

Course Title:	Environmental Science
Grade(s):	11 &12

Course Description
Environmental Science is a full-year academic course that explores the scientific principles and processes that govern the natural world and the ways human activities influence Earth's systems. Students investigate how ecosystems function, how energy and matter move through the environment, and how living organisms interact with each other and with their physical surroundings. Emphasis is placed on understanding biodiversity, species adaptations, and the ecological relationships that support life on Earth. The course examines population dynamics, atmospheric and oceanic processes, soil formation, freshwater availability, and the geological forces that shape the planet. Students analyze how land is used for agriculture, forestry, mining, and urban development, and evaluate the environmental consequences of these choices. Energy production and consumption are explored through comparisons of renewable and nonrenewable resources, with attention to environmental impacts, efficiency, and sustainability. Students also study major environmental challenges related to air and water pollution, waste management, habitat loss, and global climate change. Scientific concepts are applied to current issues, real-world case studies, and data-driven investigations. Throughout the year, students develop critical thinking, quantitative reasoning, and problem-solving skills while learning how environmental decisions affect ecosystems, human health, and global stability. By the end of the course, students will have a broad scientific understanding of Earth's interconnected systems and will be prepared to evaluate environmental issues, consider competing solutions, and understand the pathways toward a more sustainable future.
Approved Curricular Materials/Textbook(s)

Unit Title	Unit Description (Include Unit Objectives)	Unit Pacing
Unit 1: The Living World: Ecosystems	Unit 1 serves as an introduction to environmental science. Much of the unit centers around outlining what exactly comprises the environment and outlining a few of the major ways organisms and the environment interact. Also covered are concepts regarding sustainability as well as the scientific method and basic chemistry and biology. Students will be able to: • Describe ecosystem structure (biotic vs. abiotic factors). • Explain energy flow through food webs, food chains, and trophic levels. • Calculate GPP, NPP, and ecological efficiency. • Analyze biogeochemical cycles (carbon, nitrogen, phosphorus, hydrologic). • Explain ecological niches and ranges of tolerance. • Identify major global biomes and how climate drives their distribution. • Describe how ecosystems respond to natural disruptions.	September-November
Unit 2: The Living World: Biodiversity	The Living World centers around the organisms that inhabit the Earth. In this unit we will study a variety of different topics regarding how living things interact with themselves and their environment. This unit draws heavily from biology, especially ecological and evolutionary concepts. Students will be able to: • Define species, genetic, and ecosystem biodiversity. • Describe ecosystem services and their importance to humans. • Explain natural selection, evolution, and speciation. • Analyze ecological succession and ecosystem recovery. • Explain island biogeography and the effects of habitat fragmentation. • Identify human impacts on biodiversity and strategies for protection.	November-December

Unit 3: Population Dynamics	Unit 3 focuses on population dynamics: the way in which populations of organisms change and develop over time. This unit starts by focusing on populations in general and transitions to focusing on how human populations have altered in relation to their technological development level. Students will be able to: • Describe characteristics of populations (size, density, distribution). • Compare K-selected and r-selected species. • Interpret survivorship curves. • Calculate population growth (r, doubling time, growth rate). • Compare exponential vs. logistic growth. • Explain carrying capacity and limiting factors. • Analyze human population trends and demographic transitions.	January-February
Unit 4: Earth Systems and Resources	Earth Systems and Resources centers around the forces that shape and literally move the Earth. In this unit, we will study everything from the distribution of resources to the impact of solar radiation of air and ocean currents. Students will be able to: • Describe Earth's layers and plate tectonic processes. • Explain the rock cycle, soil formation, and soil characteristics. • Analyze watersheds, freshwater resources, and water availability. • Describe solar radiation and factors influencing climate. • Explain atmospheric circulation, ocean currents, and weather patterns. • Identify natural Earth processes (ENSO, seasonal changes, geologic events).	February- March
Unit 5: Water and Land Resource Management	Unit 5 focuses on how our use of land influences the environment. The unit starts by investigating the different anthropogenic uses and classifications of land including agriculture, forestry and rangelands. We then transition to discussing human nutritional needs focusing heavily on industrial agriculture as well as global fisheries.	March-April

	Students will be able to: • Describe major land uses (agriculture, forestry, grazing, mining, urban). • Explain agricultural systems (traditional, industrial, sustainable). • Analyze irrigation methods, pest management, and the Green Revolution. • Describe environmental impacts of logging, overgrazing, and monocropping. • Explain fishing methods, aquaculture, and impacts on marine ecosystems. • Evaluate land-use practices in relation to sustainability.	
Unit 6: Energy Resources and Consumption	Unit 6 focuses on the various forms and sources of energy humans use to power our world. The unit begins by investigating the variety of energy resources available on Earth first nonrenewable and next renewable forms. In the second half of the unit, we investigate energy efficiency, sustainability and how to make the most of our remaining energy resources. Students will be able to: • Compare nonrenewable energy sources (coal, oil, natural gas, nuclear). • Describe extraction methods and their environmental impacts. • Evaluate renewable energy sources (solar, wind, biomass, geothermal, hydro). • Explain energy conservation and efficiency strategies. • Analyze global patterns of energy use and environmental trade-offs. • Calculate energy efficiency and household energy consumption.	April-May
Unit 7: Global Change	This final unit of the course focuses on how humans have impacted the world at large and how we can expect Earth to change as a consequence of our actions. In this unit, we will discuss what changes society can take to become more sustainable and ensure a future in which everyone has access to the resources we need to survive with a large focus on economics.	May-June

	Students will be able to: ● Explain the greenhouse effect and major greenhouse gases. ● Interpret evidence for climate change (temperature trends, ice core data). ● Describe ocean warming, sea-level rise, and ocean acidification. ● Analyze changes in species ranges, migration, and extinction risk. ● Explain ozone depletion, causes, and recovery under the Montreal Protocol. ● Evaluate mitigation and adaptation strategies for climate change.	
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