

# Introduction to Environmental and Agricultural Science

Lesson Title:	<b><i>What are the Environmental and Agricultural Careers?</i></b>
Nebraska Career Field/ Career Cluster/ Career Pathway:	Environmental and Agricultural Systems→Agricultural and Natural Resources→Introduction
Overview:	This lesson presents an overview of careers in the environmental and agricultural industry. Learners then complete a career report on one career in the industry.
Student Learning Objectives:	<p>Objective 1: Learners will identify the seven different pathways in the environmental and agricultural systems career cluster and identify one career in each pathway.</p> <p>Objective 2: Learners will identify four major factors that will define the career market opportunities in the environmental and agricultural systems industry.</p> <p>Objective 3: Learners will select one career within one of the environmental and agricultural systems pathways and prepare a research paper on the career, identifying the knowledge and skills required, as well as the employment opportunities. Students will present their career report to the class.</p>
Course Outcomes:	Technical content, experiential learning, core academics (reading/writing), careers
Key Terms:	Environmental and agricultural systems, animal systems, agribusiness systems, environmental service systems, natural resources systems, plant systems, power, structural, and technical systems
Time:	Two 45-minute periods for content materials. Additional time needed for career report and extended activities.
Resource(s):	<p>Agriscience Fundamentals and Applications, 4<sup>th</sup> Edition – Unit 4,</p> <p>Employment Opportunities for College Graduates in the U.S. Food, Agricultural, and Natural Resources System</p> <p>PACES – Bringing Agricultural Careers to Life in the Classroom (from Rev It Up kit)</p> <p>Career Explorer, National FFA Website <a href="http://www.ffa.org/index.cfm?method=c_job.CareerSearch">http://www.ffa.org/index.cfm?method=c_job.CareerSearch</a></p>
Tools, Equipment and Supplies:	Computer with projector to view PowerPoint. Computer lab with Internet access for career report. Activity Sheet 1 (one per student), Activity Sheet 2 (one per student).
Early Work:	Students will identify what career(s) their parents(s) have and try to figure out which career cluster they fit in. (Working in groups of two). Students will share with each other their parents' careers. Have a few students share with the whole class.
Interest Approach:	Dress up as a career person in one of the environmental and agricultural sciences pathways. Example: Dress-up as veterinarian and wear a lab coat and stethoscope around your neck and bring a small animal (dog, cat or pocket pet) with you. Have students interview you about your career and which pathway it fits in.
Summary of Content for Objective 1:	<p>Objective 1: Learners will identify the seven different pathways in the environmental and agricultural systems career cluster and identify one career in each pathway.</p> <p>Careers in environmental and agricultural systems</p> <ul style="list-style-type: none"> <li>□ The environmental and agricultural systems career field consists of seven career pathways. These pathways include :</li> </ul>

- Animal Systems
  - Agribusiness Systems
  - Environmental Service Systems
  - Food Products and Processing Systems
  - Natural Resource Systems
  - Plant Systems
  - Power, Structural and Technical Systems
- This diverse career cluster prepares learners for careers in the planning, implementation, production, management, processing and /or marketing of agricultural commodities and services, including food, fiber, wood products, natural resources, horticulture and other plant and animal products. It also includes related professional, technical and educational services.
- Agribusiness System Workers use technology to coordinate all activities that contribute to production, processing, marketing, distribution, financing and development of agricultural commodities. Sample occupations:
- International Agri-Marketing Specialist
  - Agricultural Loan Officer
  - Agricultural Commodity Broker
  - Farm/Ranch Manager
  - Livestock Buyer/Seller
  - Feed/Farm Supply Store Manager
  - Agricultural Products Buyer
  - Agricultural Salesperson
- Animal Systems: Workers study genetics, nutrition, reproduction, growth and development of food animals and companion animals. They inspect and grade food animals, food products, purchase food animals or work in sales or marketing. Sample occupations:
- Animal Geneticist
  - Aquaculturalist
  - Animal Nutritionist
  - Animal Scientist
  - Livestock Buyer/Seller
  - Embryo Technologist
  - Veterinarian
  - Feed Sales Representative
  - Artificial Insemination Technician
- Environmental Service Systems: Workers are involved in pollution control, recycling, waste disposal and public health. They control hazardous waste management studies, analysis and research environmental projects. Sample occupations:

- Pollution Prevention and Control Manager
- Environmental Sampling Technician
- Health and Safe Sanitarian
- Hazardous Materials Handler
- Water Environment Manager
- Toxicologist
- Solid Waste Disposer / Recycler
- Environmental Compliance Assurance Manager
- Water Quality Manager
  
- Food Products and Processing Systems: Workers discover new food sources, and analyze and develop ways to process, preserve, package or store food. They create new food products and inspect food processing to ensure sanitation, safety, quality and waste management standards are met. Sample occupations:
  - Food Scientist
  - Bacteriologist
  - Food and Drug Inspector
  - Toxicologist
  - Biochemist
  - Food and Fiber Engineer
  - Produce Buyer
  - Meat Processor
  
- Natural Resources Systems: Workers help to develop, maintain and manage the forest and natural environment. Conservation scientists and foresters manage, develop and help protect these natural resources. Sample occupations:
  - Wildlife Manager
  - Water Monitoring Technician
  - Park Manager
  - Fish and Game Officer
  - Forestry
  - Fisheries Manager
  - Mining Engineer
  
- Plant Systems: Workers develop ways to improve the nutritional value of crops and quality of seeds. They use genetic engineering to develop pest and drought resistant crops, helping the producer while conserving natural resources and the environment. Sample occupations:
  - Plant Breeder and Geneticist
  - Soil and Water Specialist
  - Certified Crop Advisor
  - Botanist

	<ul style="list-style-type: none"> <li>▪ Tree Surgeon</li> <li>▪ Golf Course Superintendent</li> <li>▪ Education and Extension Specialist</li> <li>▪ Greenhouse Manager</li> <li>▪ Forest Geneticist</li> </ul> <p>□ <u>Power, Structural, and Technical Systems</u>: Workers apply knowledge of engineering, hydraulics, pneumatics, electronics, power, structure and controls to the field of agriculture. They develop conservation of soil and water to improve the processing of agricultural products. Sample occupations:</p> <ul style="list-style-type: none"> <li>▪ Remote Sensing Specialist</li> <li>▪ Global Positioning Systems Technician</li> <li>▪ Agricultural Engineer</li> <li>▪ Equipment Parts Manager</li> <li>▪ Machinist</li> <li>▪ Communication Technician</li> <li>▪ Welder</li> </ul>
<p>Summary of Content for Objective 2:</p>	<p>Objective 2: Learners will identify four major factors that will define the career market in the environmental and agricultural systems industry.</p> <ul style="list-style-type: none"> <li>☛ <i>Employment opportunities for U.S. college graduates with expertise in the food, agricultural and natural resources systems are expected to remain strong during the next five years. We expect slightly more than 52,000 annual job openings for new graduates during 2005–2010, and some 49,300 qualified graduates available each year for these positions.</i></li> <li>☛ <i>Annually, an average of approximately 32,300 new graduates from U.S. colleges of agriculture and life sciences, forestry and veterinary medicine are expected to take jobs in the system. Other job openings will be filled by some 17,000 qualified graduates from allied higher education programs such as biological sciences, engineering, business, health sciences, communication and applied technologies</i></li> </ul> <p>Four major factors will define the market for graduates during 2005-2010:</p> <ul style="list-style-type: none"> <li>• Consumers and their preferences.</li> <li>• Evolving business structure in the U.S. food system.</li> <li>• New developments in science and technology.</li> <li>• Public policy choices and food system security.</li> </ul> <ul style="list-style-type: none"> <li>☛ <i>You'll find most opportunities in management and business, where graduates can expect more openings than qualified applicants. Graduates also can expect a large number of positions in scientific and engineering specialties. They'll find specialized niche opportunities in agricultural and forestry production. Ample qualified graduates are forecast for positions in education, communication and government services.</i></li> </ul> <p>New graduates can expect the best opportunities in:</p>

