

Wallenpaupack Area School District

COURSE: Ecological Studies CP

GRADE: Tenth-Twelfth Grade

LENGTH OF COURSE: 90 Days

TEXT: Environmental Science, the Way the World Works. 7th Edition

PUBLISHER: Prentice Hall

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COURSE DESCRIPTION:

Ecological studies CP is an accelerated and in-depth approach to the ecological studies curriculum. This course is for the highly motivated student with an interest in natural resources and the environment. Topics include ecology, biodiversity, population biology, forestry wildlife, land-use, pollution and recycling. The course will explore the interrelationships of the natural world and analyze environmental problems and their solutions. Through journal writing, students will be asked to record and reflect on observations from the natural environment. Students will also be expected to locate current articles which focus on environmental topics. Sources for the articles may be scientific journals, newspapers, or news magazines. Students will need to think critically and analytically about environmental issues.

AREAS OF STUDY:

Ecosystems and Their Interactions
Pennsylvania Wildlife
Forestry
Integrated Pest Management
Threatened, Endangered, and Extinct Species
Pollution
Humans and the Environment
Alternative Energy and Sustainability

CURRICULUM WRITING TEAM:

Linda Lohner

DATE OF REVISION:

2002

WALLENPAUPACK AREA SCHOOL DISTRICT

Topics:	Skills: (continued)
Ecosystems and Their Interactions	<p>solutions</p> <p>Use process skills to make inferences and predications using collected information and to communicate, using space/time relationships, defining operationally</p> <p>Generate questions about objects, organisms and/or events that can be answered through scientific investigations</p> <p>Evaluate the appropriateness of questions</p> <p>Design an investigation with adequate control and limited variables to investigate a question</p> <p>Organize experimental information using a variety of analytic methods</p> <p>Judge the significance of experimental information in answering the question</p> <p>Suggest additional steps that might be done experimentally</p> <p>Analyze the relationships among components of an ecosystem</p> <p>Evaluate the efficiency of energy flow within an ecosystem</p> <p>Explain limiting factors and their impact on carrying capacity</p> <p>Understand how biological diversity impacts the stability of an ecosystem</p> <p>Analyze the positive or negative impacts of outside influences on an ecosystem</p> <p>Analyze how different land use practices can affect the quality of soils</p> <p>Evaluate the materials necessary for natural cycles</p> <p>Explain the processes involved in the natural cycles</p> <p>Analyze the effects of substances that move through natural cycles</p> <p>Analyze the effects of natural occurrences and their effects on ecosystems</p> <p>Analyze effects of human action on an ecosystem</p> <p>Compare the stages of succession and how they influence the cycles existing in an ecosystem</p>
Activities:	Performance Assessments:
<p>Textbook reading and questions for chapter 1-5</p> <p>Field investigations</p> <p>Food chain problem solving activity</p> <p>Pyramid calculations</p>	<p>Assignment evaluations</p> <p>Teacher observation</p> <p>Student performance on field trips, investigations, and activities</p> <p>Exams</p>

WALLENPAUPACK AREA SCHOOL DISTRICT

ACTIVITIES: (continued)	PERFORMANCE ASSESSMENTS:
<p>Food web and energy flow simulations Neno and the Guava Tree story Introduced species research poster and presentation Graphing and interpreting population data and population growth curves Readings: Deer; Deer Everywhere; Deer Management Packet; Irish Potato Famine Succession guided imagery Natural selection activity Library Computer Lab Project Wild Activities: Good Buddy; Oh Deer; How Many Bears Can Live In This Forest? Quick Frozen Critters Project Learning Tree Activities; Rain Reasons; Can It be Real?; Secondary Succession</p>	

