

# **ECOLOGY CURRICULUM**

**AUGUST 2008**

## **COURSE DESCRIPTION:**

The purpose of this course is to provide students with an overview of major ecological concepts. Students will learn about biodiversity, abiotic and biotic factors, biological pyramids, population dynamics, aquatic and terrestrial ecosystems, energy flow within various ecosystems, endangered species, Ornithology and more. Students will discover how the science of ecology evolved due to the studies of many scientists.

## **CORE CURRICULUM CONTENT STANDARDS:** (Quoted from state document)

Standard 5.7 (Environmental Studies) All students will develop an understanding of the environment as a system of interdependent components affected by human activity and natural phenomena.

Standard 8.1(Technological Literacy) All students will use computer applications to gather and organize information and to solve problems.

## **CUMULATIVE PROGRESS INDICATORS:** (Quoted from state document)

### **STANDARD 5.7 (Environmental Studies)**

Building upon knowledge and skills gained in preceding grades, by the end of Grade 12 students will:

#### **A. Cultural Contributions**

1. Recognize the role of the scientific community in responding to changing social and political conditions and how scientific and technological achievement effect historical events.

#### **B. Historical Perspectives**

1. Examine the lives and contributions of important scientists who effected major breakthroughs in our understanding of the natural and designed world.

2. Discuss significant technological achievements in which science has played an important part as well as technological advances that have contributed to the advancement of scientific knowledge.

3. Describe the historical origin of important scientific developments such as atomic theory, genetics, plate tectonics, etc., showing how scientific theories develop, are tested, and can be replaced or modified in light of new information and improved investigative techniques.

### **STANDARD 8.1 (Technology Literacy)**

Building upon knowledge and skills gained in preceding grades, by the end of grade 12, students will:

#### **A. Basic Computer Skills and Tools**

1. [Create a multi-page document with citations using word processing software in conjunction with other tools that demonstrates the ability to format, edit, and print.](#)
2. Create documents including a resume and a business letter using professional format.
3. Construct a spreadsheet, enter data, use mathematical or logical functions to manipulate and process data, generate charts and graphs, and interpret the results.
4. Given a database, define fields, input data from multiple records, produce a report using sort and query, and interpret the data.
5. [Produce a multimedia project using text, graphics, moving images, and sound.](#)
6. Produce and edit page layouts in different formats using desktop publishing and graphics software.
7. Develop a document or file for inclusion into a website or web page.
8. Discuss and/or demonstrate the capability of emerging technologies and software in the creation of documents or files.
9. [Merge information from one document to another.](#)

#### **B. Application of Productivity Tools**

## **Social Aspects**

1. Describe the potential and implications of contemporary and emerging computer applications for personal, social, lifelong learning, and workplace needs.
2. Exhibit legal and ethical behaviors when using information and technology, and discuss consequences of misuse.
3. Make informed choices among technology systems, resources, and services in a variety of contexts.
4. Use appropriate language when communicating with diverse audiences using computer and information literacy.

## **Information Access and Research**

5. [Select and use specialized databases for advanced research to solve real world problems.](#)
6. [Identify new technologies and other organizational tools to use in personal, home, and/or work environments for information retrieval, entry, and presentation.](#)
7. [Evaluate information sources for accuracy, relevance, and appropriateness.](#)
8. [Compose, send, and organize e-mail messages with and without attachments.](#)

## **Problem Solving and Decision Making**

9. Create and manipulate information, independently and/or collaboratively, to solve problems and design and develop products.
10. Identify, diagnose, and suggest solutions for non-functioning technology systems.
11. Identify a problem in a content area and formulate a strategy to solve the problem using brainstorming, flowcharting, and appropriate resources.
12. [Integrate new information into an existing knowledge base and communicate the results in a project or presentation.](#)

**SUGGESTED ACTIVITIES THAT ADDRESS THESE STANDARDS  
MAY INCLUDE BUT ARE NOT LIMITED TO: (Arrange by  
standard)**

**STANDARD 5.7 (Environmental Studies)**

Group work – Current Environmental Issues  
Textbook- Carbon Footprint  
Quick Lab- Classifying resources  
LAB – What’s in an Ecosystem  
Group Activity – “Tragedy of the Commons” (game)  
LAB – Physical Factors of the Soil  
LAB – Lesson of the Kaibab Deer.  
Activity – Population Growth  
Long Term Project – Create an Ecosystem  
Long Term Project – Environmental Mapping Project  
Long Term Project – Triops  
Group Activity – Species Interactions  
LAB – Carrying Capacity of Brine Shrimp  
LAB- Mapping Lake Hopatcong

**STANDARD 8.1 (Technology Literacy)**

Internet Activity: Ecological Footprints  
Power point Project: Research an Ecologist  
Internet Activity: Gardens & Artificial Selection  
Internet Activity: Self-sustaining Colonies  
Webquest: Biodiversity  
Webquest: Endangered Species  
CD-ROM – Investigations: Population biology, Assessing Water Quality  
CD-ROM – Explorations: Pyramid of Energy; Classifying Pines; Pollination  
CD-ROM – Bioquests: Antarctic Food Web  
Internet Activity: Island Carrying Capacity  
Internet Activity: Restricted and Potential Niches  
LAB- Mapping Lake Hopatcong  
Internet Activity: Mapping Bird Migration  
Internet Activity: BIRDNET: “Ornithology of Birds”

## **INSTRUCTIONAL STRATEGIES:**

### Standard 5.7 (Environmental Studies)

- The teacher will present the meaning of ecology as well as the roles of biotic and abiotic factors within ecosystems.
- The teacher will discuss the ways in which organisms obtain energy and how it is transferred from organism to organism.
- The teacher will describe how human activities impacts upon the cycling of matter and the flow of energy through ecosystems.
- The teacher will provide examples of endangered species and encourage students to research local and state policies for these species.
- The teacher will introduce students to the science of Ornithology.
- The teacher will assist students in the identification of common birds.
- The teacher will provide students with an overview of current environmental issues.

### Standard 8.1 (Technology Literacy)

- The teacher will provide students will important, useful websites that will be utilized throughout the Ecology course.
- The teacher will present students with various research assignments utilizing the internet.
- The teacher will demonstrate the various computer programs to be utilized for completing research assignments.
- The teacher will encourage and support the use of technology to solve problems and to organize and share information.

## **EVALUATION/ASSESSMENT OF STUDENTS:**

Students will be evaluated/assessed according to the following criteria:

- Long and short term projects
- Independent Research Projects
- Power points
- Laboratory Reports
- Tests
- Quizzes

**EVALUATION/ASSESSMENT OF CURRICULUM:**

This course of study will be evaluated/assessed by instructional staff during the first year of implementation, for the purpose of necessary revision at the end of the first year. In addition, this course of study will be reviewed according to the Five-Year Curriculum Review schedule (see attached).

**RESOURCES/BIBLIOGRAPHY:**

Environmental Science-Holt, Rinehart, Winston