New Mexico Agriculture, Food & Natural Resources Course Framework

Science of Large Agricultural Animals (0161)

Suggested Course Length: 180 Days

AFNR Pathway: Animal Systems (AS), Biotechnology Systems (BS), Agribusiness Systems (ABS)

Prerequisite: Agricultural Science (0132) or Introduction to the Science of Agriculture (0133) Recommended.

Instructional Design Philosophy

Science of Large Agricultural Animals is an advanced animal science course focused on livestock production, animal health, nutrition, genetics, reproduction, biotechnology, facilities management, animal welfare, and agricultural marketing. Students develop scientific and technical competencies while studying beef, swine, sheep, goat, poultry, and exotic animal industries.

The SAE serves as the backbone of instruction. Students should develop a livestock ownership, breeding, production, placement, veterinary science, animal biotechnology, ranch management, or entrepreneurship SAE. Every unit should contribute to a comprehensive livestock management portfolio and animal systems capstone project.

Course-at-a-Glance

Quarter	Units	Days
Q1	Units 1-3	45
Q2	Units 4-6	45
Q3	Units 7-9	45
Q4	Units 10-12	45

Unit 1: Animal Agriculture Industry Overview

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Present and Future Industry Trends	AS.01 Animal Agriculture Systems	Industry Trends Report	Industry Associations	Livestock SAE
Animal Agriculture Careers	AS.04 Career Exploration	Career Portfolio	AgCareers	Career Development Events
Animal Agriculture in Society	AS.01 Industry Applications	Industry Analysis	Extension Resources	Exploratory SAE

Unit Assessment

- Animal Industry Report
- Animal Science Career Portfolio

Unit 2: Livestock Production Industries

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Beef Industry	AS.07 Animal Production Systems	Beef Industry Analysis	Beef Industry Council	Beef SAE
Swine Industry	AS.07 Species Management	Swine Production Evaluation	Pork Industry Resources	Swine SAE
Sheep and Goat Industry	AS.07 Small Ruminant Systems	Species Comparison Project	Sheep & Goat Associations	Sheep/Goat SAE
Poultry and Exotic Species	AS.07 Alternative Animal Systems	Poultry and Exotic Species Report	Poultry Industry Resources	Specialty Animal SAE

Unit Assessment

- Species Industry Portfolio
- Animal Industry Presentation

Unit 3: Animal Nutrition Fundamentals

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Nutritional Needs of Animals	AS.03 Animal Nutrition	Feed Evaluation	Feed Industry Resources	Livestock SAE
Animal Digestion Systems	AS.03 Digestive Physiology	Digestive System Model	Animal Science Curriculum	Research SAE
Nutrients and Their Importance	AS.03 Nutrient Management	Nutrient Analysis Activity	Extension Publications	Production SAE

Unit Assessment

- Feed Evaluation Project
- Animal Nutrition Portfolio

Unit 4: Feed Rations and Nutritional Management

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Balancing Rations	AS.03 Feeding Programs	Ration Formulation Project	Feed Software	Livestock SAE
Life-Cycle Feeding Programs	AS.03 Growth and Nutrition Systems	Feeding Plan	Industry Feeding Guides	Production SAE
Feed Cost Analysis	ABS.01 Economic Analysis	Feed Budget Activity	Farm Management Resources	Entrepreneurship SAE

Unit Assessment

- Livestock Feeding Program
- Ration Formulation Practicum

Unit 5: Animal Reproduction

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Reproductive Anatomy and Physiology	AS.06 Animal Reproduction	Reproductive Systems Lab	Animal Reproduction Curriculum	Breeding SAE
Natural Reproduction	AS.06 Reproductive Management	Reproduction Plan	Industry Resources	Livestock SAE
Animal Developmental Stages	AS.06 Production Life Cycles	Development Timeline	Species Resources	Animal Ownership SAE

Unit Assessment

- Reproduction Systems Assessment
- Animal Development Project

Unit 6: Reproductive Technologies

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Artificial Insemination	AS.06 Reproductive Technologies	Technology Report	AI Industry Resources	Research SAE
Embryo Transfer	AS.06 Genetic Improvement Technologies	Case Study Analysis	Breed Associations	Breeding SAE
Biotechnology Applications	BS.03 Biotechnology Applications	Biotechnology Presentation	Biotechnology Resources	Agriscience Fair

