Culture

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	COURSES ADDRESSING STANDARD AND BENCHMARK
<p>II-C Understand Food and Fiber System's role in United States history.</p>	<p><u>K-3</u> 1. Realize early Americans were agriculturists. 2. Identify prominent early Americans involved in Food and Fiber Systems. 2. Identify the origins of food, clothing, and shelter of Native Americans and early settlers. <u>4-6</u> 1. Illustrate how people seeking to meet their basic resource needs of food, clothing, and shelter moved from region to region. 2. Describe how immigration, migration, and agriculture are interdependent in United States history.</p>	<p>CR 3 LA 1,2,3 SS 1,4,11,12,13</p>	<p>0131</p>
<p>II-D Understand the relationship between Food and Fiber Systems and world cultures.</p>	<p><u>K-3</u> 1. Discover that foods they consume, and clothes they wear originate from different countries. 2. Compare food and clothing among cultures. <u>4-6</u> 1. Identify geographic origins of plants and animals. 2. Explain how geography influences the production of plant and animals. 3. Locate current world production areas of Food and Fiber Systems products.</p>	<p>LA 1,2,3 SC 1,3 SS 1,11,12,13</p>	<p>0131</p>
<p>II-E Understand how different viewpoints impact Food and Fiber Systems.</p>	<p><u>K-3</u> 1. Realize people live in cities, towns, and rural areas. 2. Determine whether they live in a city, suburb, town, or rural area. <u>4-6</u> 1. Identify Food and Fiber Systems issues in the community or state. 2. Compare and contrast different viewpoints of each issue.</p>	<p>LA 1,2,3 SS 1,4,10,11,12,13</p>	<p>0131</p>

STANDARD III: Science, Technology, and Environment

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	COURSES ADDRESSING STANDARD AND BENCHMARK
<p>III-A Understand how ecosystems are related to Food and Fiber Systems.</p>	<p><u>K-3</u> 1. Identify the natural life cycles of plants and animals. 2. Describe components of an ecosystem. 3. Illustrates specific components of and ecosystems in the community. <u>4-6</u> 1. Discover how ecosystems regenerate. 2. Identify how Food and Fiber Systems affect ecosystems. 3. Evaluate the positive and negative impacts of agriculture on ecosystems. 4. Analyze the interaction of Food and Fiber Systems with natural cycles. 5. Discover similarities of ecosystems in the world. 6. Categorize ecosystems by common characteristics (e.g. topography, climate, soil type).</p>	<p>LA 1,2 SC 2,3,4,9,10,11,12, 16 SS 12</p>	<p>0131</p>

STANDARD III: Science, Technology, and Environment

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	COURSES ADDRESSING STANDARD AND BENCHMARK
<p>III-B Understand Food and Fiber Systems' dependence on natural resources.</p>	<p><u>K-3</u> 1. Identify natural resources. 2. Illustrate natural resources used by Food and Fiber Systems. 3. Describe renewable and non-renewable natural resources used in the production of food, clothing, and shelter. <u>4-6</u> 1. Examine how living organisms transform natural resources into consumer's products. 2. Analyze food, clothing, and shelter to determine the natural resources used. 3. Explain why all countries' agricultural systems depend on natural resources. 4. Evaluate why Food and Fiber Systems compete for natural resources.</p>	<p>LA 1,2 SC 1,2,3,4,11,15,16 SS 12</p>	<p>0131</p>

STANDARD III: Science, Technology, and Environment

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	COURSES ADDRESSING STANDARD AND BENCHMARK
III-C Understand science and technology's role in Food and Fiber Systems.	<p><u>K-3</u></p> <ol style="list-style-type: none"> 1. Identify tools and machines used in Food and Fiber Systems. 2. Give examples of tools and machines used to produce food and fiber products. 3. Recognize inventors and inventions related to Food and Fiber Systems. 4. Describe the agricultural importance of the inventions. <p><u>4-6</u></p> <ol style="list-style-type: none"> 1. Explain how technological advancements enhance Food and Fiber Systems efficiency. 2. List technologies that reduce manual labor needs in agriculture. 3. Recognize how science and technology impact Food and Fiber Systems. 4. Analyze the effects of science and technology on food, clothing, and shelter. 	CR 3 LA 1,2 SC 4,6,11,14,15,16 SS 13	0131

STANDARD IV: Business and Economics

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	COURSES ADDRESSING STANDARD AND BENCHMARK
IV-A Understand Food and Fiber Systems and economics are related.	<p><u>K-3</u></p> <ol style="list-style-type: none"> 1. Recognize agricultural products have monetary value. 2. Explain how food and clothing are worth money. 3. Describe how a shortage or surplus of a product provides an opportunity for trade. 4. Predict what happens when shortages or surpluses occur. <p><u>4-6</u></p> <ol style="list-style-type: none"> 1. Define agribusiness. 2. Give examples of agribusinesses in the community. 3. Identify events affecting food and fiber trade. 4. Analyze the economic impact of these events on Food and Fiber Systems. 	CR 2 LA 1,2 MA 1,2 SS 13	0131
IV-B Understand Food and Fiber Systems have an impact on local, state, national, and international economies.	<p><u>K-3</u></p> <ol style="list-style-type: none"> 1. Identify people in the community who rely on Food and Fiber Systems to make a living. 2. Make the connection between Food and Fiber Systems and local businesses. 3. Recognize people responsible for delivering agricultural products to consumers. 4. Compare jobs performed from production to consumption. <p><u>4-6</u></p> <ol style="list-style-type: none"> 1. Identify how value is added to raw agricultural products after production. 2. Compare the value of raw and processed products. 3. Identify industries whose inputs are from Food and Fiber Systems. 4. Evaluate industries to determine the agricultural inputs. 	LA 1,2 MA 1 SC 9,10 SS 13	0131

STANDARD IV: Business and Economics

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	COURSES ADDRESSING STANDARD AND BENCHMARK
IV-C Understand government's role in Food and Fiber Systems.	<u>K-3</u> 1. Recognize that the government regulates food and fiber. 2. Classify government functions, including safety, inspection and grading. <u>4-6</u> 1. Explain the need for government regulation in agriculture. 2. Give examples of regulations and laws impacting food and fiber systems.	LA 1,2 SC 16 SS 3,10	0131
IV-D Understand factors influencing international trade of food and fiber products.	<u>K-3</u> 1. Recognize food and clothing comes from other countries. 2. Give examples of food and fiber products from other countries. 3. Define import and export. 4. Identify United States food and fiber products exported to other countries. <u>4-6</u> 1. Explain why nations trade products and services. 2. Make a list of agricultural services that the United States trades with other nations. 3. Explain "free trade" and "balance of trade". 4. Compare United States food and fiber trade policies to other nations' policies. 5. Identify factors influencing international Food and Fiber Systems trade. 6. Explain how these factors impact food and fiber products and services.	CR 2 LA 1,2 MA 1 SS 1,13	0131

STANDARD V: Food, Nutrition, and Health

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	COURSES ADDRESSING STANDARD AND BENCHMARK
V-A Understand Food and Fiber Systems provide nourishment for people and animals.	<u>K-3</u> 1. Explain how people and animals obtain sustenance from food and fiber products. 2. Illustrate products people and animals eat. 3. Distinguish between processed and unprocessed food products people and animals eat. 4. Compare how common food products eaten by humans and animals are processed differently. <u>4-6</u> 1. Identify ways of processing food products for people and animals. 2. Explain reasons for processing food products. 3. Compare food and feed ingredient labels. 4. Recognize that food and feed products contain additives. 5. Categorize additives from ingredient labels.	LA 1,2 SC 9,15 SS 13	0131
			0131

<p>V-B Understand Food and Fiber Systems provide healthy diet components.</p>	<p><u>K-3</u> 1. Identify the parts of the Food Guide Pyramid. 2. Illustrate a well-balanced meal. 3. Match food groups with their recommended daily servings. 4. Plan healthy meals for one day.</p> <p><u>4-6</u> 1. Identify the six basic food nutrients: carbohydrates, protein, water, vitamins, minerals, and fats. 2. Categorize foods based on nutritional content. 3. Interpret food nutritional labels. 4. Compare personal food intake to the United State Department of Agriculture's Food Guide Pyramid.</p>	<p>LA 1,2 MA 1 SC 9,16</p>	
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STANDARD V: Food, Nutrition, and Health

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	COURSES ADDRESSING STANDARD AND BENCHMARK
<p>V-C Understand Food and Fiber Systems provide food choices.</p>	<p><u>K-3</u> 1. Recognize how individual preferences affect food selection. 2. Show where food preferences fit into the Food Guide Pyramid. 3. Identify food advertisements. 4. Explain the relationship between food choice and advertising.</p> <p><u>4-6</u> 1. Explain how factors, such as culture and convenience, affect food a choice. 2. Analyze how food preferences have changed over time. 3. Explain how food choices are influenced by economics. 4. Compare food choices based on cost. 5. Describe how research and development influences food choices. 6. Research new food choices.</p>	<p>LA 1,2 MA 1 SS 1,10</p>	<p>0131</p>
<p>V-D Understand Food and Fiber Systems promote a safe food supply.</p>	<p><u>K-3</u> 1. Recognize the role Food and Fiber Systems producers, processors, and transportation play in providing a safe food supply. 2. Describe safe food production practices (e.g. animal care, sanitation, irrigation and clean water).</p> <p><u>4-6</u> 1. Recognize the agriculturists' role in affecting a safe food supply. 2. Evaluate how food safety issues impact Food and Fiber Systems.</p>	<p>CR 4 LA 1,2 SS 10,13</p>	<p>0131</p>

AFNR Career Cluster Strands

- Academic Foundations
- Communications
- Problem Solving & Critical Thinking
- Information Technology Applications
- Systems
- Safety, Health, & Environmental
- Leadership & Teamwork
- Ethics & Legal Responsibilities
- Employability & Career Development
- Technical Skills

CLUSTER STANDARDS AND BENCHMARKS - The Agriculture, Food, and Natural Resource cluster standards and benchmarks identify knowledge and skills learners need to form a strong basis for success in high school, college, technical training, apprenticeship programs and the workplace. The AFNR cluster standards and benchmarks are embedded throughout the curriculum whether the course is a beginning level or senior level course.

STRAND: ACADEMIC FOUNDATIONS

STANDARD I: Achieve specific academic knowledge and skills required to pursue the full range of career and post-secondary education opportunities within AFNR.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING STANDARD AND BENCHMARK
I-A Pass certification tests to meet state academic standards and qualify for selected fields of study.	<ol style="list-style-type: none"> 1. Achieve an acceptable score on State tests. 2. Explain what types of skills or knowledge are necessary to work in a specific field of study. 3. Know what type of degree or certification is required to enter a desired job/career. 	CR 1-A,B,C,D,E CR 2-A,B; CR 3-A,B,C,D CR 4-A,B,C, CR 5-A,B,C,D SS 6-G; SS 10-H	Career Show Degree Program Proficiency Awards Agri-entrepreneurship 30 Career Development Events SAE Record Books	0144, 0145, 0152, 0153, 0154, 0163, 0172, 0173, 0174,
I-B Be proficient in using a variety of resources for both research and development.	<ol style="list-style-type: none"> 1. Conduct informational searches for types of resources that are appropriate for locating scholarly and academic information. 2. Analyze materials to determine their value for research and development areas. 	CR 1-A,B,C,D CR 2-A,B,C CR 3-A,B,C,D CR 4-E LA 1-A,B,C,D	Public Speaking Ag Issues Forum POA/National Chapter Agri-Marketing Plan Agri-science Fair	All Agriculture Education classes.

STRAND: COMMUNICATIONS

STANDARD II: Use oral and written communication skills in creating, expressing and interpreting information and ideas including technical terminology and information within AFNR.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING STANDARD AND BENCHMARK
II-A Develop good reading skills to enable reading of technical materials with understanding and fluency.	<ol style="list-style-type: none"> 1. Comprehend a broad range of reading materials containing technical concepts, knowledge and vocabulary to better understand written and electronic information. 2. Locate organize and reference written information from various sources (books, journals, magazines, internet) to answer questions, solve problems, and develop written and oral communication. 	CR 1-E CR 3-A,C,D LA 1-A,B,C,D LA 2-B.C	30 Career Development Events SAE Record Books 48 Proficiency Award Areas Degree Program Commodity Marketing Partners for a Safer Community Risk Management Essay Food For America	All Agriculture Education classes.
II-B Compose written material to present technical information.	<ol style="list-style-type: none"> 1. Compose multi-paragraph writing containing technical concepts, knowledge and vocabulary to complete an effective document. 2. Develop and incorporate tables, charts, graphs, and figures to support written and oral communications. 3. Use information technology to design, produce, and present written and multimedia materials. 	CR 2,3 LA 1-C,D LA 2-A,C	SAE Record Books 48 Proficiency Award Areas Marketing Plan CDE Agricultural Issues CDE POA/National Chapter Award Agri-entrepreneurship Agri-science Fair State Fair Educational Booths ACE Reporter Scrapbook Award Chapter Meetings	All Agriculture Education classes.
II-C Listen effectively to learn in both formal and informal situations.	<ol style="list-style-type: none"> 1. Appreciate personality preferences to achieve full meaning in processing and sharing information 2. Recognize the meanings of posturing to interpret nonverbal communications and messages. 3. Apply active listening skills to obtain information and clarify oral communications. 	CR 2,3,4 LA I-A.B	Made for Excellence Conference COLT 30 Career Development Events EDGE Conference ALD Conference Leadership Camp Washington Leadership Conf. State and National Conventions	All Agriculture Education classes.
II-D Develop speaking skills to present information orally in formal and informal situations.	<ol style="list-style-type: none"> 1. Access a broad range of technical concepts, knowledge and vocabulary to develop and deliver formal presentations and to use in informal discussions. 2. Apply human relations' skills to contribute effectively to group discussions and meetings. 	CR 1,2,3,4,5 LA 1-B,C,D LA 2-A C	Parliamentary Procedure CDE Public Speaking Chapter Meetings Food For America EDGE, MFE, ALD Career Development Events	All Agriculture Education classes.

