

# WRHS Science Curriculum Syllabus

**Course Name: Environmental Science**

**Grade Level: 11 & 12**

## **Course Description:**

Every citizen needs to understand the effects of growth and development on their environment. Increasing human population threatens the quality of life, our land, air and water resources. This course aims to develop an understanding of environmental problems and the laws that govern these issues. These problems will be studied in a variety of ways in the classroom, in the laboratory, in the field and through project work. The course is designed to enable students to experience the environmental impacts of local development. It also enables students to utilize their previous course work to analyze and assess real development sites.

## **Links to Student Expectations:**

- All students will develop skills to utilize technology to gather, to evaluate, to assimilate, and to present information.
- All students will utilize critical thinking skills to identify and to provide resources to solve a problem.
- All students will be able to make decisions and solve problems using logical processes (e.g., scientific method, induction, deduction, syllogism, etc.).
- All students will develop skills to promote a sense of confidence in tackling the rigors of standardized tests such as the required MCAS and optional AP, SAT.

## **Interdisciplinary Connections:**

Environmental Science is designed to explain how the physical environment affects the human environment of Massachusetts. The course directly relates scientific information to social issues that govern the development of the state. Students as future voters need to express their understanding both written and orally.

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### **I. Essential Questions for Course**

- What is the purpose of using regionalization to resolve environmental problems?
- Is the development of Massachusetts governed by its geologic history?
- Why are soils a limiting factor in Massachusetts?
- How can groundwater be utilized as a drinking supply?
- What land development techniques can be utilized to protect water?

- Why is does the resolution of waste management in Massachusetts require an integrated approach?
- How can open space be maintained in Massachusetts?

## **II. Student Objectives**

- To explain the concept of regionalization.
- To describe how Massachusetts can be regionalized: politically, climatically, ecologically, hydrologically, physiographically and geologically.
- To explain the geologic (structural, glacial) history of New England.
- To identify and describe the physiographical regions of Massachusetts.
- To identify the major soil components and discuss their role in plant growth.
- To diagram, label and describe a typical soil profile.
- To explain soil texture and its effect on a soil's properties.
- To use a soil survey as a land use planning tool.
- To identify the major components of the hydrological cycle.
- To discuss groundwater and its suitability as a water supply.
- To identify the major sources of water contamination.
- To identify the nature and characteristics of hazardous substances.
- To discuss the pathways and effects of toxic substances in the body.
- To diagram and explain the function of a septic system.
- To explain the functioning of a wastewater treatment plant.
- To differentiate between total solid waste and municipal waste
- To discuss the historical changes and reasons of solid waste disposal.
- To explain the functioning of a secure, sanitary landfill.
- To identify the components of an Integrated Solid Waste Disposal Plan.
- To differentiate between rural, suburban and urban.
- To explain the concept and rational of zoning.
- To discuss creative zoning.

## **III. Suggestions for Instruction**

- Lecture
- Discussion
- Textbook Readings (Mass. Audubon Series)
- Worksheet Activities
- Laboratory Experiments
- Field Studies
- Maps
- Videos

**IV. Suggestion for Assessment**

- Written Assessments
- Worksheet Activities
- Projects
- Maps

**V. Curriculum**

- Physical Environment
  - Regionalization
  - Physiography
  - Geology
  - Soils
  - Hydrology
- Human Impact
  - Water Supply / Contamination
  - Toxicology
  - Waste Disposal
    - sanitary
    - solid
  - Zoning

**VI. Lesson Extensions**

- Individual projects that extend the materials covered in class.