Reading Public Schools

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

Science Curriculum Guide **Environmental Issues: Energy**

Course Description

Environmental Issues: Energy is a semester course which gives students an overview of the intersection of how humans obtain energy and how we impact the environment. With a focus on what modern society needs energy for and the various forms of energy we harness, the course allows students to be informed citizens when it comes to a global issue. Climate change is specifically addressed in this course.

Content Standards

This Course is aligned to the State Standards. The standards are listed below:

Earth's Systems

HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth's systems over different time scales result in changes in climate. Analyze and interpret data to explain that longterm changes in Earth's tilt and orbit result in cycles of climate change such as Ice Ages.

HS-ESS2-5. Describe how the chemical and physical properties of water are important in mechanical and chemical mechanisms that affect Earth materials and surface processes.

HS-ESS2-6. Use a model to describe cycling of carbon through the ocean, atmosphere, soil, and biosphere and how increases in carbon dioxide concentrations due to human activity have resulted in atmospheric and climate changes.

Earth and Human Activity

HS-ESS3-1. Construct an explanation based on evidence for how the availability of key natural resources and changes due to variations in climate have influenced human activity.

HS-ESS3-3. Illustrate relationships among management of natural resources, the sustainability of human populations, and biodiversity.

Energy

HS-PS3-3. Design and evaluate a device that works within given constraints to convert one form of energy into another form of energy.

HS-ETS4-1(MA). Research and describe various ways that humans use energy and power systems to

Skills

Environmental Issues places an emphasis on analytical skills and forming logical and informed arguments. Students are expected to:

- apply knowledge of energy resources to weigh their pros and cons.
- Describe the impacts of climate change and what populations are affected.
- Synthesize information about the role of government in energy decisions into arguments for specific policies.

Subject Environmental Issues: Energy

Units	Essential Questions	Key Activities <u>MAY</u> include…
Unit 1: **Energy, Work, and Power**	• What is energy and how do we use it? • What is the difference between energy and power?	• Calculating your Kilowatts
Unit 2: **Earth Systems and Cycles**	• How does the Earth re-use matter? • How is carbon recycled by nature? • How is water recycled by nature?	• The Albedo Effect
Unit 3: **Climate Change**	• What are the factors that affect climate? • What is the difference between weather and climate? • What are the impacts of climate change?	• Poster Project: What affects Earth's Climate?
Unit 4: **Energy Sources**	• What makes a resource renewable? • What are new developments in energy resources? • What are the limitations of fossil fuels? Renewables?	• In-depth analysis of a renewable power generating facility
Unit 5: **Energy and Transportation**	• What provides the energy for transportation? • How has transportation changed throughout history?	• Evaluation of public transportation options
Unit 6: **Government Policy**	• What role does the government play in managing energy resources? • How does the government use money to influence energy choices?	• Bureau of Land Management Investigation • Film: Promised Land
Unit 7: **Efficiency and Supply Chains**	• How do supply chains work? • How can efficiency improve the environment?	• Supply Chain Analysis

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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 Earth and Space Science, High School Technology/ Engineering and High School Chemistry. Detailed information for the STE Framework can be found at: http://www.doe.mass.edu/frameworks/scitech/2016-04.pdf.
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
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.