WALLENPAUPACK AREA SCHOOL DISTRICT

Topics:	Skills: (continued)
	<p>Use process skills to make inferences and predictions using collected information and to communicate, using space/time relationships, defining operationally</p> <p>Generate questions about objects, organisms and/or events that can be answered through scientific investigations</p> <p>Evaluate the appropriateness of questions</p> <p>Judge the significance of experimental information in answering the question</p> <p>Suggest additional steps that might be done experimentally</p>
Activities:	Performance Assessments:
<p>Field guide activities</p> <p>Laserdisc slides and movies</p> <p>Field walks to observe and identify birds and mammal sign</p> <p>Owl pellet dissection</p> <p>Feather Lab</p> <p>Pennsylvania Songbirds Activity Guide: Migration Mapping Activity Flight; Guided Imagery</p> <p>Migration and Identification Posters</p> <p>Nature Scope: Bat activity; Rodent Diversity activity; Carnivore Logic Puzzle; Hoofed Mammal Diversity activity</p> <p>Tracking Kit</p> <p>Videos on bats</p> <p>Pennsylvania mammal research, creative essay and oral presentation</p> <p>Pennsylvania mammal crossword puzzle</p>	<p>Assignment evaluations</p> <p>Teacher observations</p> <p>Student performance on field trips, investigations, and activities</p> <p>Exams</p>

WALLENPAUPACK AREA SCHOOL DISTRICT

Activities: (continued)	Performance Assessments:
Identification posters, Tree Cross Sections, Wood Samples United States Forest Service booklet and video on the history of forestry Forest Management Role Play	

WALLENPAUPACK AREA SCHOOL DISTRICT

Course: Ecological Studies CP

Grade Level: Grade 10-12

Unit: Integrated Pest Management

PA Standard: 4.5.10.A
4.5.10.B
4.5.10.C

Time: 4 Blocks

<p>Topics:</p> <p>Integrated Pest Management</p>	<p>Skills:</p> <p>Identify environmental effect(s) of pests on different regions of the world</p> <p>Identify introduced species that are classified as pests in their new environments</p> <p>Identify the health risks associated with chemicals used in common pesticides</p> <p>Assess various levels of control within different integrated pest management practices including increased immunity to pesticides, food safety, sterilization, nutrient management and weed control</p> <p>Analyze the risks to the environment and society associated with alternative practices used in integrated pest management</p> <p>Analyze the benefits to the environment and society associated with alternative practices used in integrated pest management</p>
<p>Activities:</p> <p>Various activities from Pennsylvania's Integrated Pest Management Curriculum and Pennsylvania's Food, Land and People Curriculum</p> <p>Introduced species research project and presentations</p> <p>Invasive species video</p>	<p>Performance Assessments:</p> <p>Assignment evaluations</p> <p>Teacher observations</p> <p>Student performance on field trips, investigations, and activities</p> <p>Exams</p>

WALLENPAUPACK AREA SCHOOL DISTRICT

Course: Ecological Studies CP

Grade Level: Grade 10-12

Unit: Threatened, Endangered and Extinct Species

PA Standard: 4.7.12.A
4.7.12.B
4.7.12.C

Time: 8 Blocks

Topics:	Skills:
<p>Threatened, Endangered and Extinct Species</p>	<p>Examine and explain what happens to an ecosystem as biological diversity changes</p> <p>Explain the relationship between species' loss and bio-diversity</p> <p>Examine and explain how a specialized interaction between two species may affect the survival of both species</p> <p>Predict how human or natural action can produce change to which organisms cannot adapt</p> <p>Identify species that became extinct through natural causes and explain how that occurred</p> <p>Identify a species that became extinct due to human actions and explain what occurred</p> <p>Identify and explain how a species' increase, decline or elimination affects the ecosystem and/or human social, cultural and economic structures</p> <p>Explain why natural populations do not remain constant</p> <p>Analyze management strategies regarding threatened or endangered species</p> <p>Identify laws, agreements or treaties at national or international levels regarding threatened or endangered species</p> <p>Analyze the role of zoos and wildlife preserves on species that have been identified as threatened or endangered</p> <p>Examine the influence of wildlife management in preserving different species in Pennsylvania</p>