STRAND: COMMUNICATIONS

STANDARD II: Use oral and written communication skills in creating, expressing and interpreting information and ideas including technical terminology and information within AFNR.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING STANDARD AND BENCHMARK
II-E Write clearly to communicate written ideas, results and questions to all types of people.	<ol style="list-style-type: none"> 1. Write with effective language to produce written communications for journals, newsletters, or other informative articles. 2. Explain aspects of the industry to people not involved in it, and discuss its components. 	CR 1,2,3,4,5 LA 1-C,D LA 2-A,B,C	AG Issues CDE Marketing Plan CDE POA/National Chapter Food For America Partners for a Safer Community	0132, 0133, 0134, 0135, 0137, 0142, 0145, 0151, 0161, 0162, 0171, 0172, 0130, 0183,
II-F Know how to orally communicate clearly and effectively to have dialogue with members of an example career field.	<ol style="list-style-type: none"> 1. Monitor different kinds of behavior in order to improve communication. 2. Prepare presentations to explain to both large groups and individuals issues of concern to the industry. 3. Discuss aspects of the industry competently to an audience of both professionals and people not involved in the industry. 	CR 1,2,3,4,5 LA 1-C,D LA 2-A,B,C SS 3-A	AG Issues CDE Marketing Plan CDE Public Speaking CDE Food for America AG Exposition AG Festival EDGE, MFE, ALD	All Agriculture Education classes.

STANDARD III: Employ technical communications effectively to maintain good records and reporting procedures.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING STANDARD AND BENCHMARK
III-A Use technical communications to document work and process information.	<ol style="list-style-type: none"> 1. Record technical information. 2. Compose technical reports. 3. Communicate documentation to others. 4. Maintain Record Books for SAE program. 	CR 1,2,3,4,5 LA 1-C,D LA 2-A,B MA 1-A.B SS 10-I	SAE Record Books 48 Proficiency Award Areas Degree Program POA/National Chapter Membership records Agri-science Fair Career Development Events	0143, 0144, 0151, 0152, 0154, 0171, 0172, 0173, 0174, 0130, 0184, 0192

STRAND: PROBLEM SOLVING AND CRITICAL THINKING

STANDARD IV: Solve problems using critical thinking skills (e.g., analyze, synthesize and evaluate) independently and in teams.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING STANDARD AND BENCHMARK
IV-A Formulate ideas, proposals, and solutions to handle problems.	<ol style="list-style-type: none"> 1. Formulate ideas and proposals to solve problems. 2. Analyze and evaluate ideas, proposals, and solutions to manage a variety of problems. 	CR 1,2,3,4,5 LA 1-A,B,C,D SS 10-I	SAE Risk Management Essay POA/National Chapter Career Development Events Agri-science Fair	0137, 0143, 0145, 0151, 0152, 0153, 0154, 0171, 0172, 0174, 0130, 0192, 0199
IV-B Analyze information critically to ascertain its value to whatever discipline it is applied.	<ol style="list-style-type: none"> 1. Explain how to analyze, synthesize, and evaluate information and apply its implications to a variety of avenues. 2. Assess problem solutions to determine their appropriateness and efficiency. 	CR 1,2,3,4,5 LA 1-A,B,C,D LA 2-C SS 2-C	Career Development Events Agri-science Fair Parliamentary Procedure SAE Partners for a Safer Community National Chapter Award	0135, 0136, 0142, 0143, 0151, 0152, 0153, 0154, 0161, 0162, 0163, 0171, 0172, 0174,

STANDARD V: Access suitable resources to identify public policies, issues, and regulations impacting AFNR management.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING STANDARD AND BENCHMARK
V-A Review regulations and major laws to evaluate their impact on AFNR management.	<ol style="list-style-type: none"> 1. Describe the major impacts of the AFNR acts. 2. Describe the major regulations impacting the management of an individual resource. 3. Identify situations that violate regulations. 	CR 1 LA 1-A,B,C,D; LA 2-B,C SS 2-B,C; SS 2-B,C SS 10-A,B,C,D,F SS 12-G; SS 14-C	Career Development Events Livestock Shows SAE Global Programs	0136, 0141, 0142, 0143, 0145, 0161, 0162, 0163, 0172, 0173, 0174, 0129, 0130, 0183,
V-B Read appropriate written material to stay abreast of current issues impacting AFNR.	<ol style="list-style-type: none"> 1. Identify significant issues that impact AFNR. 	CR 1 LA 1-A,B,C,D SS 2-C; SS 3-B,C SS 10-A,B,C,..D,F	Agricultural Issues CDE Global Programs Washington Leadership Conf.	All Agriculture Education classes.

V-C Use critical thinking skills to identify, organize alternatives, and evaluate public policy issues related to AFNR.	<ol style="list-style-type: none"> 1. Identify alternatives to an issue's potential solution. 2. Evaluate alternatives for strengths and weaknesses. 3. Recommend a solution based on research and analysis. 	CR 1 LA 1-A,B,C,D; LA2-C SS 5-B; SS 10-A,B,C,D,F SS 14-C	Agricultural Issues CDE Career Development Events WLC Global Programs Agri-science Fair	All Agriculture Education classes.
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STRAND: INFORMATION TECHNOLOGY APPLICATIONS

STANDARD VI: Use information technology tools specific to AFNR to access, manage, integrate and create information.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
VI-A Use Personal Information Management.	<ol style="list-style-type: none"> 1. Manage personal schedule and contact information. 	CR 2,4,5	SAE Record Keeping Degree Program EDGE, MFE, ALD COLT Proficiency Awards	All Agriculture Education classes.
VI-B Use Internet application.	<ol style="list-style-type: none"> 1. Search for and access information. 	CR 3 LA 1-A,B	SAE Record Keeping Local Program Resource	All Agriculture Education classes.
VI-C Use writing and publishing application.	<ol style="list-style-type: none"> 1. Prepare simple reports and other business communications. 2. Prepare complex reports and other business communications, integrating graphics and other non-text elements. 	CR 2,3 LA 1-B,C,D LA 2-A,B	Agricultural Issues CDE Marketing Plan CDE POA/National Chapter Food for America Agri-science Fair	0137, 0141, 0142, 0143, 0145, 0171 0172, 0173, 0174, 0191, 0192, 0199
VI-D Use presentation applications.	<ol style="list-style-type: none"> 1. Prepare and deliver presentations for training, sales, and information sharing. 	CR 2,3 LA 1-D LA 2-A,B,C	Agricultural Issues CDE Marketing Plan CDE POA/National Chapter	All Agriculture Education classes.
VI-E Use spreadsheet applications.	<ol style="list-style-type: none"> 1. Perform calculations and analysis on data. 	CR 2,3 LA 1-A,D MA 2-B,C,D	SAE Record Books Proficiency Awards	0143, 0144, 0171, 0172, 0173, 0174, 0191, 0199
VI-F Use database applications.	<ol style="list-style-type: none"> 1. Manage, analyze and report on interrelated data elements. 	CR 2,3 LA 1-A,C,D MA 2-B,C,D	SAE Record Books POA/National Chapter	All Agriculture Education classes.
VI-G Use Geographic Information System/Global Positioning System (GIS/GPS) applications.	<ol style="list-style-type: none"> 1. Create maps. 2. Locate people or things. 3. Identify best route for traveling. 	CR 2,3 LA 1-D SC 14-D SS 12-B,F	Forestry CDE	0129, 0130
VI-H	<ol style="list-style-type: none"> 1. Operate computer-driven equipment and 	CR2,3	Agricultural Mechanics CDE	0151, 0154, 0172, 0173, 0174

Use computer-based equipment containing embedded computer [or processors] used to control electromechanical devices.	<p>machines.</p> <ol style="list-style-type: none"> 2. Use installation and operation manuals. 3. Troubleshoot computer-driven equipment and machines and access support as needed. 	LA 1-D SC 14-D	SAE Record Books	
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STRAND: SYSTEMS

STANDARD VII: Understand roles within teams, work units, departments, organizations, inter-organizational systems and the larger environment.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
VII-A Examine company performance and goals to appreciate AFNR organizations and the AFNR industry.	<ol style="list-style-type: none"> 1. Examine the role and major function of AFNR organizations to better utilize AFNR guidelines. 2. Examine economic, social, and technological changes to spotlight their impact on AFNR organizations and the industry. 3. Explain technological changes to reveal their impact on information technology and transportation. 	CR 1,2,3 LA 1-A,B,C,D LA 2-A,B SC 12-A,B,C; SC 16-A SS 2-B; SS 10-A,D,F SS 12-G SS 13-A,B SS 14-C,D	Program of Activities (POA) National/Superior Chapter Commodity Marketing Career Development Events Proficiency Award Areas Agri-science Fair and Recognition SAE/ School Based Enterprise	0171, 0172, 0192

STANDARD VIII: Identify how key organizational systems affect organizational performance and the quality of products and services.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
<p>VIII-A Manage and improve organizational systems to better serve customers.</p>	<ol style="list-style-type: none"> 1. Evaluate customer needs to manage relationships with both internal and external customers. 2. Develop and manage plans and budgets to accomplish organizational goals and objectives. 3. Develop plans to improve organizational performance including customer satisfaction and service operations performance. 4. Develop plans to maintain compliance with organizational policies and government laws and regulations. 	<p>CR 1,2,3 LA 1-B,C,D LA2-C MA 1-A,B,C,D,E,F MA 2-B,C,D,E SC 15-C; SC 16-A,B SS 5-B; SS 6-G; SS 10-A SS 12-H</p>	<p>POA/National Chapter Career Development Events Degree Program SAE School Based Enterprise</p>	<p>0143, 0144, 0145, 0151, 0152, 0153, 0154, 0171, 0172, 0173, 0174, 0184, 0183, 0191</p>
<p>VIII-B Research geographical data to recognize the types of systems used in various geographical areas.</p>	<ol style="list-style-type: none"> 1. Evaluate the effects of implementing practices to advance a system. 2. Explore multi-area trends to explain how systems differ across geographical areas. 	<p>CR 1,2,3 LA 1-B,C,D; LA 3-A SC 14-B SC 15-C; SC 16-A,B SS 2-B; SS 12-E</p>	<p>Global Programs SAE Food for America Commodity Marketing</p>	<p>0171, 0172, 0192</p>

STRAND: SAFETY, HEALTH, AND ENVIRONMENTAL

STANDARD IX: Understand the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
IX-A Examine required regulations to maintain/improve safety, health, and environmental management.	<ol style="list-style-type: none"> 1. Study appropriate resources to identify the major regulatory areas and governmental laws and regulations. 2. Examine the major system components to realize benefits of health, safety, and environmental management systems in AFNR organizations. 3. Measure or estimate benefits to explain how government agencies promote compliance and improve health, safety, and environmental performance in AFNR organizations. 4. Examine logistics, distribution and transportation to explain how AFNR organizations promote improved health, safety, and environmental performance. 	CR 1,2,3 LA 1-B,C SC 14-B SC 15-B,C SC 16-A,B SS 2-B,C SS 3-A,B SS 5-B SS 10-A,B,C SS 12-H,G SS 14-C	Degree Program Proficiency Awards Career Development Events Agri-science Fair POA/National Chapter Partners for a Safer Community State Fair	0143, 0145, 0161, 0162, 0163, 0171 0172, 0173, 0174, 0129

