



AGRIBUSINESS

ANIMAL SCIENCE

**ENVIRONMENTAL
AND NATURAL
RESOURCES**

PLANT SCIENCE

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 a diverse spectrum of occupations, ranging from farmer, rancher, and veterinarian to geologist, land conservationist, and florist. It also includes non-traditional agricultural occupations like wind energy, solar energy, and oil and gas production.

Agribusiness Statewide Program of Study



The Agribusiness program of study explores the occupations and educational opportunities associated with the business of farming and agriculturally related business that supplies farm inputs, such as machinery and seeds. This program of study may also include exploration into the marketing of farm products, the purchase of farm products either for further processing or resale and grading or classifying unprocessed food or other agricultural products.

Secondary Courses for High School Credit

Level 1

- Principles of Agriculture, Food, and Natural Resources

Level 2

- Professional Communications

Level 3

- Agribusiness Management and Marketing

Level 4

- Practicum in Agriculture, Food, and Natural Resources
- Career Preparation I/Extended

Postsecondary Opportunities

Associates Degrees

- Agricultural Business and Management, General
- Banking and Financial Support Services
- Advertising
- Marketing/ Marketing Management, General

Bachelor's Degrees

- Agricultural Business and Management, General
- Finance, General
- Financial Mathematics
- Marketing/ Marketing Management, General

Master's, Doctoral, and Professional Degrees

- Agricultural Business and Management, General
- Finance, General
- Financial Mathematics
- Marketing/ Marketing Management, General

Work-Based Learning and Expanded Learning Opportunities

Exploration Activities	Work-Based Learning Activities
<ul style="list-style-type: none">Tour a farm machinery products companyParticipate in Texas FFA	<ul style="list-style-type: none">Intern with a farm machinery products companyWork on a farm or ranch

Industry-Based Certifications

- Entrepreneurship and Small Business
- Microsoft Office Specialist: Microsoft Excel Expert (Excel and Excel 2019)
- Production Agriculture - Job Ready

- Microsoft Office Specialist Excel*
- *IBC sunseting 8/31/24



Aligned Occupations

Occupations	Median Wage	Annual Openings	% Growth
Farmers, Ranchers, and Other Agricultural Managers	\$59,134	405	9%
Farm and Ranch Loan Officers	\$45,594	268	25%
Buyers and Purchasing Agents, Farm Products	\$46,488	268	20%

Successful completion of the Agribusiness program of study will fulfill requirements of the Business and Industry Endorsement. Revised – August 2022

Agribusiness

Course Information

Level 1

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5100 Principles of Agriculture, Food, and Natural Resources	13000200 (1 credit)	None	9-12

Level 2

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
7220 Professional Communications	13009900 (.5 credit)	None	9-12

Level 3

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5101 Agribusiness Management and Marketing	13000900 (1 credit)	Recommended: Principles of Ag or Principles of Business	10-12

Level 4

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5130 Practicum in Agriculture, Food, and Natural Resources	13002510 (2 credits)	Agribusiness, Management, and Marketing	11-12
5090/ 5091 Career Preparation I/Extend	12701300 (2 credits) 12701305 (3 credits)	None	11-12
5092/5093 Career Preparation II/Extend	12701400 (2 credits) 12701405 (3 credits)	Career Prep I	12

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Animal Science Statewide Program of Study



The Animal Science program of study focuses on the science, research, and business of animals and other living organisms. It teaches CTE learners how to apply biology and life science to real-world life processes of animals and wildlife, either in laboratories or in the field, which could include a veterinary office, a farm or ranch, or any outdoor area harboring animal life. Students may also research and analyze the growth and destruction of species and research or diagnose diseases and injuries of animals.