	<ul style="list-style-type: none"> <li>• sales and marketing</li> <li>• veterinary medical specialties</li> <li>• food safety and biosecurity</li> <li>• forest ecosystem management</li> <li>• precision agriculture technologies</li> <li>• biomaterials engineering</li> <li>• landscape and horticultural crops</li> <li>• plant and animal genetics</li> <li>• specialty crops production</li> <li>• food and nutrition service</li> <li>• environmental science and management</li> <li>• food system nanotechnologies</li> <li>• plant and animal inspection</li> <li>• consumer information technologies</li> <li>• animal health care and well-being</li> </ul>
<p>Summary of Content for Objective 3:</p>	<p>Objective 3: Learners will select one career within environmental and agricultural sciences and prepare a research paper on the career, identifying the knowledge and skills required, as well as the employment opportunities.</p> <p>A career report will serve as the assessment part of this lesson. Learners will research a particular career found within plant systems and write a career report based on their findings. A computer lab with Internet access is required for this assignment. Hand out and read through the Career Report Criteria sheet.</p> <p>While in the computer lab, the Nebraska Career Connections site contains great information on a variety of agriculture careers. Check the website to become familiar with its organization prior to class—learners easily can sign up for a free user name and password to access the information. Learners may use other resources as deemed appropriate by the teacher.</p> <p>Website: <a href="http://www.nebraskacareerconnections.org">http://www.nebraskacareerconnections.org</a></p> <p>Career Explorer, National FFA Website: <a href="http://www.ffa.org/index.cfm?method=c_job.CareerSearch">http://www.ffa.org/index.cfm?method=c_job.CareerSearch</a></p>
<p>Review:</p>	<p>To review material taught within this introductory unit, learners will present their career reports to the entire class.</p>
<p>Extended Classroom/Laboratory Activity:</p>	<p>Learners can interview an adult employed in the environmental and agricultural science field.</p>
<p>Extended FFA/Leadership Activity:</p>	<p>Learners may wish to become involved in related CDEs.</p>
<p>Extended SAE/Experiential Activity:</p>	<p>Learners may wish to gain employment at in one of the environmental and agricultural sciences pathways.</p>

Assessment:	Early work assessment from notes Career report
Assessment Answer Key/Rubric:	Attached

Activity Sheet 1

Introduction to Environmental and Agricultural Science

Name: \_\_\_\_\_

Early work

Date \_\_\_\_\_

1. The seven pathways in the environmental and agricultural systems career cluster are:

2. Identify the four major factors that will define the career market opportunities in environmental and agricultural systems.

a.

b.

c.

d.

Activity Sheet 2  
 Introduction to Environmental and Agricultural Sciences  
 Scoring Rubric for Career Report

Student: \_\_\_\_\_

Date: \_\_\_\_\_

	5-excellent; 4-good; 3-acceptable; 2-poor; 1-not acceptable				
Job title provided	5				1
Education and training required	5				1
Working conditions for the job explained	5	3			1
Advantages/benefits of the job described	20	10			1
Disadvantages/drawbacks of the job explained	20	10			1
Salaries of beginning/advanced workers described	10	6			1
Aspects of the job you liked explained	10	6			1
Presentation—vocal expression, volume	10	6			1
One page in length, typed, double-spaced	5				1
Grammar, sentence structure, semantics	10	8	6	4	1

Total Score \_\_\_\_\_ /100

Constructive Feedback of the Career Description

Strengths

Areas of Improvement

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*\*\*Information provided by Nebraska Agricultural Education Program Director.*