



Agriculture, Food, and Natural Resources Career Cluster

The Agriculture, Food, and Natural Resources (AFNR) career cluster focuses on the essential elements of life, food, water, land, and air. This career cluster includes occupations, ranging from farmer, rancher, and veterinarian to geologist, land conservationist, and florist.

Statewide Program of Study: Plant Science

The Plant Science program of study focuses on occupational and educational opportunities associated with the science, research, and business of plants and other living organisms. This program of study includes the application of biology and life science to real-world life processes of plants and vegetation, either in laboratories or in the field.



Secondary Courses for High School Credit

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|----------------|--|
| Level 1 | <ul style="list-style-type: none"> Principles of Agriculture, Food, and Natural Resources |
| Level 2 | <ul style="list-style-type: none"> Landscape Design and Management Turf Grass Management Greenhouse Operation and Production Greenhouse Operation and Production + Agricultural Laboratory and Field Experience Entrepreneurship I |
| Level 3 | <ul style="list-style-type: none"> Viticulture Floral Design Floral Design + Agricultural Laboratory and Field Experience Horticultural Science Horticultural Science + Agricultural Laboratory and Field Experience |
| Level 4 | <ul style="list-style-type: none"> Advanced Plant and Soil Science Advanced Floral Design Practicum in Agriculture, Food, and Natural Resources Practicum in Agriculture, Food, and Natural Resources + Extended Practicum in Agriculture, Food, and Natural Resources Practicum in Entrepreneurship Career Preparation for Programs of Study Career Preparation for Programs of Study + Extended Career Preparation Career and Technical Education Project-Based Capstone Scientific Research and Design |

Aligned Advanced Academic Courses

AP or IB	<ul style="list-style-type: none"> AP Biology AP Environmental Science IB Biology SL IB Biology HL 	<ul style="list-style-type: none"> AP Chemistry IB Chemistry SL IB Chemistry HL
Dual Credit	Dual credit offerings will vary by Local Education Agency	

Students should be advised to consider these course opportunities to enrich their preparation. AP or IB courses not listed under the Secondary Courses for High School Credit section of this framework document do not count towards Concentrator/Completer status for this program of study.

Work-Based Learning and Expanded Learning Opportunities

Work-Based Learning Activities	<ul style="list-style-type: none"> Work in a part-time job at a landscaping company to learn about production and management of plants. Intern at an agricultural research company, working alongside a biological technician to learn about application of biology to plant production
Expanded Learning Opportunities	<ul style="list-style-type: none"> Participate in an FFA career, leadership, and speaking contest like an agriscience fair Participate in an industry-related competition like an agriscience fair

Aligned Industry-Based Certifications

- Agricultural Biotechnology
- BASF Plant Science Certification
- Commercial/NonCommercial Pesticide Applicator
- Commercial/NonCommercial Pesticide Applicator "Vegetation Management" License
- Horticulture - Landscaping - Job Ready
- Landscape Irrigator
- Principles of Floral Design Certification
- Production Agriculture - Job Ready
- Texas Certified Landscape Associate (TCLA)
- Texas Certified Nursery Professional
- Texas State Florist's Association Knowledge Based Floral Certification
- Texas State Florist's Association Level I Floral Certification
- Texas State Florist's Association Level II Floral Certification



Example Postsecondary Opportunities

Apprenticeships

- Horticulturist

Associate Degrees

- Biology/Biological Sciences
- Biological and Physical Sciences

Bachelor's Degrees

- Horticulture
- Plant Pathology/Phytopathology

Master's, Doctoral, and Professional Degrees

- Plant Breeding
- Botany/Plant Biology

Additional Stackable IBCs/Licensures

- Nursery Floral License
- Horticulturist Certification



Example Aligned Occupations

Pesticide Handlers, Sprayers, and Applicators, Vegetation

Median Wage: \$46,153
Annual Openings: 205
10-Year Growth: 17%

Biological Technicians

Median Wage: \$45,787
Annual Openings: 879
10-Year Growth: 14%

Farmers, Ranchers, and Other Agricultural Managers

Median Wage: \$65,490
Annual Openings: 28,020
10-Year Growth: 4%

Data Source: TexasWages, Texas Workforce Commission. Retrieved 3/8/2024



For more information visit:

<https://tea.texas.gov/academics/college-career-and-military-prep/career-and-technical-education/programs-of-study-additional-resources>



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Statewide Program of Study: *Plant Science*

Course Information

Level 1

Course	Prerequisites Corequisites	Career Clusters
Principles of Agriculture, Food, and Natural Resources* 13000200 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	

Level 2

Course	Prerequisites Corequisites	Career Clusters
Landscape Design and Management 13001900 (0.5 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Turf Grass Management 13001950 (0.5 credit)	Prerequisites: None Corequisites: None	
Greenhouse Operation and Production 13002050 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Greenhouse Operation and Production + Agricultural Laboratory and Field Experience 13002060 (2 credits)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Entrepreneurship I* 13011101 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Principles of Business, Marketing and Finance Recommended Corequisites: None	

Level 3

Course	Prerequisites Corequisites	Career Clusters
Viticulture N1300265 (1 credit)	Prerequisites: at least one credit in a course from the AFNR career cluster Corequisites: None Recommended Prerequisites: Principles of AFNR Recommended Corequisites: None	
Floral Design 13001800 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Floral Design + Agricultural Laboratory and Field Experience 13001810 (2 credits)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	

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* Indicates course is included in more than one program of study.

For additional information on the **Agriculture, Food, and Natural Resources** career cluster, contact cte@tea.texas.gov or visit <https://tea.texas.gov/cte>



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Level 3

Course	Prerequisites Corequisites	Career Clusters
Horticultural Science 13002000 (1 credit)	Prerequisites: at least one credit in a course from the Agriculture, Food, and Natural Resources Career Cluster Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Horticultural Science + Agricultural Laboratory and Field Experience 13002010 (2 credits)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	

Level 4

Course	Prerequisites Corequisites	Career Clusters
Advanced Plant and Soil Science 13002100 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Biology, Integrated Physics and Chemistry, Chemistry, or Physics and a minimum of one credit from the courses in the AFNR career cluster Recommended Corequisites: None	
Advanced Floral Design N1300270 (1 credit)	Prerequisites: Floral Design Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Practicum in Agriculture, Food, and Natural Resources* First Time Taken: 13002500 (2 credits) Second Time Taken: 13002510 (2 credits)	Prerequisites: a minimum of two credits with at least one course in a Level 2 or higher course from the AFNR career cluster Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	

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Level 4

Course	Prerequisites Corequisites	Career Clusters
Practicum in Agriculture, Food, and Natural Resources + Extended Practicum in Agriculture, Food, and Natural Resources* First Time Taken: 13002505 (3 credits) Second Time Taken: 13002515 (3 credits)	Prerequisites: a minimum of two credits with at least one course in a Level 2 or higher course from the AFNR career cluster Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Practicum in Entrepreneurship* First Time Taken: 13011111 (2 credits)	Prerequisites: None Corequisites: None Recommended Prerequisites: Entrepreneurship I and Entrepreneurship II or successful completion of at least two courses in a CTE program of study Recommended Corequisites: None	
Career Preparation for Programs of Study* First Time Taken: 12701121 (2 credits)	Prerequisites: at least one Level 2 or higher CTE course Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Career Preparation for Programs of Study + Extended Career Preparation* First Time Taken: 12701141 (3 credits)	Prerequisites: at least one Level 2 or higher CTE course Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Career and Technical Education Project-Based Capstone* First Time Taken: 12701101 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Scientific Research and Design 13037200 (1 credit)	Prerequisites: Biology, Chemistry, Integrated Physics, Chemistry (IPC), or Physics Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	

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