WALLENPAUPACK AREA SCHOOL DISTRICT

Activities:	Performance Assessments:
Textbook reading and questions for Chapter 11 Endangered species research project Pennsylvania endangered species activity They're gone-in-the round activity Create-a-species activity You choose activity Nature Scope – Reserve data graph and statistics Whooping Crane and Osprey success stories Videos on endangers species Current events articles on endangered species	Assignment evaluations Teacher observations Student performance on research, investigations, and activities Exams

WALLENPAUPACK AREA SCHOOL DISTRICT

Topics:	Skills: (continued)
	<p>regulations Analyze the roles that local, state and federal governments play in the development and enforcement of environmental laws Identify local and state environmental regulations and their impact on environmental health Explain the positive and negative impacts of the Endangered Species Act</p>
Activities:	Performance Assessments:
<p>Textbook readings on selected topics (ch. 9, 13, 14, 16, 18, 19, 20, 21, 22) Research and present a pollution topic and activity Environmental Science activities kit Numerous pollution demonstrations and activities EPS Turning the Tide on Trash – a learning guide on marine debris Booklet: Groundwater – A Primer of Pennsylvanians Project Learning Tree Exploring Environmental Issues: Municipal Solid Waste EPA Celebrate Water-informational packet and activity pages Teacher’s guide to hazardous wastes from home Videos on pollution topics Project WET curriculum and activity guide Wonders of Wetlands activity guide Explore Internet web sites on pollution topic (www.EPA.gov) Videos on pollution topics</p>	<p>Assignment evaluations Teacher observations Student performance on research, investigations, and activities Exams</p>

WALLENPAUPACK AREA SCHOOL DISTRICT

Course: Ecological Studies CP

Grade Level: Grade 10-12

Unit: Humans and the Environment

PA Standard: 3.8.10.A

3.8.10.B

3.8.10.C

Time: 15 Blocks

3.8.12.C

4.8.10.A

4.8.10.C

4.8.10.D

4.8.12.D

Topics:	Skills:
<p>Science, Technology and Human Endeavors</p>	<p>Identify past and current tradeoffs between increased production, environmental harm and social values (e.g., increased energy needs, power plants, automobiles)</p> <p>Compare technologies that are applied and accepted differently in various cultures (e.g., factory farming, nuclear power)</p> <p>Analyze a recently invented item, describing the human need that prompted its invention and the current and potential social impacts of the specific invention</p> <p>Assess the impacts that agricultural science has had on meeting human needs and improving the quality of life</p> <p>Relate scientific and technological advancements in terms of cause and effect</p> <p>Describe and evaluate the impacts that financial considerations have had on specific and technological applications</p> <p>Compare and contrast potential solutions to technological, social, economic and environmental problems</p> <p>Analyze the impacts on society of accepting or rejecting scientific and technological advances</p> <p>Propose solutions to specific scientific and technological applications, identifying possible financial considerations</p> <p>Analyze scientific and technological solutions through the use of risk/benefit analysis</p> <p>Analyze and communicate the positive or negative impacts that a recent</p>

WALLENPAUPACK AREA SCHOOL DISTRICT

Topics:	Skills: (continued)
<p>Humans and the Environment</p>	<p>technological invention had on society Evaluate and describe potential impacts from emerging technologies and the consequences of not keeping abreast of technological advancements (e.g., assessment alternatives, risks, benefits, costs, economic impacts, constraints)</p> <p>Explain why some societies have been unable to meet their natural resource needs Compare and contrast the use of natural resources and the environmental conditions in several countries Describe how uses of natural resources impact sustainability Analyze and evaluate changes in the environment that are the result of human activities Compare and contrast the environmental effects of different industrial strategies (e.g., energy generation, transportation, logging, mining agriculture) Identify natural resources of which societal demands have been increasing Identify specific resources, for which human consumption has resulted in scarcity of supply (e.g., buffalo, lobsters) Describe the relationship between population density and resource use and management Analyze environmental issues and their international implications</p>
Activities:	Performance Assessments:
<p>Textbook chapters 6 and 7 Exponential growth activities Everything is connected activity (concept map) Distribution of wealth activity Graphing activities (computers) Zero population growth activities Grim Reaper's revenge activity World population growth video Environmental Science Activities Kit Quality of life activity Thinking about the future activity Current events articles related to</p>	<p>Assignment evaluations Teacher observations Student performance on field trips, investigations and activities Exams</p>

