

# Reading Public Schools

*Instilling a joy of learning and inspiring the innovative leaders of tomorrow*



## Science Curriculum Guide

## High School Environmental Issues Ecology

### Course Description

Environmental Issues uses an interdisciplinary approach to explore real-world issues in environmental science at local, state, national and global levels. Students will use projects, case studies, and current literature to study the ecological, societal and economic impacts related to current environmental issues and develop the knowledge and skills needed to be informed citizens. Environmental challenges and opportunities needed to create a more sustainable society will be investigated. Environmental Issues-Ecology will focus on such topics as Biodiversity, Ecosystems, Rare and Invasive Species and Conservation.

### Content Standards

The following State Standards will be a part of this course:

- HS-LS2-1. Analyze data sets to support explanations that biotic and abiotic factors affect ecosystem carrying capacity.
- HS-LS2-2. Use mathematical representations to support explanations that biotic and abiotic factors affect biodiversity.
- HS-LS2-4. Describe energy transfer through an ecosystem.
- HS-LS2-5. Explain the roles of photosynthesis, cellular respiration, decomposition and combustion in the Carbon Cycle.
- HS-LS2-6. Use evidence to demonstrate that ecosystems with greater biodiversity tend to have greater resistance to change and resilience.
- HS-LS2-7. Analyze effects of human activities on biodiversity and ecosystem health. Evaluate and refine a solution for reducing the impacts of human activities on biodiversity and ecosystem health.
- HS-LS3-4. Illustrate that many traits of individuals are due to interactions of genetic and environmental factors.

### Science and Engineering Practices

The high school biological and ecological standards place particular emphasis on science and engineering practices of developing and using models; constructing explanations; engaging in argumentation from evidence; and obtaining, evaluating, and communicating information. Students are expected to:

- construct and revise explanations and claims based on valid and reliable evidence and apply scientific reasoning to evaluate complex real-world problems such as the effects of human activity on biodiversity and ecosystem health.
- find and interpret scientific literature to compare, integrate, and evaluate sources and communicate phenomena related to genetics, the functioning of organisms, and interrelationships between organisms, populations, and the environment.



<b>Units</b>	<b>Essential Questions</b>	<b>Key Activities</b> <b><u>MAY include:</u></b>
<b>Introduction to Environmental Issues</b>	<ul style="list-style-type: none"> <li>• What are the major environmental issues that face us ?</li> <li>• What past events have impacted our environment?</li> <li>• How can we look at environmental issues from different angles?</li> </ul>	Current Event Presentation Analyzing the Issue Presentation Hetch Hetchy Journal Entry
<b>Tragedy of the Commons</b>	<ul style="list-style-type: none"> <li>• What is the Tragedy of the Commons?</li> <li>• What are examples of the Tragedy of the Commons?</li> <li>• What can we do to prevent more of these tragedies?</li> </ul>	Reflection on Movie: “Empty Oceans, Empty, Nets” Research project on present day Tragedy of the Commons
<b>Buy, Use, Toss</b>	<ul style="list-style-type: none"> <li>• What natural resources do we use too much of?</li> <li>• What can we do to stop using up natural resources?</li> </ul>	Calculating Ecological Footprint Mapping the Impact Diagram Activity Pacific Garbage Patch Web quest Activity
<b>Invasive Species</b>	<ul style="list-style-type: none"> <li>• Why are invasive species harmful?</li> <li>• What invasive species are found in the U.S?</li> <li>• What can we do to stop the spread of invasive species?</li> </ul>	Movie Reflection, “Strange Days on Planet Earth” Controlling Invasives” Activity Invasive Species “Wanted” Poster
<b>Biography in a Bag</b>	<ul style="list-style-type: none"> <li>• Who are some famous environmentalists?</li> <li>• Why are environmentalists important?</li> </ul>	“Biography in a Bag” Independent Project.
<b>Biomes</b>	<ul style="list-style-type: none"> <li>• Why are biomes ecological important?</li> <li>• What is threatening our biomes?</li> <li>• What can we do to help protect biomes?</li> </ul>	Climatogram Graphing Activity Biome Brochure Project
<b>Sustainability</b>	<ul style="list-style-type: none"> <li>• What is sustainability?</li> <li>• What companies are following sustainability practices?</li> <li>• What changes can I make to be more sustainable?</li> </ul>	Sustainability Web Quest Activity Sustainability Project Student Reflection

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## Science Curriculum Guide Overview

### Curriculum Guide

Curriculum guides are public documents aligned with the Massachusetts Department of Education Curriculum Frameworks. They focus on the set of standards that students will learn within certain disciplines at appropriate grade levels. Each area of the curriculum is divided into general strands (broad categories) under which the standards fall. When we discuss “standards-based education” we mean that students are measured against their proficiency and growth towards meeting these standards. Curriculum Guides are intended for teachers, parents, and the wider school community as an overview document of the course of study for the year.

### Content Standards

The Environmental Issues Ecology curriculum at Reading Memorial High School is aligned with the 2016 Massachusetts Science and Technology/Engineering Curriculum Frameworks for High School Biology. Detailed information for the STE Framework can be found at: <http://www.doe.mass.edu/frameworks/scitech/2016-04.pdf>. The content standards describe what students should know and be able to do. They build from middle school and allow students to explain additional and more complex phenomena related to genetics, the functioning of organisms, and interrelationships between organisms, populations, and the environment.

### Science and Engineering Practices

The integration of science and engineering practices in high school science courses gives students dynamic and relevant opportunities to refine and communicate science understandings to be well prepared for civic life, postsecondary education, and career success.

### Essential Questions

Essential questions are questions that are not answerable with an easy answer or a simple instruction. The purpose of essential questions is to provide opportunities for inquiry into the learning and act as an umbrella to anchor the unit/lesson.

### Key Activities

Key Activities identified in Curriculum Guides are not intended to be exhaustive, nor are they intended to be prescriptive. The activities identified may function as a menu of curriculum resources from which educators identify the most appropriate tools to utilize in their classrooms.