New Mexico Agriculture, Food & Natural Resources Course Framework

Physical Science of Agriculture (0134)

Suggested Course Length: 180 Days

AFNR Pathway: Animal Systems (AS), Plant Systems (PS), Natural Resource Systems (NRS), Biotechnology Systems (BS), Career Ready Practices (CRP) from

Recommended Grade Level: 9-10

Instructional Design Philosophy

Physical Science of Agriculture serves as an intermediate AFNR science course that integrates leadership development, SAE expansion, animal science, plant science, soil science, agricultural biotechnology, environmental stewardship, and career development. Students apply scientific principles to agricultural production systems while expanding leadership capacity through FFA and supervised agricultural experiences.

The SAE serves as the backbone of instruction. Students should expand an existing SAE or establish a new research, entrepreneurship, placement, or ownership SAE related to animal science, plant science, agriscience, soil science, or biotechnology. Every unit contributes directly to student SAE growth and portfolio development.

Course-at-a-Glance

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

Quarter	Units	Days
Q4	Units 10-12	45

Unit 1: FFA Leadership and SAE Expansion

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
FFA Degrees, Awards and CDEs	CRP.01 Career Planning & Management	Degree Planning Worksheet	National FFA Resources	Degree Advancement
Officer Duties and Responsibilities	CRP.03 Leadership Development	Officer Presentation	FFA Officer Guides	Leadership SAE
Planning and Organizing FFA Meetings	CRP.04 Communication & Team Leadership	Meeting Facilitation Activity	Parliamentary Procedure Resources	Chapter Officer Experience
Expanding SAE Programs	CRP.02 Personal Responsibility	SAE Growth Plan	SAE for All Resources	SAE Expansion

Unit Assessment

- SAE Expansion Plan
- FFA Leadership Portfolio
- Conducting a Chapter Meeting

Unit 2: Personal Skills, Careers and Communication

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Self-Assessment and Personal Skills	CRP.02 Personal Responsibility	Personal Skills Inventory	LifeKnowledge	Career Development SAE
Human Relations Skills	CRP.03 Professionalism	Workplace Scenario Analysis	Leadership Curriculum	Placement SAE
Effective Communication	CRP.04 Communication Skills	Presentation Activity	FFA LifeKnowledge	Leadership Development
Speaking and Listening Skills	CRP.04 Professional Communication	Persuasive Speech	Public Speaking Resources	Public Speaking LDE

Unit Assessment

- Career Readiness Portfolio
- Persuasive Agricultural Speech

Unit 3: Agriculture, Society and Global Systems

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Importance of Agriculture to Society	CRP.01 Industry Awareness	Agricultural Literacy Project	USDA Resources	Agricultural Advocacy
World Agricultural Production	ABS.01 Economic & Global Agricultural Systems	Global Agriculture Report	FAO, USDA	Agribusiness Exploration
Consumer Roles in Agriculture	ABS.01 Market Systems	Consumer Analysis	Farm Credit Resources	Entrepreneurship SAE
Agricultural Trends	CRP.05 Critical Thinking	Trend Analysis Report	Extension Resources	Career Exploration

Unit Assessment

- World Agriculture Portfolio
- Agricultural Trends Investigation

Unit 4: Agriscience, Research and Biotechnology

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Agricultural Research	BS.01 Scientific Inquiry	Research Proposal	CASE Curriculum	Agriscience SAE
Conducting Research	BS.01 Experimental Design	Research Investigation	Agriscience Fair Resources	Research SAE
Nature of Biotechnology	BS.03 Biotechnology Applications	Biotechnology Analysis	Biotechnology Resources	Biotechnology SAE
Technology in Agriculture	PST.05 Technology Applications	Technology Assessment	Industry Publications	Agriscience Research

Unit Assessment

- Agriscience Research Project
- Biotechnology Investigation

Unit 5: Animal Science Careers and Industry Trends

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Animal Science Industry Trends	AS.01 Animal Agriculture Systems	Industry Trends Report	Industry Associations	Animal SAE
Ways Animals Help People	AS.01 Animal Industry Applications	Community Impact Activity	Animal Agriculture Resources	Exploratory SAE
Animal Science Careers	AS.04 Career Exploration	Career Investigation	AgCareers	Career Development
Animal Selection Principles	AS.07 Animal Production Systems	Selection Exercise	Livestock Evaluation Resources	Livestock SAE

Unit Assessment

- Animal Industry Portfolio
- Career Exploration Project

Unit 6: Animal Nutrition and Digestion

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 Feed Nutrient Analysis	Nutrient Analysis Activity	Extension Publications	Production SAE
Balancing Rations	AS.03 Feeding Programs	Ration Formulation Project	Feed Software	Livestock Management SAE

