



# 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

- Level 1**
- Principles of Agriculture, Food, and Natural Resources
- Level 2**
- Landscape Design and Management
  - Turf Grass Management
  - Greenhouse Operation and Production
  - Greenhouse Operation and Production + Agricultural Laboratory and Field Experience
  - Entrepreneurship I
- Level 3**
- Viticulture
  - Horticultural Science
  - Horticultural Science + Agricultural Laboratory and Field Experience
  - Floral Design
  - Floral Design + Agricultural Laboratory and Field Experience
- Level 4**
- Advanced Plant and Soil Science
  - Advanced Floral Design
  - Career and Technical Education Project-Based Capstone
  - 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
  - Practicum in Entrepreneurship + Extended Practicum in Entrepreneurship
  - Career Preparation for Programs of Study
  - Career Preparation for Programs of Study + Extended Career Preparation
  - Scientific Research and Design

## Aligned Advanced Academic Courses

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

## 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 Florists' Association Knowledge Based Floral Certification
- Texas State Florists' Association Level I Floral Certification
- Texas State Florists' Association Level II Floral Certification

Successful completion of the Plant Science program of study will fulfill requirements of the Business and Industry endorsement.



## 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/License

- Nursery Floral License
- Horticulture 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>



# Agriculture, Food, and Natural Resources Career Cluster

## Statewide Program of Study: Plant Science

### Course Information

Level 1

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

Level 2

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

Level 3

Course	Prerequisites   Corequisites	Career Clusters
<b>Viticulture</b> N1300265 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Principles of AFNR <b>Recommended Corequisites:</b> None	

*Continued on next page*

\* 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](mailto:cte@tea.texas.gov) or visit <https://tea.texas.gov/cte>



[LEA name] does not discriminate on the basis of race, color, national origin, sex, or disability in its programs or activities and provides equal access to the Boy Scouts and other designated youth groups. The following person has been designated to handle inquiries regarding the nondiscrimination policies: [title], [address], [telephone number], [email]. Further nondiscrimination information can be found at [Notification of Nondiscrimination in Career and Technical Education Programs](#).



# Agriculture, Food, and Natural Resources Career Cluster

## Statewide Program of Study: *Plant Science*

### Course Information

Level 3

Course	Prerequisites   Corequisites	Career Clusters
<b>Horticultural Science</b> 13002000 (1 credit)	<b>Prerequisites:</b> At least one credit in a course from the AFNR career cluster <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	
<b>Horticultural Science + Agricultural Laboratory and Field Experience</b> 13002010 (2 credits)	<b>Prerequisites:</b> At least one credit in a course from the AFNR career cluster <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	
<b>Floral Design</b> 13001800 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	
<b>Floral Design + Agricultural Laboratory and Field Experience</b> 13001810 (2 credits)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	

Level 4

Course	Prerequisites   Corequisites	Career Clusters
<b>Advanced Plant and Soil Science</b> 13002100 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Biology, Integrated Physics and Chemistry, Chemistry, or Physics and a minimum of one credit in a course from the AFNR career cluster <b>Recommended Corequisites:</b> None	
<b>Advanced Floral Design</b> N1300270 (1 credit)	<b>Prerequisites:</b> Floral Design <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	
<b>Career and Technical Education Project-Based Capstone*</b> First Time Taken: 12701101 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	

*Continued on next page*

\* 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](mailto:cte@tea.texas.gov) or visit <https://tea.texas.gov/cte>



# Agriculture, Food, and Natural Resources Career Cluster

## Statewide Program of Study: Plant Science

### Course Information

Level 4

Course	Prerequisites   Corequisites	Career Clusters
<b>Practicum in Agriculture, Food, and Natural Resources*</b> First Time Taken: 13002500 (2 credits) Second Time Taken: 13002510 (2 credits)	<b>Prerequisites:</b> A minimum of two credits with at least one course in a Level 2 or higher course from the AFNR career cluster <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	
<b>Practicum in Agriculture, Food, and Natural Resources + Extended Practicum in Agriculture, Food, and Natural Resources*</b> First Time Taken: 13002505 (3 credits) Second Time Taken: 13002515 (3 credits)	<b>Prerequisites:</b> A minimum of two credits with at least one course in a Level 2 or higher course from the AFNR career cluster <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	
<b>Practicum in Entrepreneurship*</b> First Time Taken: 13011111 (2 credits)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Entrepreneurship I and Entrepreneurship II or successful completion of at least two courses in a CTE program of study <b>Recommended Corequisites:</b> None	
<b>Practicum in Entrepreneurship + Extended Practicum in Entrepreneurship*</b> First Time Taken: 13011121 (3 credits)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Entrepreneurship I and Entrepreneurship II or successful completion of at least two courses in a CTE program of study <b>Recommended Corequisites:</b> None	
<b>Career Preparation for Programs of Study*</b> First Time Taken: 12701121 (2 credits)	<b>Prerequisites:</b> At least one Level 2 or higher CTE course <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	
<b>Career Preparation for Programs of Study + Extended Career Preparation*</b> First Time Taken: 12701141 (3 credits)	<b>Prerequisites:</b> At least one Level 2 or higher CTE course <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	

*Continued on next page*

\*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](mailto:cte@tea.texas.gov) or visit <https://tea.texas.gov/cte>

[LEA name] does not discriminate on the basis of race, color, national origin, sex, or disability in its programs or activities and provides equal access to the Boy Scouts and other designated youth groups. The following person has been designated to handle inquiries regarding the nondiscrimination policies: [title], [address], [telephone number], [email]. Further nondiscrimination information can be found at [Notification of Nondiscrimination in Career and Technical Education Programs](#).



# Agriculture, Food, and Natural Resources Career Cluster

## Statewide Program of Study: *Plant Science*

### Course Information

Level 4

Course	Prerequisites   Corequisites	Career Clusters
<b>Scientific Research and Design*</b> 13037200 (1 credit)	<b>Prerequisites:</b> Biology, Chemistry, Integrated Physics and Chemistry (IPC), or Physics <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	

\* 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](mailto:cte@tea.texas.gov) or visit <https://tea.texas.gov/cte>



[LEA name] does not discriminate on the basis of race, color, national origin, sex, or disability in its programs or activities and provides equal access to the Boy Scouts and other designated youth groups. The following person has been designated to handle inquiries regarding the nondiscrimination policies: [title], [address], [telephone number], [email]. Further nondiscrimination information can be found at [Notification of Nondiscrimination in Career and Technical Education Programs](#).