Secondary Courses for High School Credit

Level 1

- Principles of Agriculture, Food, and Natural Resources

Level 2

- Small Animal Management
- Equine Science

Level 3

- Livestock Production/Lab
- Veterinary Medical Applications/Lab

Level 4

- Advanced Animal Science
- Practicum in Agriculture, Food, and Natural Resources
- Project-Based Research
- ISM - Scientific Research and Design

Postsecondary Opportunities

Associates Degrees

- Food Science and Technology
- Veterinary Studies
- Biotechnology Laboratory Technician
- Biology Technician

Bachelor's Degrees

- Animal Sciences
- Agriculture
- Biology
- Zoology/ Animal Biology

Master's, Doctoral, and Professional Degrees

- Genetics
- Veterinary Medicine
- Biological and Physical Sciences
- Biological and Biomedical Sciences

Work-Based Learning and Expanded Learning Opportunities

Exploration Activities

- Participate in Texas FFA

Work-Based Learning Activities

- Compete in an Agri-Science Fair 4H
- Volunteer at a local farm or with a veterinarian
- Participate in an FFA supervised agriculture experience

Industry-Based Certifications

- Agricultural Biotechnology
- Certified Veterinary Assistant, Level 1
- Elanco Fundamentals of Animal Science Certification
- Elanco Veterinary Medical Applications Certification
- Equine Management & Evaluation Certification
- Feedyard Technician in Cattle Care and Handling
- Licensed Veterinary Technician
- Production Agriculture - Job Ready
- Small Animal Science and Technology



Aligned Occupations

Occupations	Median Wage	Annual Openings	% Growth
Animal Breeders	\$39,139	28	9%
Animal Scientists	\$57,533	22	12%
Medical Scientists	\$63,898	435	27%
Veterinarians	\$93,496	294	24%
Zoologists and Wildlife Biologists	\$67,309	45	32%

Successful completion of the Animal Science program of study will fulfill requirements of a Business and Industry endorsement or STEM endorsement if the math and science requirements are met. Revised – August 2022

Animal Science

Course Information

Level 1

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5100 Principles of Agriculture, Food, and Natural Resources	13000200 (1 credit)	None	9-12

Level 2

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5190 Small Animal Management	13000400 (0.5 credit)	Recommended: Principles of Ag	9-12
5135 Equine Science	13000500 (0.5 credit)	Recommended: Principles of Ag	9-12

Level 3

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5185 Livestock Production	13000300 (1 credit)	Recommended: Principles of Ag	10-12
5105 Veterinary Medical Applications	13000600 (1 credit)	Small Animal Mang, Equine Science, or Livestock Prod	11-12

Level 4

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5155 Advanced Animal Science	13000700 (1 credit)	Biology and Chemistry or IPC; Algebra I and Geometry; and Small Animal, Equine Sci, or Livestock Prod Recommended: Vet Med Apps	11-12
5150 Practicum in Agriculture, Food, and Natural Resources – Certified Vet Assistant	13002500 (2 credits)	Vet Med Applications Course #5105	12
5130 Practicum in Agriculture, Food, and Natural Resources	130025010(2 credits)	At least one course in Animal Science	11-12
5008 Project-Based Research	12701500 (1 credit)	None	11-12
0030 ISM - Scientific Research and Design	13037200 (1 credit)	Biology, Chemistry, IPC, or Physics	11-12

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Environmental and Natural Resources Statewide Program of Study



The Environmental and Natural Resources program of study explores the occupations and educational opportunities associated with the research, design, and planning of engineering or technical duties in the prevention and control of environmental hazards. This program of study may also include exploration into conducting research for the purpose of identifying, abating, or eliminating sources of pollutants or hazards that affect either the environment or the health of the population.

Secondary Courses for High School Credit

Level 1

- Principles of Agriculture, Food, and Natural Resources

Level 2

- Wildlife, Fisheries, and Ecology Management/Lab

Level 3

- Project-Based Research

Level 4

- Practicum in Agriculture, Food, and Natural Resources
- ISM - Scientific Research and Design

Postsecondary Opportunities

Associates Degrees

- Environmental Science
- Environmental Studies
- Wildlife, Fish, and Woodlands Science and Management
- Environmental Engineering Technology/ Environmental Technology

Bachelor's Degrees

- Environmental Science
- Environmental/ Environmental Health Engineering
- Wildlife, Fish, and Woodlands Science and Management
- Natural Resources Law Enforcement and Protective Services

Master's, Doctoral, and Professional Degree

- Environmental Science
- Environmental/ Environmental Health Engineering
- Wildlife, Fish, and Woodlands Science and Management
- Fishing and Fisheries Science and Management

Work-Based Learning and Expanded Learning Opportunities

Exploration Activities

- Attend summer leadership events
- Participate in Texas FFA

Work-Based Learning Activities

- Intern at a waste treatment plant
- Participate in an FFA supervised agriculture experience

