New Mexico Agriculture, Food & Natural Resources Course Framework

Science in Horticulture / Botany (0141)

Suggested Course Length: 180 Days

AFNR Pathway: Plant Systems (PS), Biotechnology Systems (BS), Agribusiness Systems (ABS)

Prerequisite: Agricultural Science (0132) Recommended

Instructional Design Philosophy

Science in Horticulture/Botany is an advanced plant science course focused on plant biology, physiology, propagation, greenhouse production, nursery management, soil science, genetics, plant health, and horticultural crop production. Students investigate the scientific principles that drive plant growth and apply those principles through laboratory, greenhouse, and nursery experiences.

The SAE serves as the backbone of instruction. Students should develop a greenhouse, nursery, floriculture, plant science research, plant propagation, landscape, biotechnology, or horticultural entrepreneurship SAE. Each unit contributes to a comprehensive plant science portfolio and capstone greenhouse/nursery 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: Introduction to Horticulture

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Understanding Horticulture	PS.01 Plant Industry Systems	Horticulture Industry Report	MyCAERT, NMSU Extension	Exploratory Horticulture SAE
Importance of the Horticulture Industry	PS.01 Plant Industry Applications	Industry Analysis	SAF Resources	Floriculture SAE
Career Opportunities in Horticulture	CRP.01 Career Planning & Management	Career Portfolio	AgCareers	Career Exploration SAE
Environmental Impacts of Horticulture	PS.01 Sustainable Plant Production	Environmental Impact Assessment	Extension Resources	Agriscience SAE

Unit Assessment

- Horticulture Career Portfolio
- Industry Analysis Report

Unit 2: Horticulture Safety and Plant Classification

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Horticulture Safety	PS.01 Safe Plant Production Practices	Safety Certification	Greenhouse Safety Curriculum	Greenhouse SAE
Classifying Ornamental Plants	PS.02 Plant Identification and Classification	Plant Collection	Plant ID Resources	Floriculture SAE
Classifying and Naming Plants	PS.02 Plant Taxonomy	Taxonomy Lab	Botanical References	Plant Science SAE

Unit Assessment

- Plant Identification Practicum
- Greenhouse Safety Certification

Unit 3: Plant Anatomy and Morphology

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Root Anatomy	PS.02 Plant Structure and Function	Root Structure Lab	Plant Biology Resources	Research SAE
Stem Anatomy	PS.02 Plant Structure Systems	Stem Investigation	Greenhouse Curriculum	Plant Production SAE

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Leaf Anatomy and Morphology	PS.02 Plant Morphology	Leaf Classification Activity	Botanical Guides	Agriscience SAE
Flower Anatomy	PS.02 Reproductive Structures	Flower Dissection Lab	Floral Resources	Floriculture SAE

Unit Assessment

- Plant Anatomy Portfolio
- Plant Structure Laboratory Practical

Unit 4: Plant Physiology

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Plant Physiology	PS.02 Plant Growth and Development	Physiology Investigation	Plant Science Curriculum	Research SAE
Photosynthesis	PS.02 Plant Energy Systems	Photosynthesis Lab	Biology Resources	Agriscience Fair
Respiration	PS.02 Plant Metabolism	Respiration Investigation	Science Resources	Experimental SAE
Plant Growth Regulators	PS.02 Growth Processes	Growth Regulator Study	Industry Publications	Greenhouse Production SAE

Unit Assessment

- Plant Physiology Investigation
- Photosynthesis Lab Report

Unit 5: Environmental Factors Affecting Plant Growth

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Light Effects on Plant Growth	PS.01 Plant Growth Factors	Light Experiment	Greenhouse Resources	Plant SAE
Temperature Effects	PS.01 Crop Production Systems	Temperature Study	Controlled Environment Resources	Greenhouse SAE
Water and Air Relationships	PS.01 Environmental Factors	Water Management Activity	Irrigation Resources	Production SAE

Unit Assessment

- Environmental Factors Research Project

Unit 6: Plant Reproduction and Genetics

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Sexual Reproduction	PS.03 Plant Reproduction	Germination Investigation	Propagation Curriculum	Plant Production SAE
Crossbreeding and Hybrids	BS.03 Genetic Applications	Genetics Activity	Plant Breeding Resources	Research SAE
Plant Life Cycles	PS.03 Plant Development	Life Cycle Project	Plant Science Texts	Floriculture SAE

Unit Assessment

- Plant Genetics Portfolio
- Plant Reproduction Project

Unit 7: Plant Propagation Systems

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Cuttings	PS.03 Plant Propagation Methods	Rooting Project	Nursery Guides	Nursery SAE
Division and Layering	PS.03 Asexual Reproduction	Propagation Trial	Greenhouse Resources	Entrepreneurship SAE
Grafting and Budding	PS.03 Advanced Propagation	Grafting Demonstration	Fruit Crop Resources	Orchard SAE

