Reading Public Schools

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Science Curriculum Guide **AP Environmental Science**

Course Description

As stated by the College Board, this course provides the equivalent of a one semester, introductory college course in environmental science. It provides students with the scientific principles, concepts and methodologies necessary to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and man-made, to evaluate the risks while examining alternative solutions to resolve or prevent such problems. This is an interdisciplinary course that emphasizes the study of environmental issues from a scientific, sociological and political perspective, thus unifying a wide variety of topics. The units are prescribed by College Board. For more information, please refer to: https://apcentral.collegeboard.org/courses/ap-environmental-science.

Content Standards

- Ecosystems, including introduction to ecosystems, terrestrial biomes, aquatic biomes, the carbon cycle, the nitrogen cycle, the phosphorus cycle, the hydrological cycle, primary productivity, trophic levels, energy flow and 10% rule, food chains and food webs.
- Biodiversity, including introduction to biodiversity, ecosystem services, island biogeography, ecological tolerance, natural disruptions to ecosystems, adaptations and ecological succession.
- Populations, including Generalist and Specialist Species, K-Selected r-Selected Species, Survivorship Curves, Carrying Capacity, Population Growth and Resource Availability, Age Structure Diagrams, Total Fertility Rate, Human Population Dynamics, Demographic Transition
- Earth Systems and Resources, including Plate Tectonics, Soil Formation and Erosion, Soil Composition and Properties, Earth's Atmosphere, Global Wind Patterns, Watersheds, Solar Radiation and Earth's Seasons, Earth's Geography and Climate, El Niño and La Niña
- Land and water use, including The Tragedy of the Commons, Clearcutting, The Green Revolution, Impacts of Agricultural Practices, Irrigation Methods, Pest Control Methods, Meat Production Methods, Impacts of Overfishing, Impacts of Mining, Impacts of Urbanization, Ecological Footprints, Introduction to Sustainability, Methods to Reduce Urban Runoff, Integrated Pest Management, Sustainable Agriculture, Aquaculture,, Sustainable Forestry
- Energy Resources and Consumption including Renewable and Nonrenewable Resources, Global Energy Consumption, Fuel Types and Uses, Distribution of Natural Energy Resources, Fossil Fuels, Nuclear Power, Energy from Biomass, Solar Energy, Hydroelectric Power, Geothermal Energy, Hydrogen Fuel Cell, Wind Energy, Energy Conservation
- Pollution including Introduction to Air Pollution, Photochemical Smog, Thermal Inversion, Atmospheric CO2 and Particulates, Indoor Air Pollutants, Reduction of Air Pollutants, Acid Rain, Noise Pollution
- Aquatic and Terrestrial Pollution including Sources of Pollution, Human Impacts on Ecosystems, Endocrine Disruptors, Human Impacts on Wetlands and Mangroves, Eutrophication, Thermal Pollution, Persistent Organic Pollutants (POPs), Bioaccumulation and Biomagnification, Solid Waste Disposal, Waste Reduction Methods, Sewage Treatment, Lethal Dose 50% (LD50), Dose Response Curve, Pollution and Human Health, Pathogens and Infectious Diseases
- Global Change, including Stratospheric Ozone, Depletion, Reducing Ozone Depletion, The Greenhouse Effect, Increases in the Greenhouse Gases, Global Climate Change, Ocean Warming, Ocean Acidification, Invasive Species, Endangered Species, Human Impacts on Biodiversity

Science and Engineering Practices

The Advanced Placement Environmental Science standards place particular emphasis on concept explanation, visual representation, text analysis, scientific experiments, data analysis, mathematical routines, and environmental solutions. Students are expected to:

- Explain environmental concepts, processes, and models presented in written format
- Analyze visual representations of environmental concepts and processes
- Analyze sources of information about environmental issues
- Analyze research studies that test environmental principles
- Analyze and interpret quantitative data represented in tables, charts, and graphs
- Apply quantitative methods to address environmental concept
- Propose and justify solutions to environmental problems

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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 content standards for Advanced Placement classes at Reading Memorial High School are set by the College Board. For more information please refer to: https://apcentral.collegeboard.org/courses/ap-environmental-science.
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.