

**Unit 1**

**Environmental Science**

Duration			Assessed
<b>Priority Standard(s)</b>		Define Environmental Science	
<b>Supporting Standard(s)</b>		Identify ways in which humans have altered the environment.	
		Identify key environmental indicators and their trends over time.	
		Define sustainability and explain how it can be measured using the ecological footprint.	
		Explain the scientific method and its application to the study of environmental problems	
		Discuss how matter is conserved in chemical and biological systems.	
		Distinguish among various forms of energy and understand how they are measured.	
		Discuss the first and second laws of thermodynamics and explain how they influence environmental systems.	
		Explain how scientists keep track of energy and matter inputs, outputs, and changes to environmental systems.	

**Unit 2**

**Ecosystem Ecology/Global Climate and Biomes**

Duration			Assessed
<b>Priority Standard(s)</b>		Describe ecosystems and how they work using the following concepts:flow of energy and flow of matter.	
		Define climate, weather, and how these help to determine biomes.	
<b>Supporting Standard(s)</b>		Differentiate between trophic levels in food chains and food webs.	
		Explain energy transfer efficiency and trophic pyramids	
		Explain the processes of photosynthesis and cellular respiration	
		Explain how water, carbon, nitrogen, phosphorus and sulfur cycle through an ecosystem.	
		Distinguish between ecosystem resistance and resilience.	
		Identify the five layers of the atmosphere	
		Discuss the factors that cause unequal heating of the Earth	
		Describe how the Earth's tilt affects seasonal differences in temperatures	
		Explain how the properties of air affect the way it moves in the atmosphere.	
		Identify factors that drive atmospheric convection currents	
		Describe how Earth's rotation affects the movement of air currents	
		Explain how the movement of air currents over mountain ranges affects climates.	
		Describe patterns of surface ocean circulation	
		Explain the mixing of surface and deep ocean waters from thermohaline circulation	
		Identify the causes and consequences of the El Nino -Southern Oscillation.	
		Explain how we define terrestrial biomes	
		Interpret climate diagrams	
	Identify the major terrestrial biomes.		
	Identify the major freshwater biomes		
	Identify the major marine biomes.		

**Unit 3**

**Evolution**

Duration			Assessed
<b>Priority Standard</b>		Summarize how Earth's biodiversity is generated and how it changes naturally over time.	
<b>Supporting Standard(s)</b>		Define and distinguish between biological diversity, genetic diversity, species richness, and ecosystem diversity.	
		Calculate species diversity in a given area.	
		Identify the processes that cause genetic diversity.	
		Explain how evolution can occur through natural selection, artificial selection, and random processes.	
		Differentiate between allopatric and sympatric speciation	

## Population & Human Population

Duration			Assessed
<b>Priority Standard(s)</b>		Explain growth models, reproductive strategies, survivorship curves, and metapopulations.	
		Describe species interactions and roles	
<b>Supporting Standard(s)</b>		Describe the characteristics of a population	
		Describe factors that influence a population's growth rate.	
		Distinguish between exponential and logistic growth models.	
		Compare reproductive strategies and survivorship curves of different species.	
		Discuss various species interactions and their impacts on one another.	
		Differentiate between primary, secondary, and aquatic succession.	
		Describe factors that increase human population growth,	
		Calculate population growth.	
		Interpret and create age structure diagrams.	
		Interpret the demographic transition model.	
		Explain how relationships among population size, economic development, and resource consumption influence the environment.	

**Unit 5**

**Earth Systems and Resources**

Duration			Assessed
<b>Priority Standard(s)</b>		Describe geologic process: plate tectonics, weathering, erosion, the rock cycle and soil formation.	
		Identify and explain the benefits and environmental impacts of common mining practices.	
		Explain how water is used by humanity.	
<b>Supporting Standard(s)</b>		Explain the formation of the Earth and the distribution of critical elements on Earth	
		Define the theory of plate tectonics	
		Differentiate between divergent, convergent, and transform fault boundaries.	
		Predict the type of geologic activity that results for each type plate boundary.	
		List and define the three types of convergent boundaries.	
		Describe the rock cycle and discuss its importance to environmental science	
		Describe how weathering and erosion occur and how they contribute to element cycling and soil formation	
		Explain how soil is formed and describe characteristics of soil	
		Distinguish the various horizons of soil.	
		Interpret a soil triangle.	
		Describe how humans extract elements and minerals and the environmental consequences of these activities.	
		Differentiate between strip mining, open-pit mining, mountaintop removal, placer mining, and subsurface mining.	
		List sources of groundwater and identify the largest source of freshwater.	
		Explain how man has manipulated the movement of water.	
		Explain how salt water can be converted into freshwater.	
	Describe how man uses water.		
	Differentiate between furrow irrigation, flood irrigation, spray irrigation and drip irrigation.		