STANDARD X: Identify health goals and safety procedures for AFNR occupations.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
X-A Apply safety/health precautions to participation in AFNR projects.	<ol style="list-style-type: none"> 1. Wear personal protective clothing. 2. Demonstrate how to avoid placing oneself in hazardous work situations. 3. Identify various emergency response plans for a facility. 	CR 1,2,3 LAI-B SC 16-A,B	Career Development Events SAE Projects National Chapter Partner for a Safer Community	0141, 0143, 0145, 0151, 0152, 0153, 0154, 0161, 0162, 0163, 0173, 0174 0129, 0130
X-B Identify hazards and acquire first aid skills to promote safety.	<ol style="list-style-type: none"> 1. Identify general workplace safety hazards. 2. Apply general workplace safety precautions/procedures. 3. Handle chemicals and safety equipment appropriately. 4. Observe all regulatory and safety standards. 	CR 1,2,3 SC 16-A.B	SAE Projects Career Development Events Partners for a Safer Community National Chapter	0142, 0143, 0145, 0151, 0152, 0153, 0154, 0161, 0162, 0163, 0173, 0174 0130

STRAND: LEADERSHIP AND TEAMWORK

STANDARD XI: Use leadership skills in collaborating with others to accomplish organizational goals and objectives.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
<p>XI-A Communicate, focus on results, make decisions, solve problems, invest in individuals and resources to develop premier leadership.</p>	<ol style="list-style-type: none"> 1. Work independently and in group settings to get things done. 2. Focus on results. 3. Plan effectively. 4. Identify and use resources. 5. Communicate effectively with others. 6. Learn from mistakes and deal with setbacks. 7. Evaluate and reflect on action taken. 	<p>CR 4,5 LA 1-B LA 2-A LA 3-A</p>	<p>Career Development Events EDGE, MFE, ALD POA/National Chapter SAE Projects Proficiency Awards Food for America PALS Leadership Camp COLT State and National Convention</p>	<p>All Agriculture Education classes.</p>
<p>XI-B Embrace compassion, service, listening, coaching, developing others and teams, and understanding and appreciating others to develop premier leadership.</p>	<ol style="list-style-type: none"> 1. Practice the human relations skills of compassion, empathy, unselfishness, trustworthiness, reliability and listening. 2. Interact and work with others. 3. Participate effectively as a team member. 4. Understand, accept, and appreciate others for their contributions. 	<p>CR 4,5 LA 3-A SS 6-C SS 8-A SS 11-D</p>	<p>Code of Ethics Career Development Events EDGE, MFE, ALD POA/National Chapter Food for America PALS Leadership Camp</p>	<p>All Agriculture Education classes.</p>
<p>XI-C Embrace integrity, courage, values, ethics, humility, perseverance, self-discipline, and responsibility to develop premier leadership.</p>	<ol style="list-style-type: none"> 1. Live with integrity. 2. Practice self-discipline. 3. Respect others. 4. Accept diversity of ideas and opinions. 5. Accept responsibility for personal actions. 6. Value service to others. 	<p>CR 4,5 LA 3-A SS 6-C SS 8-A</p>	<p>Code of Ethics Career Development Events EDGE, MFE, ALD Food for America PALS Leadership Camp SAE State Fair</p>	<p>All Agriculture Education classes.</p>

<p>XI-D Include self, community, diversity, environment, global awareness and knowledge to develop premier leadership.</p>	<ol style="list-style-type: none"> 1. Participate in issues important to the community. 2. Perform leadership tasks associated with citizenship. 3. Study local, state, national, and global issues. 4. Apply knowledge gained from study of trends and issues. 5. Participate in activities that promote acceptance of diversity. 	<p>CR 4,5 LA 3-A,B SC 16-A,B SS 2-B,C SS 3-C SS 6-C,G SS 9-A SS 13-A,B SS 14-C,D</p>	<p>Partners for Active Learning Code of Ethics Career Development Events EDGE, MFE, ALD Food for America Leadership Camp Global Programs POA/National Chapter</p>	<p>All Agriculture Education classes.</p>
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STRAND: LEADERSHIP AND TEAMWORK

STANDARD XI: Use leadership skills in collaborating with others to accomplish organizational goals and objectives.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
<p>XI-E Embrace attitude, exercise, goal-setting, planning, self-discipline, sense of balance, persistence and respect to develop personal growth.</p>	<ol style="list-style-type: none"> 1. Practice healthy eating habits. 2. Respect one's own body. 3. Discipline self to lead an active, healthy life. 	<p>CR 4,5 LA 3-A SS 6-C</p>	<p>PALS EDGE, MFE,ALD COLT Code of Ethics Leadership Camp</p>	<p>All Agriculture Education classes.</p>
<p>XI-F Embrace friendship, integrity, morals, values, etiquette, citizenship, and respect for differences to develop personal growth.</p>	<ol style="list-style-type: none"> 1. Accept those different from self. 2. Use proper social graces. 3. Relate to people across generations. 4. Develop friendships. 5. See self in a positive way. 	<p>CR 4,5 LA 3-A SS 6-C SS 8-A</p>	<p>PALS EDGE, MFE, ALD COLT Code of Ethics CDE competition Leadership competition</p>	<p>All Agriculture Education classes.</p>
<p>XI-G Embrace goal-setting, planning, respect, dependability, loyalty, trustworthiness to develop personal growth.</p>	<ol style="list-style-type: none"> 1. Plan and implement professional goals and set priorities. 2. Demonstrate professional ethics. 3. Demonstrate exemplary employability skills. 	<p>CR 4,5 LA 2-A,B,C LA 3-A SS 6-C</p>	<p>Leadership camp Leadership conference CDE competition</p>	<p>All Agriculture Education classes.</p>

STRAND: ETHICS AND LEGAL RESPONSIBILITIES

STANDARD XII: Know and understand the importance of professional ethics and legal responsibilities.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
XII-A Apply knowledge of professional and workplace ethics and legal responsibilities to organize guidelines for workplace conduct.	<ol style="list-style-type: none"> Demonstrate awareness of legal responsibilities for different roles and functions within organizations. Research local, state, and national sources to identify the legal bodies that regulate the desired career. Discuss ethical responsibilities in the workplace. 	CR 1,2 LA 1-B,C,D LA 3-A SC 16-A,B SS 6-C SS 10-H	Career Development Events SAE Projects Proficiency Awards EDGE, MFE, ALD Degree Program State Fair	0136, 0137, 0141, 0142, 0143, 0144, 0145, 0151, 0152, 0153, 0154, 0161, 0162, 0163, 0171, 0172, 0173, 0174, 0191, 0192
XII-B Evidence interest and concern to demonstrate natural resource stewardship and ethics.	<ol style="list-style-type: none"> Explain how personal choices are related to natural resource sustainability. 	CR 1,2 LA 3-A SC 16-A,B SS 2-B SS 11-C SS12-E	Career Development Events SAE Projects EDGE, MFE, ALD Degree Program Proficiency Awards	0131, 0132, 0133, 0164, 0136, 0129, 0130

STRAND: EMPLOYABILITY AND CAREER DEVELOPMENT

STANDARD XIII: Know and understand the importance of employability skills.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
XIII-A Know the standards and qualifications that must be met in order to enter a given industry.	<ol style="list-style-type: none"> Discuss employability in a given industry and factors that effect it in order to evaluate salaries and opportunities. Organize an educational plan to acquire the skills needed in order to join and industry of choice. Identity and demonstrate positive work behaviors and personal qualities required to uphold quality standards. 	CR 1,2,4,5 LA 1-B,C,D LA 2-B LA 3-A SS 10-H	Career Development Events SAE Projects EDGE, MFE, ALD Degree Program	0137, 0143, 0145, 0151, 0171, 0172, 0191, 0192, 0199
XIII-B Identify career opportunities to help develop career plans.	<ol style="list-style-type: none"> Identify and explore career opportunities in one or more career pathways to discover personal preferences. Develop career plans. Discuss employability in a given industry and factors that affect it in order to evaluate salaries and opportunities. 	CR 1,2,4,5 LA 1-B,C LA 2-B,C SS 10-H	Career Development Events SAE Projects EDGE, MFE, ALD Degree Program National Career Show	0136, 0137, 0143, 0144, 0145, 0151, 0152, 0153, 0154, 0161, 0162, 0163, 0173, 0174, 0129, 0130, 0183, 0184,
XIII-C	<ol style="list-style-type: none"> Seek, apply for, and accept employment to begin 	CR 1,2,4,5	Proficiency	

Manage employment relations to hunt for a job, land a job, and advance within the company.	<p>career objective.</p> <ol style="list-style-type: none"> Evaluate and compare employment opportunities to find the best job available based on sensible expectations. Explain what projects need to be accomplished or what skills need to be acquired to gain a promotion. 	<p>LA 1-B,C,D LA 2-B,C SS 10-H</p>	<p>Job Interview Career Development Events SAE Projects EDGE, MFE, ALD Degree Program National Career Show</p>	<p>0136, 0137, 0143, 0144, 0145, 0151 0152, 0153, 0154, 0161, 0162, 0163 0173, 0174, 0129, 0130, 0183, 0184</p>
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STRAND: TECHNICAL SKILLS

STANDARD XIV: Use the technical knowledge and skills required to pursue the full range of careers for all AFNR pathways.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
XIV-A Identify technical skills needed to run an industry efficiently and accomplish goals in transportation.	<ol style="list-style-type: none"> Correctly operate tools associated with a specific skill. Evaluate transportation needs to explain the role and function of critical transportation systems. 	<p>CR 1,2 LA 1-B,C,D</p>	<p>Career Development Events SAE Projects EDGE, MFE, ALD Degree Program Proficiency Awards</p>	<p>0143, 0145, 0151, 0152, 0153, 0154, 0161, 0162, 0163, 0171, 0172, 0173, 0174, 0130, 0783, 0184</p>
XIV-B Use tools, equipment, machinery and technology to work in areas related to AFNR	<ol style="list-style-type: none"> Select the appropriate tool to perform a given task. Identify standard tools, equipment, and safety procedures. Follow operating instructions. Set up/adjust tools and equipment. Maintain tools. Store tools with appropriate safety precautions. 	<p>CR 1,2 LA 1-B,C,D</p>	<p>Career Development Events SAE Projects Degree Program Proficiency Awards Agri-science Fair</p>	<p>0143, 0144, 0145, 0151, 0152, 0153, 0154, 0161, 0162, 0163, 0173, 0174, 0130, 0183, 0184,</p>
XIV-C Wear protective equipment and handle tools the equipment properly.	<ol style="list-style-type: none"> Wear appropriate personal protective equipment. Demonstrate proper spacing distance others when using tools. Demonstrate the proper usage of tools and equipment. Describe regulations for the use of tools and equipment. 	<p>CR 1,2 LA 1-B,C</p>	<p>Career Development Events SAE Projects Degree Program Proficiency Awards Agri-science Fair</p>	<p>0143, 0144, 0145, 0151, 0152, 0153, 0154, 0161, 0162, 0163, 0173, 0174, 0130, 0183, 0184</p>

<p>XIV-D Observe safety and operational guidelines to use equipment effectively.</p>	<ol style="list-style-type: none"> 1. Operate applicable vehicles (pickup trucks, four-wheel-drive vehicles, tractors, vehicles with attachments, graders, backhoe tractors, front-end loaders excavators, etc.) 2. Operate applicable pumps (diesel and gas engines, centrifugal pumps, air and gas compressors.) 3. Operate applicable miscellaneous equipment (hoists, winches, pulleys, drilling equipment, etc.) 4. Operate applicable electronic equipment (survey equipment, generators, soil analysis, tensiometers, etc.) 	<p>CR 1,2 LA 1-D SC 14-D</p>	<p>Career Development Events SAE Projects Degree Program Proficiency Awards Agri-science Fair</p>	<p>0143, 0145, 0152, 0154, 0161, 0173, 0174</p>
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AFNR Career Pathways

- Plant Systems
- Power, Structural & Technical Systems
- Animal Systems
- Agribusiness Systems
- Food Products and Processing Systems
- Natural Resources & Environmental Services Systems