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Tissue Culture	BS.03 Biotechnology Applications	Tissue Culture Investigation	CASE Biotechnology	Research SAE

Unit Assessment

- Propagation Practicum
- Tissue Culture Lab

Unit 8: Growing Media and Soil Science

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Properties of Growing Media	PS.01 Plant Growth Factors	Media Analysis	Greenhouse Resources	Greenhouse SAE
Growing Media Components	PS.01 Soil and Media Systems	Media Formulation Activity	Industry Suppliers	Nursery SAE
Nature and Formation of Soil	PS.01 Soil Properties	Soil Profile Investigation	NRCS Resources	Soil Science SAE

Unit Assessment

- Growing Media Portfolio

- Soil Science Lab

Unit 9: Plant Nutrition and Crop Production

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Nutrient Functions and Utilization	PS.01 Nutrient Management	Nutrient Deficiency Study	Extension Publications	Crop Production SAE
Supplying Nutrients to Floriculture Crops	PS.01 Fertility Management	Fertility Plan	Greenhouse Curriculum	Floriculture SAE
Specialty Crop Production	PS.01 Plant Production Systems	Crop Production Log	Industry Resources	Entrepreneurship SAE

Unit Assessment

- Greenhouse Crop Production Record Book

Unit 10: Greenhouse Crop Production

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Growing Poinsettias	PS.01 Crop Production Systems	Production Schedule	Greenhouse Guides	Floriculture SAE
Growing Chrysanthemums	PS.01 Specialty Crop Production	Crop Production Journal	SAF Resources	Greenhouse Enterprise SAE
Bedding Plants and Foliage Plants	PS.01 Controlled Environment Production	Crop Evaluation	Greenhouse Curriculum	Entrepreneurship SAE
Bulbs, Corms and Tubers	PS.03 Plant Reproduction Systems	Crop Comparison Project	Industry References	Floriculture SAE

Unit Assessment

- Specialty Crop Production Portfolio

Unit 11: Nursery Crop Production and Plant Health

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Nursery Production Facilities	PS.01 Plant Production Facilities	Facility Evaluation	Nursery Industry Resources	Nursery SAE
Producing Nursery Crops	PS.01 Plant Production Systems	Nursery Production Log	Industry Guides	Production SAE

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Managing Plant Pests	PS.03 Plant Health Management	Pest Identification Lab	IPM Resources	Agriscience SAE
Safe Pesticide Use	PS.03 Plant Protection Systems	Pesticide Safety Assessment	EPA Resources	Commercial Applicator Preparation

Unit Assessment

- Nursery Production Portfolio
- Integrated Pest Management Project

Unit 12: Nursery Management and Horticultural Science Capstone

Length: 15 Days

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Packaging Nursery Crops	ABS.01 Product Marketing Systems	Packaging Evaluation	Industry Sources	Entrepreneurship SAE
Managing the Nursery Business	ABS.01 Business Operations	Nursery Business Plan	SBA Resources	Nursery Enterprise SAE
Horticultural Science Integration	PS.01-PS.03 Systems Integration	Comprehensive Plant Portfolio	Industry Partners	Proficiency Awards

Course Competency	AFNR Performance Indicator	Sample Measurement	Teacher Resources	SAE/FFA Connection
Scientific Communication	CRP.04 Communication Skills	Capstone Presentation	FFA Resources	Degree Advancement

Capstone Assessment

Students develop and present a complete **Horticultural Science Portfolio** including:

1. Plant Classification Collection
2. Plant Anatomy Portfolio
3. Plant Physiology Investigation
4. Genetics Project
5. Propagation Portfolio
6. Soil Science Analysis
7. Nutrient Management Plan
8. Greenhouse Crop Production Record
9. Nursery Business Plan
10. SAE Documentation and Reflection

SAE Backbone Model

Quarter	SAE Milestone
Q1	Establish greenhouse, nursery, floriculture, or plant science SAE

Quarter	SAE Milestone
Q2	Develop plant physiology, genetics, and propagation projects
Q3	Manage greenhouse crops and maintain production records
Q4	Complete nursery business plan and capstone portfolio

End Goal

Every student completes a documented Greenhouse, Nursery Production, Floriculture, Plant Science Research, Biotechnology, or Horticultural Entrepreneurship SAE while developing competencies in:

- Plant Anatomy & Physiology
- Plant Genetics
- Plant Reproduction
- Plant Propagation
- Soil Science
- Plant Nutrition
- Greenhouse Production
- Nursery Management
- Integrated Pest Management
- Horticultural Entrepreneurship

This course serves as New Mexico's advanced plant science and botany course and provides strong preparation for Greenhouse/Nursery Operations, Floriculture, Landscape, Agriscience Research, Biotechnology, and postsecondary plant science programs.