WALLENPAUPACK AREA SCHOOL DISTRICT

ACTIVITIES: (continued)	PERFORMANCE ASSESSMENTS:
overpopulation Senior Citizen interview (Environmental Science activities kit: Wants and needs activity) Selected activities and assignments from Economics and the Environment Selected activities and assignments from How Big Is Your Backyard? An Ethics-Based Approach To Environmental Decision-Making	

WALLENPAUPACK AREA SCHOOL DISTRICT

Course: Ecological Studies CP

Grade Level: Grade 10-12

Unit: Alternative Energy and Sustainability

PA Standard: 4.2.10.A
4.2.10.B
4.2.10.C
4.2.10.D

Time: 8 Blocks

<p>Topics:</p> <p>Environment and Ecology</p>	<p>Skills:</p> <p>Explain the effects on the environment and sustainability through the use of nonrenewable resources</p> <p>Evaluate the advantages and disadvantages of reusing our natural resources</p> <p>Evaluate the use of natural resources and offer approaches for using them while diminishing waste</p> <p>Compare the economics of different areas based on the availability and accessibility of the natural resources</p> <p>Compare the use of natural resources in different countries</p> <p>Examine and explain the path of a recyclable material from collection to waste, reuse or recycling identifying the market forces</p> <p>Understand current regulations concerning recycling and solid waste</p> <p>Research new technologies in the use, reuse or recycling of materials</p>
<p>Activities:</p> <p>Textbook reading on selected topics chapters 15, 17, 24</p> <p>Conservation survey</p> <p>Internet research and presentation on sustainable technology, renewable energy and alternative energy</p> <p>Environmental Science activities kit</p> <p>Public Hearing Zoning Board simulation/role play</p> <p>Zoning Ordinance and Zoning map for Palmyra Township</p> <p>Current events article related to land use – summary and presentation to class</p> <p>Optional – Ostrich Bay – town development simulation</p>	<p>Performance Assessments:</p> <p>Assignment evaluations</p> <p>Teacher observations</p> <p>Student performance on field trips, investigations and activities</p> <p>Exams</p>

WALLENPAUPACK AREA SCHOOL DISTRICT

BIBLIOGRAPHY/RESOURCE LIST

- Textbook – *Environmental Science, The Way the World Works* and associated teach resource materials
- Laserdisks – *The Living Textbook*, Optical Data Corporation
- Videotapes as mentioned in the course of study. Located in room 247, front storeroom or in the library
- *Nature's Notebook* by John Serrao, Stackpole Books, Harrisburg, PA, 1992
- *NatureScope* series by the National Wildlife Federation, Washington, D.C., 1987
- *Project Wild* Secondary Activity Guide, Western Regional Environmental Education Council, 1986
- *Project Learning Tree* Environmental Education Activity Guide, American Forest Foundation, Washington, D.C., 1994
- *Environmental SMARTS* Resource Book, National Institute for Environmental Renewal, Mayfield, PA, 1994
- *Environmental Science Activities Kit*, Michael L. Roa, The Center for Applied Research in Education, New York 1993
- *Using Cooperative Learning to Enhance Your Science Instruction* Resource Handbook, Jack Hassard, Bureau of Education & Research, WA, 1994
- Field Guides
- Posters

NOTE: All resource books listed are on the shelf in the front storeroom of classroom 247. All field guides are on the self in classroom 247. All posters are in the map storage cabinet at the back of classroom 247.