Unit Assessment

- Feed Analysis Portfolio
- Livestock Nutrition Project

Unit 7: Animal Reproduction and Genetics

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Reproductive Anatomy and Physiology	AS.06 Animal Reproduction	Reproduction Systems Lab	Animal Reproduction Curriculum	Livestock SAE
Natural Reproduction	AS.06 Reproductive Management	Reproduction Plan	Industry Resources	Production SAE
Reproductive Technology	AS.06 Reproductive Technologies	Technology Report	AI and ET Resources	Agriscience SAE
Genetics	AS.06 Genetic Principles	Genetics Problem Set	Livestock Genetics Resources	Breeding SAE

Unit Assessment

- Animal Genetics Portfolio
- Reproduction Systems Assessment

Unit 8: Plant Science Foundations

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Plant Classification	PS.02 Plant Classification	Plant Identification Collection	Plant Identification Guides	Plant SAE
Flowers and Fruits	PS.02 Plant Anatomy	Flower Dissection Lab	Greenhouse Resources	Floriculture SAE
Plant Types and Uses	PS.02 Plant Characteristics	Plant Uses Project	Horticulture Resources	Entrepreneurship SAE
Plant Life Cycles	PS.03 Plant Reproduction	Life Cycle Investigation	Plant Science Curriculum	Crop Production SAE

Unit Assessment

- Plant Science Portfolio
- Plant Identification Practicum

Unit 9: Plant Growth and Propagation

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Nutrient Functions and Utilization	PS.01 Plant Growth Factors	Nutrient Deficiency Study	Extension Publications	Greenhouse SAE
Sexual Propagation	PS.03 Plant Reproduction	Seed Germination Project	Greenhouse Curriculum	Production SAE
Asexual Propagation	PS.03 Plant Propagation Methods	Propagation Lab	Nursery Resources	Entrepreneurship SAE
Tissue Culture	BS.03 Biotechnology Applications	Tissue Culture Investigation	Biotechnology Curriculum	Research SAE

Unit Assessment

- Plant Propagation Portfolio
- Tissue Culture Lab

Unit 10: Soil Science and Fertility

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Soil Degradation	NRS.02 Resource Conservation	Soil Degradation Analysis	NRCS Resources	Conservation SAE
Fertilizer Formulations	PS.01 Nutrient Management	Fertility Plan	Fertilizer Industry Resources	Crop Production SAE
Nutrient Deficiencies	PS.01 Plant Nutrition Systems	Deficiency Identification Activity	Plant Diagnostic Guides	Agriscience SAE
Soil Fertility Management	PS.01 Crop Production Systems	Soil Fertility Program	Extension Publications	Production SAE

Unit Assessment

- Soil Fertility Portfolio
- Nutrient Management Project

Unit 11: Soil Conservation and Irrigation

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Soil Erosion and Conservation	NRS.02 Conservation Practices	Conservation Plan	Conservation District Resources	Soil Conservation SAE
Soil Loss Calculations	NRS.02 Resource Management	Soil Loss Analysis	RUSLE Resources	Research SAE
Conservation Tillage	NRS.02 Sustainable Management	Tillage Comparison	NRCS Publications	Environmental SAE
Irrigation Systems	PS.04 Water Management Systems	Irrigation Plan	Irrigation Association Resources	Crop Production SAE

Unit Assessment

- Soil Conservation Plan
- Irrigation Management Project

Unit 12: Physical Science of Agriculture Capstone

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Agricultural Systems Integration	AS, PS, BS, NRS Systems Integration	Comprehensive Agricultural Analysis	AFNR Resources	Comprehensive SAE
Agricultural Communication	CRP.04 Communication Skills	Final Presentation	FFA Resources	Public Speaking
Research and Problem Solving	BS.01 Scientific Inquiry	Research Portfolio	Agriscience Fair Resources	Research SAE
Career and Leadership Development	CRP.01 Career Planning & Management	Career Portfolio	AgCareers	Degree Advancement

Capstone Assessment

Students develop and present a complete **Physical Science of Agriculture Portfolio** including:

1. FFA Leadership Record
2. SAE Growth Documentation
3. Agriscience Research Project
4. Animal Science Investigation
5. Genetics Project
6. Plant Science Portfolio

7. Propagation Project
8. Soil Conservation Plan
9. Irrigation Management Project
10. Career and Leadership Reflection

SAE Backbone Model

Quarter	SAE Milestone
Q1	Expand SAE and establish leadership goals
Q2	Develop animal science and agriscience research competencies
Q3	Implement plant science and biotechnology projects
Q4	Complete soil conservation and capstone portfolio

End Goal

Every student completes a documented SAE while demonstrating competencies in:

- FFA Leadership
- SAE Development
- Agriscience Research
- Biotechnology
- Animal Nutrition

- Animal Reproduction & Genetics
- Plant Propagation
- Soil Science
- Conservation Practices
- Irrigation Management
- Agricultural Communication

This course serves as New Mexico's advanced introductory agricultural science course and bridges students into specialized pathway courses including Animal Science, Plant Science, Agriscience Research, Environmental Science, Greenhouse Operations, and Applied Science in Agriculture.