PATHWAY: PLANT SYSTEMS

STANDARD I: Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and natural environment.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
I-A Analyze and evaluate nutritional requirements and environmental conditions to develop and implement a fertilization plan.	<ol style="list-style-type: none"> 1. Describe nutrient sources. 2. Determine plant nutrient requirements for optimum growth. 3. Identify function of plant nutrients in plants. 4. Determine the environmental factors that influence and optimize plant growth. 5. Apply nutrients to plants for economic growth. 6. Describe nutrient application methods and appropriate practices. 	CR 1-E CR 3-A,C,D CR 4-C LA 1-A,B,C,D LA 2-B MA 1-A,B,C,D MA 4-A,C SC 1-A,B; SC 4-D SC 5-B,C; SC 11-B	Horticultural Produce CDE Floriculture CDE Nursery/Landscape CDE Land Evaluation CDE Forestry CDE Turf Grass Mgt. Proficiency Fruit &/or Vegetable Proficiency Nursery Operations Proficiency Grain Production Proficiency Floriculture Proficiency	0132, 0133, 0134, 0136, 0141, 0143 0145, 0129, 0130, 0184
I-B Test appropriate materials or examine data to evaluate and manage soil/media nutrients.	<ol style="list-style-type: none"> 1. Collect and test soil/media and/or plant tissue. 2. Interpret tests of soil/media and/or plant tissue. 3. Identify soil slope, structure and type. 4. Evaluate soil/media permeability and water-holding capacity. 5. Determine the chemical properties of soil/media. 6. Determine land use capability. 7. Determine the biological functions of microorganisms of soil/media. 	CR 1-E CR 4-C LA 1-A,B,C,D MA 1-A,B,C,D MA 4-A,B,C SC 1-A,B; SC 4-D SC 5-B,C; SC 9-C SC 11-B,E,F; SC 12-A,D	Land Evaluation CDE Homesite Evaluation CDE Soil & Water Proficiency Turf Grass Mgt. Proficiency Landscape Mgt. Proficiency Natural Resources Mgt. Diversified Horticulture	0132, 0133, 0134, 0136, 0141, 0143 0145, 0129, 0130, 0184
I-C Explain and use basic methods for reproducing and propagating plants.	<ol style="list-style-type: none"> 1. Determine the role of genetics in plants. 2. Describe the components and functions of plant reproductive parts. 3. Identify and practice methods of asexual/sexual propagation. 4. Describe the principles of plant micro-propagation. 5. Apply principles and practices of biotechnology to plant propagation. 	CR 1-E CR 3-A,C,D CR 4-C LA 1-A,B,C,D SC 1-A,B SC 3-A SC 4-D SC 11-B,C,D,E,F	Horticultural Produce CDE Floriculture CDE Nursery/Landscape CDE Turf Grass Mgt. Proficiency Nursery Operations Proficiency Emerging Agriculture Technology	0132, 0133, 0134, 0136, 0141, 0143 0145, 0129, 0130, 0184

STANDARD I: Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and natural environment.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
I-D Develop and use a plan for integrated pest management.	<ol style="list-style-type: none"> 1. Identify plant pests (e.g., insects, diseases, weeds, rodents). 2. Determine pest management safety practices. 3. Determine pest management methods. 4. Develop pest management plans based on pest life cycles. 5. Implement pest control plan with appropriate treatments. 6. Evaluate pest control plan. 7. Prevent, identify, and manage pest resistance. 	CR 1-E CR 3-D CR 4-C,E LA 2-B,C SC 11-A,B SC 16-C	Turf Grass Mgt. Proficiency Landscape Mgt. Proficiency Natural Resource Mgt. Diversified Horticulture Prof. Horticultural Produce CDE Floriculture CDE Nursery/Landscape CDE Entomology CDE Emerging Agricultural Technology Proficiency	0135, 0136, 0141, 0142, 0143, 0145 0172, 0130, 0184

STANDARD II: Address taxonomic or other classifications to explain basic plant anatomy and physiology.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
II-A Examine unique plant properties to identify/describe functional difference in plant structures including roots, stems, flowers, leave and fruit.	<ol style="list-style-type: none"> 1. Identify plant structures (e.g., seeds). 2. Describe physiological functions of plants. 3. Describe germination process and conditions. 4. Explain the processes of photosynthesis and respiration. 	CR 1-E; CR 4-C LA 1-A,B,C,D LA2-C SC 3-A; SC 4-F SC 7-C; SC 9-A SC 10-A,B SC 11-A,B,C,E,F,G	Horticultural Produce CDE Floriculture CDE Nursery/Landscape CDE Forestry CDE Pasture & Range CDE Crops Evaluation CDE	0132, 0133, 0134, 0135, 0136, 0141, 0142, 0145
II-B Classify plants based on physiology for taxonomic or other classification.	<ol style="list-style-type: none"> 1. Classify plants as monocots or dicots. 2. Classify plants as annuals, biennials or perennials. 3. Classify plants according to growth habit. 4. Classify plants by type. 5. Classify plants by economic value. 	CR 1-E; CR 3-D; CR 4-C LA 1-A,B,C,D MA 1-A,B,D MA 4-A,B,C SC 1-A,B; SC 3-A; SC 5-B	Floriculture CDE Nursery/Landscape CDE Forestry CDE Pasture & Range CDE Crops Evaluation CDE	0132, 0133, 0134, 0135, 0136, 0141 0142, 0145

STANDARD III: Apply fundamentals of production and harvesting to produce plants.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
<p>III-A Apply fundamentals of plant management to develop a production plan.</p>	<ol style="list-style-type: none"> 1. Identify and select seeds and plants. 2. Manipulate and evaluate environmental conditions (e.g., irrigation, mulch, shading) to foster plant germination, growth and development. 3. Evaluate and demonstrate planting practices (e.g., population rate, germination/seed vigor, inoculation, seed and plant treatments). 4. Evaluate and demonstrate transplanting practices. 5. Prepare soil/media for planting. 6. Control plant growth (e.g., pruning, pinching, disbudding, topping, de-tasseling, staking, cabling, shearing, shaping). 7. Prepare plants and plant products for distribution. 	<p>CR 1-E CR 3-D CR 4-C LA 1-A,B,C,D MA 1-A,B,C,D MA 4-A,B,C SC 1-A,B SC 3-A SC 5-B</p>	<p>Turf Grass Mgt. Proficiency Landscape Mgt. Proficiency Natural Resources Mgt. Prof. Diversified Horticulture Prof. Floriculture CDE Nursery/Landscape CDE Forestry CDE Pasture & Range CDE Crops Evaluation CDE Grain Production Proficiency Specialty Crop Production Prof. Oil Crop Production Proficiency Diversified Crop Production Prof.</p>	<p>0141, 0143, 0145, 0172, 0184</p>
<p>III-B Apply fundamentals of plant management to harvest, handle and store crops.</p>	<ol style="list-style-type: none"> 1. Determine crop maturity. 2. Identify harvesting practices and equipment. 3. Demonstrate common harvesting techniques. 4. Calculate yield and loss. 5. Identify options for crop storage. 6. Maintain quality of plant products in storage. 7. Prepare plants and plant products for distribution. 	<p>CR 1-E CR 4-C,D LA 1-A,B,C,D MA 1-A,B,C,D MA 2-A,B MA3-A</p>	<p>Floriculture CDE Nursery/Landscape CDE Forestry CDE Crops Evaluation CDE Grain Production Proficiency Specialty Crop Production Prof. Oil Crop Production Proficiency Diversified Crop Production Prof.</p>	<p>0135, 0136, 0141, 0142, 0143, 0145</p>

STANDARD IV: Exercise elements of design to enhance an environment (e.g., floral, forest, landscape, farm).

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
IV-A Apply basic design elements and principles to create a design using plants.	<ol style="list-style-type: none"> 1. Conduct a site evaluation for physical condition and design implications. 2. Apply elements of design (e.g., line, form, texture, color). 3. Incorporate principles of design (e.g., space, scale, proportion, order). 4. Use landscape design drawing tools including Computer Aided Design (CAD) and industry-specific software. 5. Select hard goods, supplies and tools used in design. 6. Select plant(s) for design. 	CR 1-E CR 4-C LA 1-A,B,C,D SS 12-B,D,F	Landscape Design CDE Nursery/Landscape CDE Floriculture CDE Landscape Mgt. Proficiency Nursery Operations Proficiency Home/Community Development Outdoor Recreations Prof.	0144

PATHWAY: POWER, STRUCTURAL AND TECHNICAL SYSTEMS

STANDARD I: Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
I-A Relate power generation to energy sources.	<ol style="list-style-type: none"> 1. Identify petroleum sources (e.g., gasoline, diesel). 2. Identify alternative sources (e.g., ethanol, bio-diesel, air, wood, geothermal, solar). 3. Compare environmental impact of energy sources. 4. Compare efficiency of energy source. 5. Compare characteristics of energy sources. 6. Discuss efficiency of systems (e.g., fuel cells, chemical, wind, hydro, nuclear, electric, mechanical, solar, biological). 	CR 1-E; CR 3-D LA 1-A,B,C,D; LA 2-B MA 1-A,B MA 2-A,B,C,D MA 4-A,B; MA 5-A,B SC 4-B; SC 8-A SC 9-A,B; SC 12-A SC 14-B,C SS I-C	Agricultural Mechanics CDE Ag Mechanics Design & Fabrication Proficiency Ag Mechanics Repair & Maintenance Proficiency Ag Mechanics Energy Systems Proficiency Tractor Restoration State Fair Agricultural Mechanics	0151, 0154
I-B Apply principles of lubricants to sort and classify lubricants.	<ol style="list-style-type: none"> 1. Classify lubricants and determine applications. 2. Identify viscosity and strengths of lubricants. 3. Describe properties of lubricants. 	CR 1-E; CR 3-D LA 1-A,B,C,D; LA 2-B MA 1-A,B; MA 4-A,B SC 4-B; SC 8-A SC 9-A,B	Tractor Restoration State Fair Agricultural Mechanics Agricultural Mechanics CDE 3 Proficiency Areas	0151, 0154

STANDARD II: Apply principles of operation and maintenance to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
<p>II-A Perform scheduled service routines to maintain machinery and equipment.</p>	<ol style="list-style-type: none"> 1. Lubricate machinery and equipment. 2. Ensure presence and function of safety systems and hardware. 3. Service electrical systems. 4. Perform machine adjustments (e.g., belts, drive chains). 5. Service filtration system. 6. Maintain fluid levels. 7. Maintain vehicle, machinery, and equipment cleanliness and appearance. 8. Maintain fluid conveyance components, (e.g., hose and lines, valves, nozzles). 9. Design a preventative maintenance schedule. 10. Identify causes of malfunctions and failures. 11. Calibrate metering, monitoring, and sensing equipment. 	<p>CR 1-E CR 3-D LA 1-A,B,C,D LA 2-B MA 1-A,B MA 4-A,B SC 4-D SC 5-B SC 8-A SC 9-A,B</p>	<p>Agricultural Mechanics CDE Ag Mechanics Design & Fabrication Proficiency Ag Mechanics Repair & Maintenance Proficiency Ag Mechanics Energy Systems Proficiency Tractor Restoration State Fair Agricultural Mechanics</p>	<p>0151, 0152, 0153, 0154, 0172, 0173, 0174, 0130</p>
<p>II-B Observe safety guidelines to operate machinery and equipment.</p>	<ol style="list-style-type: none"> 1. Describe function of machine controls and instrumentation. 2. Perform appropriate start-up procedures. 3. Select proper machine(s) for specific task(s). 4. Safely operate equipment. 5. Perform pre-operation inspection. 6. List applicable laws for on- and off-highway operation. 	<p>CR 1-E CR 3-D LA 1-A,B,C,D LA 2-B MA 1-A,B MA 4-A,B SC 8-A SC 9-A,B</p>	<p>Agricultural Mechanics CDE Ag Mechanics Design & Fabrication Proficiency Ag Mechanics Repair & Maintenance Proficiency Ag Mechanics Energy Systems Proficiency Tractor Restoration State Fair Agricultural Mechanics</p>	<p>0143, 0145, 0151, 0152, 0163, 0154, 0161, 0162, 0130, 0183, 0184</p>

STANDARD III: Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
<p>III-A Troubleshoot problems and evaluate performance to service and repair the components of internal combustion engines.</p>	<ol style="list-style-type: none"> 1. Describe principles of operation. 2. Identify engine systems and components. 3. Analyze and troubleshoot engine. 4. Perform overhaul procedures. 5. Evaluate engine performance through post-rebuild testing. 	<p>CR 1; CR 3-D LA 1-A,B,C,D LA 2-A,B MA 1-A,B; MA 2-1 MA 4-A,B,C,D SC 8-A; SC 9-A,B SC 15-E</p>	<p>Agricultural Mechanics CDE 3 Agricultural Mechanics Proficiency Areas Tractor Restoration State Fair Agricultural Mechanics</p>	<p>0151, 0154</p>
<p>III-B Follow manufacturers' guidelines to service and repair drive train components.</p>	<ol style="list-style-type: none"> 1. Describe features, benefits, and applications of various power transmission systems. 2. Describe principles of operation of various power transmission styles. 3. Perform calculations involving speed, torque and power relationships. 4. Describe features, benefits, and applications of mechanical transmission components (e.g., belts, chains, gears, bearings, seals, universals). 5. Inspect, analyze, and repair hydrostatic transmissions. 6. Inspect, analyze, and repair differentials and final drives. 7. Inspect, analyze, and repair clutches and brakes. 8. Inspect, analyze, and repair gear-type transmissions including power shift. 9. Inspect analyze and repair auxiliary drives. 	<p>CR 1-E CR 3-D LA 1-A,B,C,D LA 2-A,B MA 1-A,B MA 4-A,B SC 9-A,B</p>	<p>Agricultural Mechanics CDE Ag Mechanics Design & Fabrication Proficiency Ag Mechanics Repair & Maintenance Proficiency Ag Mechanics Energy Systems Proficiency Tractor Restoration State Fair Agricultural Mechanics</p>	<p>0143, 0151, 0154</p>