**Unit 6**

**Land Use and Farming**

Duration			Assessed
<b>Priority Standard(s)</b>		Describe how humans use land and its impact on the environment	
		Explain the various techniques used to feed the world and how those impact the environment.	
<b>Supporting Standard(s)</b>		Describe how human land use effects the environment	
		Explain specific land management practices for rangelands and forests.	
		Describe contemporary problems in residential land use and some potential solutions.	
		Explain the causes and consequences of urban sprawl.	
		Describe human nutritional requirements and why they are not being met in various parts of the world.	
		Describe modern, large-scale agricultural methods.	
		Explain the benefits and consequences of genetically modified foods.	
		Explain the large-scale raising of meat and fish.	
		Explain the environmental impacts created by modern large scale farming methods.	
		Explain alternatives to conventional farming.	
	Explain alternative techniques used in farming animals and in fishing and aquaculture.		

**Unit 7**  
**Energy**

Duration			Assessed
<b>Priority Standard(s)</b>		Describe nonrenewable energy and explain the consequences of its use on the environment	
		Differentiate the various forms of renewable energy and their shortcomings.	
<b>Supporting Standard(s)</b>		Describe the use of nonrenewable energy in the world and in the United States.	
		Explain why different forms of energy are best suited for certain purposes.	
		Discuss primary ways that electricity is generated in the United States.	
		Discuss the uses of coal, petroleum, natural gas, oil sands, liquefied coal and their consequences on the environment.	
		Discuss the future use of fossil fuels.	
		Explain how nuclear energy is used to generate electricity.	
		Explain the advantages and disadvantages of using nuclear energy.	
		Differentiate between nuclear fission and fusion.	
		Calculate half lives for various elements.	
		Describe strategies to conserve energy and increase energy efficiency.	
		Describe various forms of biomass.	
		Explain how energy is harnessed from water and the environmental consequences of such.	
		List and describe the various forms of solar energy and their application.	
		Describe how wind energy is harnessed to create energy and its environmental impact	
		Describe how internal energy for the earth is harnessed and its shortcomings.	
	Explain the advantages and disadvantages of energy derived from Hydrogen.		
	Explain challenges of renewable energy strategy.		

**Unit 8**

**Air and Water Pollution**

Duration			Assessed
<b>Priority Standard(s)</b>		Describe various forms of water pollution and how the environment is impacted by such.	
		Describe various forms of air pollution and how the environment is impacted by such.	
<b>Supporting Standard(s)</b>		Describe how modern wastewater treatment methods and the three types of environmental problems caused by wastewater.	
		Identify the sources of heavy metals in the environmental and describe their effects on organisms.	
		Identify the sources and describe the formation of acid precipitation.	
		Explain the environmental impacts of acid precipitation.	
		Explain the sources of oil pollution and methods used to remediate oil pollution.	
		Explain the environmental impacts of oil pollution.	
		Identify sources of solid waste, sediment, thermal and noise pollution and how each impacts the environment.	
		Identify laws that prevent water contamination	
		Identify and describe major air pollutants and their sources.	
		Explain the formation and environmental impacts of photochemical smog.	
		Explain strategies, techniques and pollution control measures.	
		Describe the benefits of stratospheric ozone.	
		Describe how stratospheric ozone is depleted and discuss methods to reduce ozone depletion.	
	Differentiate indoor air pollutants in developed and developing countries.		

**Unit 9**

**Solid Waste, Environment & Human Health**

Duration			Assessed
<b>Priority Standard(s)</b>		Describe the composition of solid waste and ways to dispose it	
		Explain risk assessment, the purpose of an epidemiological study to identify and eradicate environmental problems, and describe toxicology.	
<b>Supporting Standard(s)</b>		Explain why humans generate waste and discuss recent waste disposal trends	
		Define the terms recycle, reduce, and reuse and place them in order of positive environmental impact.	
		Explain the process of composting and the benefits it creates.	
		Describe the design, function and goals of a solid waste landfill.	
		Describe the design and purpose of a solid waste incinerator.	
		Compare and contrast the advantages and disadvantages of a solid waste landfill and an incinerator.	
		Define hazardous waste and discuss its environmental impacts	
		Describe regulations and legislation regarding hazardous waste.	
		Determine alternative ways to handle waste and waste generation.	
		Identify types of human diseases.	
		Discuss historically important diseases.	
		Differentiate between neurotoxins, carcinogens, teratogens, allergens, endocrine disruptors and describe how each impact they body.	
		Differentiate between LD50 and ED50.	
		Differentiate between bioaccumulation and biomagnification.	
		Define risk assessment and be able to determine if the risk is acceptable.	

**Unit 10**

**Conservation of Biodiversity and Global Change**

Duration			Assessed
<b>Priority Standard(s)</b>		Explain factors that decrease biodiversity and methods of preserving it.	
		Summarize the environmental impacts of global climate change.	
<b>Supporting Standard(s)</b>		Explain global decline in genetic diversity among wild and domesticated species.	
		Explain factors that cause decline in biodiversity. (HIPPCO)	
		Discuss legislation that focuses on the protection of a single species and conservation efforts that focus on protecting an entire ecosystem.	
		Differentiate between global change, global climate change, and global warming.	
		Explain the greenhouse effect	
		Identify natural and anthropogenic sources of greenhouse gases.	
		Explain how temperatures, CO2 have increased over the last years	
		Discuss how we estimate temperatures and levels of greenhouse gases over the 500,000 years and into the future.	
		Explain how global climate change impacts the environment and organisms.	
	Explain the goals of the Kyoto Protocol		