Unit Assessment

- Animal Biotechnology Portfolio

Unit 7: Genetics and Genetic Improvement

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Genetics Principles	AS.06 Genetic Principles	Genetics Problem Set	Genetics Curriculum	Breeding SAE
Selection Programs	AS.07 Genetic Improvement Systems	Selection Exercise	Livestock Evaluation Resources	Livestock SAE
Organismic and Molecular Biotechnology	BS.03 Biotechnology Systems	Biotechnology Investigation	CASE Biotechnology	Research SAE

Unit Assessment

- Genetics Portfolio
- Livestock Selection Project

Unit 8: Animal Health and Disease Management

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Managing Diseases and Parasites	AS.05 Animal Health	Disease Identification Lab	Veterinary Resources	Livestock SAE
Animal Health Programs	AS.05 Health Management Systems	Health Program Plan	Extension Publications	Production SAE
Animal Health Equipment	AS.05 Animal Care Systems	Equipment Identification Practicum	Veterinary Supply Catalogs	Veterinary Science CDE

Unit Assessment

- Animal Health Management Portfolio

Unit 9: Animal Facilities and Waste Management

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Livestock Facility Design	AS.07 Animal Housing Systems	Facility Layout Plan	NRCS Resources	Ranch Management SAE
Equipment and Facilities	AS.07 Production Facilities	Facility Evaluation	Industry Resources	Livestock Production SAE
Livestock Waste Management	ESS.02 Environmental Stewardship	Waste Management Plan	Extension Resources	Environmental SAE

Unit Assessment

- Facility Design Project
- Waste Management Plan

Unit 10: Animal Welfare and Behavior

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Animal Welfare Issues	AS.08 Animal Welfare & Ethics	Welfare Evaluation	Industry Guidelines	Livestock SAE
Environmental Factors Affecting Performance	AS.07 Production Environment	Environmental Assessment	Animal Production Resources	Research SAE
Animal Behavior and Safe Handling	AS.08 Animal Behavior Systems	Handling Demonstration	Livestock Handling Guides	Placement SAE

Unit Assessment

- Animal Welfare Case Study
- Handling Skills Evaluation

Unit 11: Livestock Marketing and Consumer Systems

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Supply and Demand Concepts	ABS.01 Economic Principles	Market Analysis	USDA Market Reports	Entrepreneurship SAE
Futures Contracts and Government Programs	ABS.01 Agricultural Economics	Futures Market Activity	Market News Reports	Agribusiness SAE
Consumer Preferences	ABS.01 Consumer Analysis	Consumer Trend Investigation	Industry Marketing Reports	Livestock Marketing SAE

Unit Assessment

- Livestock Marketing Portfolio

Unit 12: Science of Large Agricultural Animals Capstone

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Livestock Production Systems	AS.03-AS.08 Systems Integration	Production Portfolio	Industry Mentors	Livestock SAE
Animal Health and Nutrition	AS.03, AS.05	Comprehensive Management Plan	Extension Resources	Production SAE
Genetics and Reproduction	AS.06 Genetics & Reproduction Systems	Breeding Program	Breed Associations	Breeding SAE
Marketing and Economics	ABS.01 Economic Systems	Marketing Portfolio	Farm Credit Resources	Entrepreneurship SAE

Capstone Assessment

Students develop and present a complete **Large Animal Science Portfolio** including:

1. Livestock Industry Analysis
2. Nutrition Program
3. Ration Formulation Project
4. Genetics Evaluation
5. Reproduction Systems Plan
6. Animal Health Program

7. Facility Design Project
8. Waste Management Plan
9. Marketing Analysis
10. SAE Documentation and Reflection

SAE Backbone Model

Quarter	SAE Milestone
Q1	Establish livestock, veterinary science, or animal production SAE
Q2	Develop nutrition, reproduction, and management competencies
Q3	Implement health, genetics, and facility management projects
Q4	Complete marketing, economics, and capstone portfolio

End Goal

Every student completes a documented Livestock Production, Breeding, Veterinary Science, Ranch Management, Animal Biotechnology, or Entrepreneurship SAE while developing competencies in:

- Livestock Production
- Animal Nutrition
- Animal Reproduction
- Genetics & Biotechnology
- Animal Health

- Facility Management
- Waste Management
- Animal Welfare
- Agricultural Marketing
- Consumer Relations

This course serves as New Mexico's advanced large animal science course and provides preparation for Animal Systems pathway coursework, Veterinary Science, Livestock Evaluation, Meat Science, Agriscience Fair projects, and postsecondary animal science programs.