STANDARD III: Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
<p>III-C Evaluate performance and check maintenance manuals to service and repair hydraulic systems.</p>	<ol style="list-style-type: none"> 1. Describe features, benefits, and applications of types of hydraulic systems. 2. Describe physical principles of operation. 3. Interpret symbols and schematic drawings. 4. Describe the application and operations of major components. 5. Inspect, analyze, and repair hydraulic components (e.g., pumps, valves). 6. Inspect, analyze, and repair fluid conveyance components (e.g., hoses, lines). 7. Evaluate system cleanliness. 8. Identify hydraulic fittings and ports. 	<p>CR 1-E CR 3-D LA 1-A,B,C,D LA 2-A,B MA 1-A,B MA 2-A MA 4-A,B SC 4-A SC 8-A SC 9-A,B</p>	<p>Agricultural Mechanics CDE Ag Mechanics Design & Fabrication Proficiency Ag Mechanics Repair & Maintenance Proficiency Ag Mechanics Energy Systems Proficiency Tractor Restoration State Fair Agricultural Mechanics</p>	<p>0143, 0145, 0154</p>
<p>III-D Troubleshoot from schematics to I service vehicle electrical systems.</p>	<ol style="list-style-type: none"> 1. Describe features and applications of electrical systems. 2. Interpret symbols and wiring diagrams. 3. Test and troubleshoot electrical systems and components (e.g., battery, charging, starting, lighting, instrumentation, accessories). 4. Troubleshoot and install instrumentation and data acquisition system (e.g., Global Positioning System (GPS), spraying, planting, harvesting monitors). 5. Diagnose and repair control systems and sensors (e.g., engine, transmission, implement). 	<p>CR 1-E CR 3-D LA 1-A,B,C,D LA 2-A,B MA 1-A,B MA 2-A MA 4-A,B SC4-B SC 9-A,B</p>	<p>Agricultural Mechanics CDE Ag Mechanics Design & Fabrication Proficiency Ag Mechanics Repair & Maintenance Proficiency Ag Mechanics Energy Systems Proficiency Tractor Restoration State Fair Agricultural Mechanics</p>	<p>0154</p>

STANDARD III: Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
<p>III-E Use company diagrams and schematics to service vehicle heating and air conditioning systems.</p>	<ol style="list-style-type: none"> 1. Describe physical principles of operation. 2. Interpret symbols and diagrams. 3. Test, troubleshoot, and replace heating and air-conditioning components (e.g., compressor, expansion valve, receiver dryer, pump, hoses). 4. Evacuate and charge air conditioning systems. 	<p>CR 1-E; CR 3-D LA 1-A,B,C,D LA 2-A,B MA 1-A,B; MA 2-A MA 4-A,B SC 4-B,C SC 9-A,B</p>	<p>Agricultural Mechanics CDE 3 Agricultural Mechanics Proficiency Areas Tractor Restoration State Fair Agricultural Mechanics</p>	<p>0154</p>
<p>III-F Check performance parameters to service and repair steering, suspension, traction, and vehicle performance systems.</p>	<ol style="list-style-type: none"> 1. Evaluate traction, ballasting, and weight transfer. 2. Evaluate vehicle stability. 3. Determine optimum vehicle performance (e.g., horsepower management, fuel efficiency). 4. Troubleshoot, adjust, and repair suspension systems. 5. Inspect and repair steering systems. 	<p>CR 1-E; CR 3-D LA 1-A,B,C,D LA 2-A,B MA 1-A,B; MA 2-A MA 4-A,B SC 4-C,D SC8-A SC 9-A.B</p>	<p>Agricultural Mechanics CDE 3 Agricultural Mechanics Proficiency Areas Tractor Restoration State Fair Agricultural Mechanics</p>	<p>0154</p>
<p>III-G Use tools in the workplace to demonstrate safe use and proper skills with construction/fabrication hand tools.</p>	<ol style="list-style-type: none"> 1. Demonstrate proper use of measurement and layout tools. 2. Apply proper use of measurement and layout tools in construction/fabrication of an actual project. 3. Demonstrate safe and proper techniques in using and power tools in construction/fabrication. 4. Demonstrate hand and power tool use to construct/fabricate an actual project according to blueprints or plans. 5. Identify and demonstrate proper hand and power tool maintenance procedures. 	<p>CR 1-E CR 3-D LA 1-A,B,C,D LA 2-A,B MA 1-A,B MA 4-A,B SC 4-C,D SC 9-A, B</p>	<p>Agricultural Mechanics CDE Ag Mechanics Design & Fabrication Proficiency Ag Mechanics Repair & Maintenance Proficiency Ag Mechanics Energy Systems Proficiency Tractor Restoration State Fair Agricultural Mechanics</p>	<p>0143, 0145, 0151, 0152, 0153, 0154,</p>

STANDARD IV: Exercise basic skills in blueprint and design development to create sketches, drawings and plans.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
IV-A Use mechanical drawing and computer skills to develop simple sketches and plans.	<ol style="list-style-type: none"> 1. Use current technology to develop simple plans and sketches. 2. Identify symbols and drawing techniques used to develop simple plans and sketches. 3. Use scale measurement and dimension to develop simple plans and sketches. 	CR 1-E; CR 3-D LA 1-A,B,C,D LA 2-A,B,C MA 1-A,B; MA 3-A MA 4-A,B SC 4-C,D; SC 9-A,B	Agricultural Mechanics CDE Ag Mechanics Design & Fabrication Proficiency Tractor Restoration State Fair Agricultural Mechanics	0144, 0151, 0152, 0153,

STANDARD V: Read and relate structural plans to specifications and building codes.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
V-A Examine blueprints and local codes to develop a logical construction plan.	<ol style="list-style-type: none"> 1. Identify parts of a plan or blueprint. 2. Identify criteria for different views of a plan or blueprint. 3. Locate elements of a construction plan and develop a construction plan. 4. Identify local code enforcement agencies and procedures. 5. Read and interpret local code information. 6. Complete permit applications. 	CR 1-E; CR 3-D LA 1-A,B,C,D LA 2-A,B,C MA 1-A,B MA 3-A MA 4-A,B SC 9-A,B SS 1-B SS 2-A	Agricultural Mechanics CDE Ag Mechanics Design & Fabrication Proficiency Ag Mechanics Repair & Maintenance Proficiency Ag Mechanics Energy Systems Proficiency Tractor Restoration State Fair Agricultural Mechanics	0143, 0152, 0153, 0173, 0174, 0173, 0184

STANDARD VI: Examine structural requirements to estimate project costs.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
VI-A Use bids and billing information to develop a complete materials list and project cost estimate.	<ol style="list-style-type: none"> 1. Identify material used in agricultural construction/fabrication. 2. Explain proper criteria for material use. 3. Identify elements of project cost estimate (materials, labor, administrative, etc.). 4. Explain selection process of all construction materials. 5. Estimate and select type and quantities of materials and other costs associated with a specified project plan. 6. Prepare a bid package for a planned project. 	CR 1-E CR 3-D LA 1-A,B,C,D LA 2-A,B,C MA 1-A,B MA 2-A MA 3-A,B,C MA 4-A,B SC 4-C,D SC 9-A,B	Agricultural Mechanics CDE Ag Mechanics Design & Fabrication Proficiency Ag Mechanics Repair & Maintenance Proficiency Ag Mechanics Energy Systems Proficiency Tractor Restoration State Fair Agricultural Mechanics	0173, 0145, 0151, 0152, 0153, 0172

STANDARD VII: Develop skills required to use construction/fabrication equipment and tools.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
VII-A Use tools in the workplace to demonstrate safe and proper skills with construction/fabrication hand tools.	<ol style="list-style-type: none"> 1. Demonstrate proper use of measurement and layout tools. 2. Apply proper use of measurement and layout tools in construction/fabrication of an actual project. 3. Demonstrate safe and proper techniques in using hand and power tools in construction/fabrication. 4. Demonstrate hand and power tools use to construct/fabricate an actual project according to blueprints or plans. 5. Identify and demonstrate proper hand and power tool maintenance procedures. 6. Demonstrate proper procedure in operating welders and cutting equipment. 	CR 1-E CR 3-D LA 1-A,B,C,D LA 2-A,B MA 1-A,B MA 2-A MA 3-A,B,C MA 4-A,B SC 4-C,D SC 9-A,B	Agricultural Mechanics CDE Ag Mechanics Design & Fabrication Proficiency Ag Mechanics Repair & Maintenance Proficiency Ag Mechanics Energy Systems Proficiency Tractor Restoration State Fair Agricultural Mechanics	0143, 0144, 0151, 0152, 0153,

STANDARD VIII: Plan, implement, manage, and/or provide support services to facility design and construction; equipment design, manufacture, repair, and service; and agricultural technology.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
<p>VIII-A Design machinery and equipment including vehicles, implements, building, and facilities (e.g., feeding, feed storage).</p>	<ol style="list-style-type: none"> 1. Analyze site/equipment/permit requirements. 2. Develop drawings. 3. Estimate material needs and costs. 4. Operate Computer Aided Drafting Design (CADD) Software. 	<p>CR 1-E; CR 3-D LA 1-A,B,C,D LA 2-A,B,C MA 1-A,B; MA 4-A,B SC 4-C,D; SC 9-A,B SS 1-B; SS 2-A</p>	<p>Agricultural Mechanics CDE 3 Agricultural Mechanics Proficiency Areas Tractor Restoration State Fair Agricultural Mechanics</p>	<p>0151, 0152, 0153</p>
<p>VIII-B Follow architectural and mechanical plans to construct building and facilities.</p>	<ol style="list-style-type: none"> 1. Identify and select appropriate building materials. 2. Install plumbing equipment and fixtures. 3. Construct with wood and metal. 4. Install electrical wiring components and fixtures. 5. Paint or protect with coatings. 6. Insulate facility. 7. Install fencing. 8. Install glass, ridged plastic panels and/or film plastic. 9. Construct with concrete, stone, and brick. 10. Construct with welding equipment. 	<p>CR 1-E CR 3-D LA 1-A,B,C,D LA 2-A,B MA 1-A,B MA 4-A,B SC 4-C,D SC 9-A.B</p>	<p>Agricultural Mechanics CDE Ag Mechanics Design & Fabrication Proficiency Ag Mechanics Repair & Maintenance Proficiency Ag Mechanics Energy Systems Proficiency Tractor Restoration State Fair Agricultural Mechanics</p>	<p>0151, 0152, 0153,</p>

STANDARD IX: Use available power source to plan and apply control systems.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
<p>IX-A Measure with selected instruments to demonstrate knowledge of basic electricity.</p>	<ol style="list-style-type: none"> 1. Show proficiency in use of various meters. 2. Discuss importance of and techniques for grounding. 3. Show understanding of codes and regulations. 4. Discuss various energy sources. 	<p>CR 1-E; CR3-D LA 1-A,B,C,D LA 2-A,B,C MA 1-A,B; MA 4-A,B SC 9-A,B</p>	<p>Agricultural Mechanics CDE 3 Agricultural Mechanics Proficiency Areas Tractor Restoration State Fair Agricultural Mechanics</p>	<p>0151, 0154</p>
<p>IX-B Reference electrical drawings to design, install, and troubleshoot control systems.</p>	<ol style="list-style-type: none"> 1. Develop and read schematic drawings for a control system. 2. Identify and describe uses of various components of control systems; (i.e., transistors, relays, HVAC, logic controllers). 3. Discuss the importance of maintenance schedules. 4. Identify system performance problems and apply troubleshooting techniques. 	<p>CR 1-E CR 3-D LA 1-A,B,C,D LA 2-A,B MA 1-A,B MA 4-A,B SC 9-A,B</p>	<p>Agricultural Mechanics CDF Ag Mechanics Design & Fabrication Proficiency Ag Mechanics Repair & Maintenance Proficiency Ag Mechanics Energy Systems Proficiency Tractor Restoration State Fair Agricultural Mechanics</p>	<p>0151, 0154</p>

STANDARD X: Explain geospatial technology to demonstrate its applications.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
X-A Employ appropriate techniques to demonstrate application of GIS/GPS systems principles.	<ol style="list-style-type: none"> 1. Explain the concept and principles. 2. Describe equipment. 3. List techniques used. 4. Explain the application of GIS/GPS systems with map development output. 	CR 1-E; CR 3-D LA 1-A,B,C,D LA 2-A,B MA 1-A,B; MA 4-A,B SC 9-A,B	Agricultural Mechanics CDE 3 Agricultural Mechanics Proficiency Areas Tractor Restoration State Fair Agricultural Mechanics	0129, 0130, 0154
X-B Use computer applications to produce maps that reflect surveying and mapping principles.	<ol style="list-style-type: none"> 1. Understand and use of various equipment. 2. Perform survey and produce map using computer techniques. 	CR 1-E; CR3-D LA 1-A,B,C,D LA 2-A,B MA 1-A,B; MA4-A,B SC 9-A,B	Agricultural Mechanics CDE 3 Agricultural Mechanics Proficiency Areas Tractor Restoration State Fair Agricultural Mechanics	0151, 0142, 0129, 0130
X-C Select an area of personal expertise to demonstrate knowledge of end applications.	<ol style="list-style-type: none"> 1. Apply knowledge and experience to a specific application or project to show competency; (i.e., calibration, volumetric controlling, electrical design). 	CR 1-E; CR 3-D LA 1-A,B,C,D LA 2-A,B MA 1-A,B; MA 4-A,B SC 9-A,B	Agricultural Mechanics CDE 3 Agricultural Mechanics Proficiency Areas Tractor Restoration State Fair Agricultural Mechanics	0174, 0145, 0152, 0154, 0173, 0174, 0130, 0183, 0184