Industry-Based Certifications

- Natural Resources Systems
- Water Operators, Class D

- Wastewater Collections*

*IBC sunseting 8/31/24



Aligned Occupations

Occupations	Median Wage	Annual Openings	% Growth
Environmental Engineering Technicians	\$53,352	101	32%
Environmental Engineers	\$86,757	288	25%
Environmental Science and Protection Technicians, Including Health	\$40,268	508	17%
Environmental Scientists and Specialists, Including Health	\$77,896	644	24%
Zoologists and Wildlife Biologists	\$67,309	45	32%

Successful completion of the Environmental and Natural Resources program of study will fulfill requirements of the Business and Industry endorsement. Revised – August 2022

Environmental and Natural Resources

Course Information

Level 1

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5100 Principles of Agriculture, Food, and Natural Resources	13000200 (1 credit)	None	9-12

Level 2

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5165 Wildlife, Fisheries, and Ecology Management	13001500 (1 credit)	Recommended: Principles of Ag	10-12

Level 3

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5008 Project-Based Research	12701500 (1 credit)	None	11-12

Level 4

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5130 Practicum in Agriculture, Food, and Natural Resources	13002510 (2 credits)	Wildlife, Fisheries, and Ecology Management	11-12
0300 ISM - Scientific Research and Design	13037200 (1 credit)	Biology, Chemistry, Integrated Physics, and Chemistry (IPC), or Physics	11-12

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Plant Science Statewide Program of Study



The Plant Science program of study focuses on the science, research, and business of plants and other living organisms. It teaches students how to apply 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

- Floral Design/Lab
- Horticultural Science/Lab

Level 3

- Advanced Plant and Soil Science
- Advanced Floral Design

Level 4

- Practicum in Agriculture, Food, and Natural Resources
- Project-Based Research
- ISM - Scientific Research and Design

Postsecondary Opportunities

Associates Degrees

- Applied Horticulture/ Horticulture Operations, General
- Ornamental Horticulture
- Agricultural Business and Management, General
- Turf and Turfgrass Management

Bachelor's Degrees

- Applied Horticulture/ Horticulture Operations, General
- Agronomy and Crop Science
- Agricultural Business and Management, General
- Turf and Turfgrass Management

Master's, Doctoral, and Professional Degrees

- Applied Horticulture/ Horticulture Operations, General
- Agronomy and Crop Science
- Agricultural Business and Management, General
- Farm/Farm and Ranch Management

Work-Based Learning and Expanded Learning Opportunities

Exploration Activities	Work-Based Learning Activities
<ul style="list-style-type: none">Participate in Texas FFA	<ul style="list-style-type: none">Work at a florist or landscaper businessParticipate in an FFA supervised agriculture experience

Industry-Based Certifications

- Agricultural Biotechnology
- BASF Plant Science Certification
- Commercial/Non-Commercial 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



Aligned Occupations

Occupations	Median Wage	Annual Openings	% Growth
Soil and Plant Scientists	\$54,662	116	21%
Tree Trimmers and Pruners	\$32,240	589	14%
Pesticide Handlers, Sprayers, and Applicators	\$36,733	196	22%
Landscaping Supervisors	\$44,408	807	19%
Biological Technicians	\$42,931	452	17%

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Plant Science

Course information

Level 1

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5100 Principles of Agriculture, Food, and Natural Resources	13000200 (1 credit)	None	9-12

Level 2

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5175 Floral Design	13001800 (1 credit)	None	10-12
5195 Horticultural Science	13002000 (1 credit)	Recommended: Principles of Ag	10-12

Level 3

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5160 Advanced Plant and Soil Science	13002100 (1 credit)	One course from Plant Science and Biology, Chemistry, IPC or Physics	11-12
5180 Advanced Floral Design	N1300270 (1 credit)	Floral Design and Texas Floral Design Level I Certificate	11-12

Level 4

COURSE NAME	SERVICE ID	PREREQUISITES	GRADE
5130 Practicum in Agriculture, Food, and Natural Resources	13002510 (2 credits)	One course from Plant Science	11-12
5008 Project-Based Research	12701500 (1 credit)	None	11-12
0300 ISM - Scientific Research and Design	13037200 (1 credit)	Biology, Chemistry, IPC, or Physics	11-12