

ENVIRONMENTAL SCIENCE | Course Syllabus

GRADE LEVEL

10 – 12

PERIODS PER WEEK

5 or Block Scheduling

COURSE LENGTH

1 School Year

CREDIT(S)

**Note: This course has a dual credit classification in Agriculture or Science*

1 (single period format – ½ class for content/ ½ class for application)

2 (double period format – 1 period for content/1 period for application)

Course Description

Environmental Science is an introductory course designed to explore the physical world with an experiential approach. Emphasis on project-based, hands-on activities and laboratory exercises that will promote problem solving, refine laboratory procedure, and reinforce reading, writing and math skills. In this course students are able to be involved in outdoor field studies and will be encouraged and rewarded for the exploration of personal avenues of interest in science. Environmental science is a challenging and diverse topic best explored utilizing a variety of different instructional tools.

Students completing this course will gain specific knowledge and skills for advancement to Environmental Science II

Careers in Agriculture and Environmental Service Systems

- Ecologist
- Hydrologist
- Environmental Compliance Officer
- Biological Technician
- Environmental Scientist and Specialist
- Regulatory Specialist
- Remediation Specialist
- Environmental Conservationist

Internships/Job Shadowing

- Business and Private Industry
- Environmental Consulting Agencies
- Federal Government (NPS, USGS, EPA, USFS, USFWS)
- Local Watershed Districts
- Non-Profit Organizations
- State Departments of Natural Resources and Protection (DNR, MPCA)

Colleges and Universities with Agriculture and Environmental Service Systems Majors/ Minors/ and Certifications

- University of California, Berkeley
- Stanford University
- Massachusetts Institute of Technology
- University of Wisconsin- Madison
- University of Michigan
- University of Washington
- Texas A&M University
- University of Illinois at Urbana – Champaign

Career Development & FFA

- Agronomy
- Environmental and Natural Resources
- Forestry
- Agricultural Issues Forum
- Leadership Training School
- Agriculture Literacy & Advocacy
- World Food Prize Youth Institute

GOALS

- To encourage students to risk mistakes and nurture curiosity.
- To engage students in learning, discovery, and problem solving with innovative creativity.
- To enable students to develop their abilities to analyze, evaluate, and synthesize information to prepare for college and careers.
- To provide opportunities for students to engage in scientific investigations that are both thought provoking and relevant.
- To engender an awareness of open-minded evaluation of different opinions.

Disclaimer: This course syllabus has been adapted from various educational curriculum medium.

All content has been reformatted selected and approved for instructional purposes by n-gAged Learning, LLC consultants.

OBJECTIVES

- Students will be able to demonstrate both an understanding of, and ability to apply:
 - Scientific facts and concepts
 - Investigative methods and techniques
- Students will be able to demonstrate an ability to construct, analyze, and evaluate:
 - Hypotheses, research questions, and predictions
 - Current environmental issues
 - Investigative strategies and techniques to collect authentic data
- Summarize an environmental problem or situation to provide context for, or explain the origin of, a particular question. Create visual presentations (such as maps, graphs, or video tapes) and written and oral statements that describe their thinking about the problem.

TOPICS OF INSTRUCTION

Introduction to Environmental Science and Agriculture

- The Nature and History of Environmental Science
- Introduction to Agriculture & Science
- U.S. Environmental Protection Agency
- Sustainability and Our Future
- Records, Research and Scientific Literacy

Freshwater Systems and Agriculture

- Freshwater Ecosystems
- Freshwater Biodiversity
- Water Chemistry and Health
- Agricultural Uses of Water
- Freshwater Pollution and its Control
- Freshwater Conservation

Soil Systems and Agriculture

- Soil Ecosystems
- Soil Biodiversity
- Soil Chemistry and Health
- Agricultural Uses of Soil
- Soil Pollution and its Control
- Soil Conservation

Forest Systems and Agriculture

- Forest Ecosystems
- Forest Biodiversity
- Forest Chemistry and Health
- Agricultural Uses of Forest
- Forest Disease, Pollution and its Control
- Forest Conservation

Agriculture, Biotechnology, and the Future of Food

- The Race to Feed the World
- Raising Animals for Food
- Preserving Crop Diversity
- Conserving Pollinators, Controlling Pests
- Genetically Modified Food and Organic Agriculture
- Sustainable Food Production

Introduction to Global Climate Change

- Weather/ Climate
- Greenhouse Gases & the Greenhouse Effect
- Phenology

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- Anthropogenic Impacts
- Impacts on Agriculture
- Introduction to Alternative Energies

Leadership and Career Development within the Environmental Service Industry

- Leadership
- Employability Skills
- Careers

Project-Based-Learning/ Problem-Based-Learning)

- Health of the Little Menomonee River
- Saving the National Parks
- Controlling Soil Erosion
- Investigation of Water Quality
- Cruisin' for a Bruisin' Food Packaging Specialist

INSTRUCTIONAL METHODS

- Specialized Learning
 - Differentiated Learning
 - Cooperative Learning
 - Scientific Inquiry Based Learning
 - Experiential Learning
- Project Based/Cross-curricular Activities
 - Class Discussion – Case studies
 - Environmental Injustice
 - Composting
 - Global Warming
 - Investigating Food Deserts
 - Cooperative Conflict
 - Field Trips
 - Resource Speakers

Supplemental Material

- Principles of Agriculture, Food, and Natural Resources
By: John S. Rayfield, Kasee L. Smith, Travis D. Park, and D. Barry Croom
- ThinkCERCA
Personalized computer literacy curriculum and platform empowers teachers to grow students' critical thinking skills, while increasing literacy.
- <https://www.teachingchannel.org/videos/differentiating-instruction>
- Differentiating Learning – Differentiating the Process PP - Pepper Skodack
- World Food Prize Youth Institute – Global Challenge
- U.S. Environmental Protection Agency