PATHWAY: ANIMAL SYSTEMS

STANDARD I: Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
I-A Use classification systems to identify species and breeds of animals	<ol style="list-style-type: none"> Describe the historical importance of various species and breeds of animals. Explain the economic importance of animal species and by-products 	CR 1-E LA 1-A,B,C,D SC 10-A SC 11-B,C,D,E SS 1-A,C SS 4-A,B	Livestock Evaluation CDE Dairy Cattle Evaluation CDE Poultry Evaluation CDE Horse Evaluation CDE Beef Production Proficiency Dairy Production Proficiency Diversified Livestock Production Sheep Production Proficiency Small Animal Proficiency	0133, 0134, 0135, 0136, 0142, 0161, 0162, 0163, 0171, 0172, 0173, 0174,
I-B Use classification systems to explain basic functions of animal anatomy and physiology.	<ol style="list-style-type: none"> Describe functional difference in animal structures and body systems. Classify animals according to anatomy and physiology. 	CR 1-E CR 3-D LA 1-A,B,C,D SC 10-A,B SC 11-A,B,C,D	Livestock Evaluation CDE Dairy Cattle Evaluation CDE Poultry Evaluation CDE Horse Evaluation CDE	0142 0162, 0163, 0183
I-C Recognize the anatomy of animal species to understand how the body structures interact and affect animal health.	<ol style="list-style-type: none"> Identify selected animal parts from a diagram or on a real animal. Identify ways that an animal's health can be affected by anatomy/physiology problems. 	CR 1-E CR 3-D LA 1-A,B,C,D SC 10-A,B SC 11-A,B,C,D	Livestock Evaluation CDE Dairy Cattle Evaluation CDE Poultry Evaluation CDE Horse Evaluation CDE Proficiencies (animal)	0142, 0162, 0163, 0183
I-D Analyze a subject animal to determine the nature of its health status.	<ol style="list-style-type: none"> Perform simple procedures in evaluating an animal's health status. Identify symptoms of diseases, illnesses, parasites and other health-related problems. Diagnose animal ailments. Implements disease prevention and health improvement program. Identify and implement (i.e., treat) treatment options. 	CR 1-E CR 3-D LA 1-A,B,C,D SC 10-A SC 11-A,B,C,D SC 16-C	Livestock Evaluation CDE Dairy Cattle Evaluation CDE Poultry Evaluation CDE Horse Evaluation CDE Beef Production Proficiency Dairy Production Proficiency Diversified Livestock Production Sheep Production Proficiency Small Animal Proficiency	0134, 0135, 0136, 0161, 0162, 0163

STANDARD II: Recognize animal behaviors to facilitate working with animal safety.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
II-A Develop a safety plan for working with a specific animal.	<ol style="list-style-type: none"> 1. Explain factors which serve to stimulate or discourage given types of animal behavior. 2. Recognize the normality curve of animal behavior. 3. Perform safe handling procedures when working with animals. 4. Identify strengths and weaknesses of an animal safety handling plan. 5. Operate animal facilities to insure safety of animals. 	CR 1-E CR 4-D,E LA 1-A,B,C,D MA 4-A,B,C SC 3-A SC 10-A SC 11-A,B,C,D	Beef Production Proficiency Dairy Production Proficiency Diversified Livestock Production Sheep Production Proficiency Small Animal Proficiency Swine Production Proficiency Poultry Production Proficiency Specialty Animal Proficiency Equine Science Proficiency	0134, 0135, 0136, 0161, 0162, 0163

STANDARD III: Provide proper nutrition to maintain animal performance.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
III-A Examine animal developmental stages to comprehend why nutrient requirements are different throughout an animal's life cycle.	<ol style="list-style-type: none"> 1. Recognize the different phases of an animal's life cycle. 2. Select diets which provide the appropriate quantity of nutrients for each animal's developmental stage. 	CR 1-E LA 1-A,B,C,D MA 4-A SC 10-A SC 11-A,B,C,D	9 Proficiency Areas in Animal Production SAE Projects	0134, 0135, 0136, 0161, 0162, 0163
III-B Analyze a feed ration to determine whether or not it fulfills a given animal's nutrient requirements.	<ol style="list-style-type: none"> 1. Identify the differences between good and poor quality feedstuffs. 2. Create a balanced ration for a given animal. 	CR 1-E LA 1-A,B,C,D MA 1-A,B,C,D SC 10-A SC 11-A,B,C,D	9 Proficiency Areas in Animal Production SAE Projects	0134, 0135, 0136, 0161, 0162,0163
III-C Record and compare feed variations to assess whether the nutritional requirements of a given animal are being met.	<ol style="list-style-type: none"> 1. Use different types of feedstuffs (e.g., roughage, concentrates) to create a feed ration containing the appropriate amounts of required nutrients. 2. Use different forms of feedstuffs (e.g., pellets, cracked, rolled, ground) to create a diet that meets the needs of a specific animal. 	CR 1-E LA 1-A,B,C,D SC 4-E SC 10-A SC 11-A,B,C,D	9 Proficiency Areas in Animal Production SAE Projects	0161, 0162, 0163

STANDARD IV: Know the factors that influence an animal's reproductive cycle to explain species response.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
IV-A Analyze elements in the reproductive cycle to explain differences between male and female reproductive systems.	<ol style="list-style-type: none"> 1. Identify the parts of male and female reproductive tracts on example animals. 2. Analyze the reproductive cycle of a given animal. 3. Evaluate animal readiness for breeding. 	CR1-E CR 3-A,C,D LA 1-A,B,C,D SC 10-A SC 11-A,B,C,D	9 Proficiency Areas in Animal Production SAE Projects	0133, 0134, 0135, 0136, 0141, 0142
IV-B Discuss reproductive cycles to show how they differ from species to species.	<ol style="list-style-type: none"> 1. Discuss the pros and cons of breeding through natural cover and artificial insemination. 2. Discuss the implications of genetic variation. 3. Describe techniques of artificial insemination. 4. Identify reproduction management practices (e.g., male to female ratios, age and weight for breeding, fertility and soundness for breeding, heat synchronization, flushing). 	CR 1-E LA 1-A,B,C,D SC 10-A SC 11-A,B,C,D	9 Proficiency Areas in Animal Production SAE Projects	0133, 0134, 0135, 0136, 0142,
IV-C Evaluate an animal to determine its breeding soundness.	<ol style="list-style-type: none"> 1. Describe the procedure for determining an animal's breeding readiness. 2. Identify and prevent problems associated with reproduction. 3. Select animals based on breeding soundness. 	CR 1-E LA 1-A,B,C,D SC 10-A SC 11-A,B,C,D	9 Proficiency Areas in Animal Production SAE Projects	0134, 0135, 0136, 0161, 0162

STANDARD V: Identify environmental factors that affect an animal's performance.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
V-A Recognize optimum performance for a given animal species.	<ol style="list-style-type: none"> 1. Identify good performance for a given animal species. 2. Identify reasons why some animals perform better than others. 	CR 1-E CR 3-A,C,D LA 1-A,B,C,D SC 10-A SC 11-A,B,C,D	Livestock Evaluation CDE Dairy Cattle Evaluation CDE Poultry Evaluation CDE Horse Evaluation CDE	0134, 0135, 0136, 0161, 0162
V-B Create a program to develop an animal to its highest potential performance.	<ol style="list-style-type: none"> 1. Identify factors that can be manipulated to control a given animal's performance. 2. Generate ways to increase an animal's performance. 	CR 1-E LA 1-A,B,C,D SC 3-A; SC 10-A SC 11-A,B,C,D	9 Proficiency Areas in Animal Production SAE Projects	0161, 0162, 0163
V-C Assess an animal to determine if it has reached its optimum performance level.	<ol style="list-style-type: none"> 1. Make appropriate changes in an animal's environment in order to achieve optimum performance. 2. Use appropriate tools in manipulating animal performance. 	CR 1-E CR 3-A,C,D LA 1-A,B,C,D SC 3-A; SC 10-A SC 11-A,B,C,D	9 Proficiency Areas in Animal Production SAE Projects	0134, 0135, 0136, 0161, 0162
V-D Develop efficient procedures to produce consistently high- quality animals, well-suited for their intended purposes.	<ol style="list-style-type: none"> 1. Identify a given species' desirable production numbers (e.g., birth weight, rate of gain, age of maturity, age of sexual maturity). 2. Evaluate desired traits (e.g., production) of animals. 3. Evaluate the role that economics plays in animal production. 4. Design facilities appropriate for the production of a given species of animal. 5. Make decisions on using new techniques and methods in the production facility so that both profit and animal safety are maximized. 	CR 1-E CR 2-C CR 3-A,C,D LA 1-A,B,C,D MA 1-A,B,C,D SC 10-A SC 11-A,B,C,D	9 Proficiency Areas in Animal Production SAE Projects	0134, 0135, 0136, 0161, 0162

PATHWAY: AGRIBUSINESS SYSTEMS

STANDARD I: Employ leadership skills to accomplish goals and objectives in an AFNR business environment.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
I-A Develop a mission statement to guide business activities effectively.	<ol style="list-style-type: none"> 1. Identify planning approaches for preparing mission statement. 2. Write a mission statement. 3. Establish short- and long-term goals. 4. Ask for feedback from stakeholders to test the impact of the mission statement. 5. Disseminate mission statement to inform fellow employees and gain in-house support. 	CR 1-A,B,C,E CR 2-B CR 4-A,B,C,D CR 5-A,B LA 1-A,B,C,D LA 2-A,B,C LA 3-A,B SS 3-B	EDGE, MFE, ALD COLT POA/National Chapter Marketing Plan CDE Agricultural Sales Proficiency Agricultural Services Proficiency	0171, 0172
I-B Apply leadership skills to accomplish general business activities from production to public relations.	<ol style="list-style-type: none"> 1. Identify leadership styles. 2. Conduct a business meeting using proper parliamentary procedures/consensus techniques. 3. Work in teams to access a variety of expertise. 4. Recognize quality performance in job tasks. 	CR 1-E; CR 2-B CR 4-A,B,C,D CR 5-A,B,C,D LA 1-A,B,C,D LA 2-A,B; LA 3-A SS 10-A	Parliamentary Procedure Prepared Public Speaking CDE Extemporaneous Speaking CDE Agricultural Communications CDE EDGE, MFE, ALD Leadership Camp	All Agriculture Education classes.
I-C Apply management skills to accomplish general business activities from production to public relations.	<ol style="list-style-type: none"> 1. Identify management types. 2. Identify organizational structures. 3. Identify time management techniques. 4. Make business agreements. 5. Follow local, state, and federal regulations and appreciate the consequences of not following them. 6. Recruit, train and evaluate human resources. 7. Make business presentation. 	CR 1-E; CR 2-B,C CR 3-D CR 4-A,B,C,D CR 5-A,D LA 1-A,B,C,D LA 2-A,B,C; LA 3-A,B SS 3-A SS 10-A,D,E	POA/National Chapter Marketing Plan CDE Agricultural Sales Proficiency Agricultural Services Proficiency Commodity Marketing Farm Business Management CDE	0171, 0172, 0191, 0192

STANDARD II: Practice good record keeping to accomplish AFNR business objectives.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
II-A Prepare and maintain all files as needed to accomplish effective record keeping.	<ol style="list-style-type: none"> 1. Identify information management systems. 2. Develop record keeping techniques and practices. 3. Keep production and agribusiness records. 4. Make record analysis. 	CR 1-E; CR 2-C CR 3-B,C,D; CR 4-C LA 1-A,B,C,D LA 2-A,C MA 1-A,B,C	SAE Record Books Degree Program Proficiency Awards Career Development Events	All Agriculture Education classes.

