

Ecology of Maine

Instructors:

Ms. Trenckmann

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Prerequisite: Successful completion or current enrollment in a chemistry course 2 semesters, 1 credit

Ecology of Maine takes an in-depth look at interrelationships between organisms and their environment. The course is designed to provide hands on-field experiences and online simulations focused on the major course concepts. As an advanced ecology course, differences and similarities between individual organisms or species and the ecology of populations, communities, and ecosystems will be emphasized. This course will also cover plant and animal adaptations, natural selection and evolution, local wildlife identification, aquatic macro-organisms, population growth and natural regulation models, and climate change.

Graduation Standards (the number of the standard is referenced in the performance indicators listed in each unit):

4- LIFE SCIENCES: STRUCTURE, FUNCTION, AND INFORMATION PROCESSING

Understand and analyze molecular, structural, and chemical biology. (LS 1)

5- LIFE SCIENCES: MATTER AND ENERGY IN ORGANISMS AND ECOSYSTEMS

Understand and analyze the characteristics, functions, and behavioral interactions within an ecosystem. (LS 2)

6- LIFE SCIENCES: GROWTH, DEVELOPMENT, AND REPRODUCTION OF ORGANISMS, NATURAL SELECTION, AND ADAPTATIONS Understand and analyze genetics, adaptation, and biodiversity. (LS 3 + LS 4)

7- EARTH AND SPACE SCIENCES: EARTH SYSTEMS, THE EARTH, SPACE, AND THE UNIVERSE Understand and analyze the origins, interactions and relationships between and among Earth, its systems, and the universe. (ESS1, ESS2, + ESS3)

8- Engineering, Technology, and Application of Science Demonstrate engineering concepts across multiple disciplines and novel situations. (HS-ETS1)

- 8 A. Ask questions/ define problems.
- 8 B. Develop and use models.
- 8 C. Plan and carry out investigations.
- 8 D. Analyze and interpret data.
- 8 E. Use mathematical and computational reasoning.
- 8 F. Construct explanations/ design solutions.
- 8 G. Engage in Argument from evidence.
- 8 H. Obtain, evaluate, and communicate information

Unit 1 Introduction to Ecology	
Summary	Students will understand the basic practices used in ecology, the importance of studying ecology, and how these principles are applied to Maine Ecology. Students will be introduced to scientific notebooks, field notebooks, and other important techniques used by ecologists in the field. Furthermore, students will review some basic ecological terms and content (e.g., organism, population, community, food chains/ webs).
Performance Indicators Assessed in Unit	5B. Apply population dynamics (species interactions and community behavior) to the functioning and resiliency of a species population, its community, and the surrounding ecosystem. 8- (A-H) Engineering, Technology, and Application of Science Practices
Unit 2 Forest Ecosystems of Maine	
Summary	Students will investigate the different types of forest ecosystems in Maine as well as the importance of those ecosystems to the state. Within the forest ecosystems, students will explore the populations, relationships, and ecological trends. Students will also compare and contrast local trees in terms of their structure, identification, processes, and role in the environment. Finally, students will investigate the basic practices of sustainable forestry and ecosystem resiliency and explore how those basic principles are applied to Maine.
Performance Indicators Assessed in Unit	5B. Apply population dynamics (species interactions and community behavior) to the functioning and resiliency of a species population, its community, and the surrounding ecosystem 5C. Classify organisms by similarities in DNA, embryonic development, physical structure, and ecological role. 6 D. Describe how living things change over time and respond to one another and their environment. 7 B. Understand the components that dictate Earth’s climate, how these have changed over time, and the implications for life on Earth. 7 E. Recognize how human use of natural resources and energy consumption impacts Earth on a local and global level. 8 (A-H). Engineering, Technology, and Application of Science Practices
Unit 3 Freshwater Ecosystems of Maine	
Summary	Students will investigate the different types of freshwater ecosystems in Maine as well as the importance of those ecosystems to the state. Within the freshwater ecosystems, students will explore the populations, relationships, and ecological trends. Students will also compare and contrast local freshwater sources in terms of their structure, identification, processes, and role in the environment. Finally, students will investigate human impacts to the freshwater ecosystems in Maine as well as various actions and responses to these impacts.
Performance Indicators Assessed in Unit	5B. Apply population dynamics (species interactions and community behavior) to the functioning and resiliency of a species population, its community, and the surrounding ecosystem 5C. Classify organisms by similarities in DNA, embryonic development, physical structure, and ecological role. 6 D. Describe how living things change over time and respond to one another and their environment. 7 B. Understand the components that dictate Earth’s climate, how these have changed

over time, and the implications for life on Earth.
7 E. Recognize how human use of natural resources and energy consumption impacts Earth on a local and global level.
8 (A-H). Engineering, Technology, and Application of Science Practices

Unit 4 Coastal Ecosystems of Maine

Summary Students will investigate the different types of coastal ecosystems in Maine as well as the importance of those ecosystems to the state. Within the coastal ecosystems, students will explore the populations, relationships, and ecological trends. Students will also compare and contrast local coastal ecosystems in terms of their structure, identification, processes, and populations. Finally, students will investigate human impacts to the coastal ecosystem in Maine as well as various actions and responses to these impacts.

Performance Indicators Assessed in Unit 5B. Apply population dynamics (species interactions and community behavior) to the functioning and resiliency of a species population, its community, and the surrounding ecosystem
5C. Classify organisms by similarities in DNA, embryonic development, physical structure, and ecological role.
6 D. Describe how living things change over time and respond to one another and their environment.
7 B. Understand the components that dictate Earth’s climate, how these have changed over time, and the implications for life on Earth.
8 (A-H). Engineering, Technology, and Application of Science Practices