STANDARD III: Apply generally accepted accounting principles and skills to manage budget, credit, and optimal application of AFNR business assets.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
III-A Use key accounting fundamentals to accomplish dependable bookkeeping and associated files.	<ol style="list-style-type: none"> 1. Budget resources (e.g., capital, human, financial, time). 2. Manage assets for optimum utilization. 3. Manage risk liabilities. 4. Evaluate credit uses and options. 5. Prepare and interpret financial statements (e.g., balance sheet, profit/loss statement, cash flow statement). 6. Prepare tax forms (e.g., W-4, I9, Depreciation, 1099, Workers Compensation). 7. Determine cost of doing business. 8. Compare and examine advantages and disadvantages of banking procedures (e.g., bank reconciliation). 9. Analyze investment options (e.g., buy, lease, finance, risk). 	CR 1-E CR 2-A,C CR 3-B,C,D CR 4-C,D LA 1-A,B,C,D LA 2-A MA 1-A,B,C,D MA 4-A SS 10-I	Farm Business Management SAE Record Books Degree Program Proficiency Awards Commodity Marketing	0171, 0172

STANDARD IV: Employ AFNR industry concepts and practices to manage inventory.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
IV-A Monitor inventory levels to accomplish practical inventory control.	<ol style="list-style-type: none"> 1. Maintain optimum inventory levels. 2. Calculate cost of carrying inventory. 3. Perform logistics management. 	CR 1-E; CR 2-C CR 3-B,C,D; CR 4-C,D LA 1-A,B,C,D LA 2-A; MA 1-A,B,C,D MA 4-A,B,C	Farm Business Management CDE SAE Record Books Degree Program Proficiency Awards	0171, 0172

STANDARD V: Utilize technology to accomplish AFNR business objectives.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
V-A Use technology and information technology strategies for business improvement.	<ol style="list-style-type: none"> 1. Utilize leading technology; (e.g., Global Positioning System (GPS), Geological Information System (GIS), Personal Data Application (PDA), cellular). 2. Create and use documents using word processors, spreadsheets, databases, and electronic mail. 3. Conduct marketing, promotion, and research using the Internet. (Web Page Deveopment) 4. Conduct oral/visual presentations using presentation software. 	CR 1-E; CR 2-A,B,C CR 3-B,C,D; CR 4-C,D CR 4-C,D; CR 5-D LA 1-A,B,C,D LA 2-A,B,C LA 3-A MA 4-A,B SC 5-A,B SC 6-C,D,E	Farm Business Management CDE SAE Record Books Degree Program Proficiency Awards Marketing Plan CDE	0171, 0172

STANDARD VI: Use sales and marketing principles to accomplish an AFNR business objective.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
VI-A Conduct market research.	<ol style="list-style-type: none"> 1. Evaluate methods of marketing products and services. 2. Apply economic principles to marketing (e.g., supply and demand). 3. Research products and service design(s). 	CR 1-E; CR 2-C CR 3-B,C,D; CR 4-C,D LA 1-A,B,C,D LA 2-A; LA3-A MA 4-A,B,C SS 10-A,D	Marketing Plan CDE Supervised Agricultural Experience Program	0171, 0172, 0191, 0192
VI-B Develop a marketing plan.	<ol style="list-style-type: none"> 1. Identify and develop value-added products. 2. Develop public relations campaign. 3. Develop sales goals and incentive programs. 	CR 1-E; CR 2-C CR 3-B,C,D; CR 4-C,D LA 1-A,B,C,D LA 2-A,C; LA 3-A,B SS 10-D	Marketing Plan CDE	0171, 0172, 0191, 0192
VI-C Implement a marketing plan.	<ol style="list-style-type: none"> 1. Promote products and services. 2. Advertise products and services. 	CR 1-E; CR 2-C CR 3-B,C,D; CR 4-C,D LA 1-A,B,C,D LA 2-A B C; LA 3-A,B	Marketing Plan CDE	0171, 0172, 0191, 0192
VI-D Merchandise products and services.	<ol style="list-style-type: none"> 1. Identify key components to organize a sale. 2. Build and develop customer relationships. 3. Conduct sales presentation. 4. Provide post-sale service. 5. Handle customer complaints. 6. Locate prospective new customers. 	CR 1-E; CR 2-C CR 3-B,C,D CR 4-C,D LA 1-A,B,C,D LA 2-B,C LA 3-A,B	Marketing Plan CDE Agricultural Sales Proficiency Agricultural Services Proficiency	0171, 0172, 0191, 0192

PATHWAY: FOOD PRODUCTS AND PROCESSING SYSTEMS

STANDARD I: Apply principles of food processing to the food industry.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
I-A Develop management plans to maintain equipment and facilities.	<ol style="list-style-type: none"> 1. Develop and maintain a Standard Sanitation Operating Procedure (SSOP). 2. Explain and demonstrate Good Manufacturing Practices (GMP), including employee safety. 	CR 1-E; CR 4-E LA 1-A,B,C,D LA 2-A,B; LA 3-B SC 4-C,D; SC 5-A SC 6-D; SC 14-B SS 12-G	Food Science CDE Dairy Foods CDE Meats Evaluation CDE Poultry Evaluation CDE Food Science Proficiency	0142, 0143, 0145, 0151, 0152, 0153, 0154, 0161, 0162, 0173, 0174, 0130
I-B Interpret and follow, develop and implement Hazard Analysis Critical Control Point (HACCP) procedures to establish operating parameters.	<ol style="list-style-type: none"> 1. Conduct a hazard analysis. 2. Identify Critical Control Points (CCP). 3. Establish critical limits for each Critical Control Point (CCP). 4. Establish monitoring procedures. 5. Establish corrective actions. 6. Establish verification procedures. 	CR 1-E; CR 4-E LA 1-A,B,C,D LA 2-A,B SC 1-B SC 4-C,D SC 5-A SC 6-D	Food Science CDF Dairy Foods CDE Meats Evaluation CDE Poultry Evaluation CDE Food Science Proficiency	0142, 0143, 0145, 0151, 0152, 0153, 0154, 0161, 0162, 0173, 0174, 0130

STANDARD II: Apply principles of food science to the food industry.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
II-A Apply food science principles to enhance product development.	<ol style="list-style-type: none"> 1. Conduct research. 2. Apply the use of chemistry. 3. Comply and apply USDA/FDA standards. 4. Use product development (e.g., consumer opinion, taste testing). 5. Conduct nutritional analysis (e.g., biochemistry). 6. Compare and contrast the nutritive values of food groups. 7. Identify and compare various food constituents. 	CR 1-E; CR 3-A,B,C CR 4-E; LA 1-A,B,C,D LA 2-A,B MA 1-A,B,C,D SC 1-B; SC 2-B,C SC 4-C,D; SC 5-A SC 6-D; SC 7-C SC 9-A,B,C; SC 14-B SS 8-A; SS 10 E,I	Dairy Foods CDE Meats Evaluation CDE Poultry Evaluation CDE Horticulture Produce CDE Agri-science Fair Food Science Proficiency Emerging AG Technology Agricultural Processing	0134, 0173, 0174

STANDARD III: Plan, implement, manage, and/or provide services for the preservation and packaging of food and food products.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE SANDARD AND BENCHMARK
<p>III-A Analyze product preparation options to prepare products for distribution.</p>	<ol style="list-style-type: none"> 1. Conduct micro-test. 2. Interpret and perform quality assurance tests (e.g., fat, moisture, protein). 3. Demonstrate approved product handling techniques. 4. Use weights and measures (e.g., US, metric) to formulate product. 5. Demonstrate documentation techniques. 6. Package products. 7. Store products. 	<p>CR 1-E; CR 3-A,C,D CR 4-E LA 1-A,B,C,D LA 2-A,B; LA 3-A,B MA 1-A,B,C,D SC 1-B; SC 2-C SC 4-C,D; SC 5-A SC 6-D; SC 7-C SC 9-A,B,C</p>	<p>Dairy Foods CDE Meats Evaluation CDE Poultry Evaluation CDE Horticultural Produce CDE Agri-science Fair Food Science Proficiency Emerging AG Technology Agricultural Processing</p>	<p>0173, 0174</p>
<p>III-B Compare and select food preservation methods to develop food preservation programs.</p>	<ol style="list-style-type: none"> 1. Calculate and inventory parts per million (ppm) of restricted ingredients (e.g., milk). 2. Explain methods of chemical preservation (e.g., pH, salt, water activity [aw], additives), 3. Explain the impact of temperature in food preservation. 4. Compare and contrast packaging preservation (e.g., film, plastic, can). 5. Compare and contrast process preservation (e.g., irradiation, pasteurization, sterilization). 	<p>CR 1-E CR 3-A,C,D CR 4-E LA 1-A,B,C,D LA 2-A,B MA 1-A,B,C,D SC 1-A,B SC 4-C,D SC 5-A; SC 6-D SC 7-C</p>	<p>Dairy Foods CDE Meats Evaluation CDE Poultry Evaluation CDE Horticultural Produce CDE Agri-science Fair Food Science Proficiency Emerging AG Technology Agricultural Processing</p>	<p>0173, 0174</p>

STANDARD IV: Identify processing, handling, and storage factors to show how they impact product quality and safety.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
<p>IV-A Develop a "quality factors program" to comply with local, national, governmental, and international standards.</p>	<ol style="list-style-type: none"> 1. Perform and interpret quality check of food products per industry standards. 2. Explain methods of food storage to assure product quality. 3. Interpret and follow industry/government standards. 	<p>CR 1-E; CR 3-A,C,D CR 4-D,E LA 1-A,B,C,D LA 2-A,B; LA 3-A SC 4-C,D; SC 5-A SC 6-D</p>	<p>Dairy Foods CDE Meats Evaluation CDE Poultry Evaluation CDE Horticultural Produce CDE Food Science Proficiency Emerging AG Technology</p>	<p>0173, 0174</p>
<p>IV-B Develop slaughter/inspection techniques to process food products and analyze food product options.</p>	<ol style="list-style-type: none"> 1. Demonstrate approved techniques for preparing ready-to-eat food products. 2. Compare and contrast slaughter techniques (e.g., zero tolerance). 3. Conduct pre-mortem and post-mortem inspections. 4. Process meat and poultry products. 5. Process dairy products. 6. Process fruits and vegetables. 7. Process grains. 8. Process bio-engineered foods. 9. Select raw-materials for processing. 	<p>CR 1-E CR 3-A,C,D CR 4-E LA 1-A,B,C,D LA 2-A,B SC 1-B SC 4-C,D SC 5-A SC 6-D</p>	<p>Dairy Foods CDE Meats Evaluation CDE Poultry Evaluation CDE Horticultural Produce CDE Food Science Proficiency Emerging AG Technology</p>	<p>0173, 0174</p>

PATHWAY: NATURAL RESOURCES AND ENVIRONMENTAL SERVICES SYSTEMS

STANDARD I: Recognize importance of resource and human interrelations to conduct management activities in natural habitats.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
I-A Identify resource management components to establish relationships in natural resource systems.	<ol style="list-style-type: none"> 1. Identify natural resources. 2. Identify organizations and agencies involved in resource management. 3. Identify impacts by humans on natural resources. 4. Describe ecosystem relationships. 	CR 1-B,E; CR 2-A,C CR 3-A,C; CR 4-A,D,E CR 5-A,B,C LA 1-A,B,C,D MA 2-A; SC 1-B SC 2-A,B; SC 5-A SC 11-F,G,H; SC 12-A SC 16-B	Environmental Science & Natural Resources Proficiency Forest Management Proficiency Wildlife Management Prof. Wildlife CDE Forestry CDE Pasture & Range CDE	0133, 0134, 0135, 0136, 0129, 0130
I-B Apply cartographic skills to natural resources.	<ol style="list-style-type: none"> 1. Describe different types of maps. 2. Interpret map features and legend. 3. Determine map scale and distance. 4. Determine elevation and terrain features from topographic maps. 5. Use land survey and coordinate system. 	CR 1-B,E CR 3-A,B,C,D CR 4-A,B,C,D LA 1-A,B,C,D; LA 2-A MA 1-B,C,D,E MA 2-A,C,D; MA 4-D,E SC 2-A,B; SC 5-A,B SC 6-E; SC 12-A; SC 16-B	Environmental Science & Natural Resources Proficiency Forest Management Proficiency Forestry CDE Land Evaluation CDE Agricultural Mechanics CDE	0133, 0134, 0135, 0136, 0129, 0130

<p>I-C Monitor natural resource status to obtain planning data.</p>	<ol style="list-style-type: none"> 1. Conduct resource inventory and population studies. 2. Collect data concerning resource availability and health. 3. Prepare a technical report. 4. Describe the relationship of harvest levels to long- term availability of resources. 	<p>CR 1-B,E; CR 2-C CR 3-B,C,D CR 4-A,B,C,D; CR 5-A LA 1-A,B,C,D; LA 2-C MA 1-B,C,D,E; MA 2-A,D SC 1-B; SC 2-A,B SC 5-A,B; SC 6-E SC 11-F,G</p>	<p>Environmental Science & Natural Resources Proficiency Forest Management Proficiency Wildlife Management Prof. Wildlife CDE Forestry CDE Pasture & Range CDE</p>	<p>0129, 0130</p>
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STANDARD I: Recognize importance of resource and human interrelations to conduct management activities in natural habitats.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
I-D Employ environmental and wildlife knowledge to demonstrate natural resource enhancement techniques.	<ol style="list-style-type: none"> 1. Demonstrate stream enhancement techniques. 2. Demonstrate forest stand improvement techniques. 3. Demonstrate wildlife habitat enhancement techniques. 4. Demonstrate range enhancement techniques. 5. Demonstrate recreation area enhancement techniques. 	CR 1-B,E; CR 3-D CR 4-A,B,C,D LA 1-A,B,C,D MA 1-B,C,D,E MA 2-A SC 1-B; SC 2-A,B; SC 5-A SC 11-E,F,G,H,I SC 16-B	Environmental Science & Natural Resources Proficiency Forest Management Proficiency Wildlife Management Prof. Wildlife CDE Forestry CDE Outdoor Recreation Proficiency	0132, 0133, 0129, 0130
I-E Examine weather and other criteria to recognize dangers related to work in an outdoor environment.	<ol style="list-style-type: none"> 1. Recognize weather-related dangers. 2. Recognize hazards as they relate to terrain. 3. Recognize poisonous plants and animals. 4. Recognize hazardous situations at the work location. 	CR 1-B,E; CR 3-D CR 4-A,B,C,D LA 1-A,B,C,D MA 2-A; SC 1-B SC 2-A,B; SC 5-A SC 12-D	Environmental Science & Natural Resources Proficiency Forest Management Proficiency Wildlife Management Prof. Pasture & Range CDE Forestry CDE	0134, 0142, 0161, 0162, 0163, 0129, 0130, 0191, 0192

STANDARD II: Use effective venues to communicate natural phenomena to the public.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
II-A Personally interpret natural resource phenomena to natural resource users.	<ol style="list-style-type: none"> 1. Conduct a workshop, activity or program to interpret an example of natural resource conservation. 2. Produce printed material that interprets a natural resource area of phenomenon. 	CR 1-B,E LA 1-A,B,C,D LA 2-B,C MA 1-B,C,D,E; MA 2-A,C MA 5-C; M 9-I; MA 12-B SC 1-B; SC 2-A,B; SC 5-A SC 6-E; SC 11-F,G,H,I	Environmental Science & Natural Resources Proficiency Forest Management Proficiency Wildlife Management Prof. National Chapter	0129, 0130

STANDARD III: Apply scientific principles to natural resource management activities.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
<p>III-A Apply scientific principles to natural resource management activities.</p>	<ol style="list-style-type: none"> 1. Develop a research/monitoring plan to inquire about a natural resource topic. 2. Conduct a research/monitoring activity for a natural resource topic. 3. Produce a technical report of results/findings. 	<p>CR 1-B,E LA 1-A,B,C,D LA 2-C; MA 1-B,C,D,E MA 4-D,E; MA 5-C MA 12-B; SC 1-B SC 2-A,B; SC 5-A; SC 6-E SC 11-F,G,H,I; SC 16-B</p>	<p>Environmental Science & Natural Resources Proficiency Forest Management Proficiency Wildlife Management Prof. National Chanter</p>	<p>0129, 0132, 0133, 0134, 0135,</p>
<p>III-B Examine biological and physical characteristics to identify and classify natural resources.</p>	<ol style="list-style-type: none"> 1. Identify tree species and other woody vegetation. 2. Identify grass and forb species. 3. Identify wildlife species. 4. Identify fish species. 5. Identify rocks, minerals and soil types. 	<p>CR 1-B,E LA 1-A,B,C,D SC 2-A,B; SC 5-A SC 10-B; SC 11-F,G,H,I SC 16-B</p>	<p>3 Proficiency Award Areas Wildlife CDE Forestry CDE Pasture & Range CDE Land Evaluation CDE</p>	<p>0129, 0130, 0132, 0133, 0134, 0135, 0136, 0141, 0142, 0143, 0145,</p>
<p>III-C Examine natural cycles and related phenomena to describe ecological concepts and principles.</p>	<ol style="list-style-type: none"> 1. Describe the hydrologic cycle. 2. Describe the nitrogen cycle. 3. Describe succession. 4. Describe population dynamics. 5. Describe primary and secondary producers. 6. Identify potential pollution sources. 7. Define watershed boundaries. 8. Describe the influence of weather and climatic factors. 	<p>CR 1-B,E LA 1-A,B,C,D MA 1-E MA 2-A SC 1-B SC 2-A,B; SC 5-A SC 11-F,G,H,I SC 12-A,D; SC 15-B,C SC 16-B</p>	<p>Environmental Science & Natural Resources Proficiency Forest Management Proficiency Forestry CDE</p>	<p>0129, 0133, 0134, 0135, 0136,</p>

STANDARD IV: Employ knowledge of natural resource industries to describe production practices and processing procedures.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
IV-A Prepare presentations to describe how natural resource products are produced, harvested, processed and used.	<ol style="list-style-type: none"> 1. Describe forest harvest techniques and procedures. 2. Describe wildlife harvest techniques and procedures. 3. Describe fish harvest techniques and procedures. 4. Describe how public recreation use is a product. 5. Describe how minerals and ores are extracted and processed. 6. Describe hydroelectric generation techniques and procedures. 	CR 1-B,E LA 1-A,B,C,D LA 2-B MA 2-A,C,D SC 1-B SC 2-A,B SC 5-A SC 11-F,G,H,I SC 16-B	Environmental Science & Natural Resources Proficiency Forest Management Proficiency Wildlife Management Prof. Wildlife CDE Forestry CDE Outdoor Recreation Proficiency	0135, 0136, 0143, 0145, 0161, 0162, 0163, 0171, 0172, 0173, 0174

STANDARD V: Practice responsible conduct to protect natural resources.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
V-A Employ techniques and equipment needed to prevent wildfire.	<ol style="list-style-type: none"> 1. Demonstrate personal fire prevention precautions while working in natural environments. 2. Participate in wildfire prevention service project. 	CR 1-B,E LA 1-A,B,C,D MA 2-A; SC 1-B SC 2-A,B; SC 5-A SC 11-F,G,H,I	Environmental Science & Natural Resources Proficiency Forest Management Proficiency Forestry CDE	0129, 0130, 0135,
V-B Recognize symptoms of animal and plant diseases and use appropriate techniques to prevent their spread.	<ol style="list-style-type: none"> 1. Identify observable diseases impacting plants and animals. 2. Describe how to report observance of disease infestations. 3. Use appropriate techniques and equipment when working with bio-hazards. 	CR 1-B,E LA 1-A,B,C,D MA 2-A; SC 1-B,D SC 11-F,G,H,I SC 16-B	Environmental Science & Natural Resources Proficiency Forest Management Proficiency Wildlife Management Prof. Wildlife CDE Forestry CDE	0129, 0136, 0141, 0142, 0143, 0145, 0161, 0162, 0163,

STANDARD V: Practice responsible conduct to protect natural resources.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
V-C Recognize insect types and available controls to prevent insect infestations.	<ol style="list-style-type: none"> 1. Identify and classify insects. 2. Identify insect damage signs. 3. Describe how to report observance of insect infestations. 	CR 1-B,E LA 1-A,B,C,D MA 2-A; SC 1-B SC 2-A,B; SC 5-A SC 10-B SC 11-F,G,H,I	Environmental Science & Natural Resources Proficiency Forest Management Proficiency Entomology CDE Forestry CDE	0129, 0134, 0135, 0136, 0141, 0142, 0143, 0145, 0161, 0162, 0163,
V-D Use acceptable pesticides to treat insect infestation.	<ol style="list-style-type: none"> 1. Obtain appropriate pesticide applicators' license. 2. Apply materials to treat for insect infestations. 	CR 1-B,E LA 1-A,B,C,D MA 1-B,C; MA 2-A SC 1-B; SC 2-A,B; SC 5-A SC 11-F,G,H,I; SC 16-D	Entomology CDE	0143, 0145, 0161, 0162

STANDARD VI: Identify public policies and regulations impacting environmental services to determine their effect on facility operation.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
VI-A Consult reliable resources or training to identify the major laws impacting environmental services.	<ol style="list-style-type: none"> 1. Identify key components of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). 2. Describe job-related activities subject to the Occupational Safety and Health Administration (OSHA). 3. Describe requirements of Resource Conservation and Recovery Act (RCRA). 4. Explain requirements of Clean Water Act. 5. Explain requirements of Safe Drinking Water Act. 6. Explain requirements of Clean Air Act. 	CR 1-B,E LA 1-A,B,C,D MA 2-A SC 1-B SC 2-A,B SC 5-A SC 11-F,G,H,I SC 12-A,D SS 2-B	Environmental Science & Natural Resources Proficiency Forest Management Proficiency Wildlife Management Prof. Forestry CDE National Chapter	0129, 0143, 0145, 0151, 0161, 0162

STANDARD VII: Apply scientific principles to environmental services.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
VII-A Apply meteorological knowledge to recognize weather systems and weather patterns.	<ol style="list-style-type: none"> 1. Identify the components of the earth's atmosphere. 2. Explain basic meteorology principles. 	CR 1-B,E LA 1-A,B,C,D MA 2-A; SC 1-B SC 2-A,B; SC 5-A SC 11-F,G,H,I; SC 12-A,D	Environmental Science & Natural Resources Proficiency	0134, 0135, 0142
VII-B Describe soil compositions and properties to demonstrate knowledge of soil science.	<ol style="list-style-type: none"> 1. Describe soil geology. 2. Describe composition of soil. 3. Describe the biological properties of soil. 4. Identify the physical properties of soil. 5. Describe the chemical properties of soil. 6. Test soil samples to determine characteristics. 7. Explain classification of soil water. 8. Explain the relationship between soil classifications and land use. 	CR 1-B,E LA 1-A,B,C,D MA 2-A SC 1-B SC 2-A,B SC 5-A SC 11-F,G,H,I SC 12-A,D	Environmental Science & Natural Resources Proficiency Forest Management Proficiency Forestry CDE Land Evaluation CDE	0129, 0134, 0135, 0136, 0141, 0142,
VII-C Explain well design and groundwater supplies to demonstrate knowledge of hydrology.	<ol style="list-style-type: none"> 1. Explain hydrology. 2. Explain geological and meteorological principles affecting groundwater supply. 3. Conduct channel flow analysis. 4. Identify basic criteria for water well design. 5. Identify environmental hazards associated with groundwater supplies. 	CR 1-B,E LA 1-A,B,C,D MA 2-A SC 2-A,B SC 5-A SC 11-F,G,H,I SC 12-A,D	Environmental Science & Natural Resources Proficiency Forest Management Proficiency Forestry CDE Homesite Evaluation CDE	0129, 0134, 0135, 0136, 0141, 0142
VII-D Discuss properties, classifications and functions in order to understand watershed principles.	<ol style="list-style-type: none"> 1. Identify properties of watersheds. 2. Explain watershed management. 3. Assess source water. 	CR 1-B,E LA 1-A,B,C,D; MA 2-A SC 2-A,B; SC 5-A SC 11-F,G,H; SC 12-A,D SS 2-B	Environmental Science & Natural Resources Proficiency Forest Management Proficiency Forestry CDE	0129, 0134, 0135, 0142

<p>VII-E Perform common microbiology procedures to examine cell types and conduct tests.</p>	<ol style="list-style-type: none"> 1. Identify groups of microorganisms. 2. Analyze factors affecting microbial growth. 3. Explain microbial growth. 4. Describe roles of microorganisms in the environment. 	<p>CR 1-B,E LA 1-A,B,C,D MA 2-A SC 2-A,B; SC 5-A SC 11-F,G,H,I SC 12-A,D</p>	<p>Environmental Science & Natural Resources Proficiency Forest Management Proficiency Forestry CDE Emerging Agricultural Technology Proficiency</p>	<p>0129, 0141, 0142,</p>
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STANDARD VIII: Understand environmental service systems.

BENCHMARK	PERFORMANCE STANDARD	ACADEMIC STANDARD BENCHMARK	FFA PROGRAM/ACTIVITY	COURSES ADDRESSING THE STANDARD AND BENCHMARK
<p>VIII-A Understand pollution control measures to maintain a safe facility environment.</p>	<ol style="list-style-type: none"> 1. Identify types of pollution (e.g. ground, surface water, air, noise, radioactive contamination). 2. Describe environmental impact from industrial and non-industrial processes. 	<p>CR 1-B,E LA 1-A,B,C,D MA2-A SC 2-A,B; SC 5-A SC 11-F,G,H,I SC 12-A,D; SC 15-B,C SC 16-B,C; SS 2-B</p>	<p>Environmental Science & Natural Resources Proficiency Partners for a Safer Community</p>	<p>0129, 0133, 0135,</p>
<p>VIII-B Apply hazardous materials management principles to assure a safe facility.</p>	<ol style="list-style-type: none"> 1. Describe risks related to hazardous materials. 2. Describe health and safety practices to reduce risks from hazardous materials. 3. Describe use appropriate use of Personal Protective Equipment. 	<p>CR 1-B,E LA 1-A,B,C,D MA2-A SC 2-A,B; SC 5-A SC 11-F,G,H,I SC 12-A,D; SC 15-B,C SC 16-B,C</p>	<p>Partners for a Safer Community Environmental Science & Natural Resources Proficiency</p>	<p>0129, 0133, 0135</p>