

**Course Resources:****Environmental Science - Course Syllabus**

## Environmental Science - Course Syllabus

**Description:**

Environmental science is a captivating and rapidly expanding field, and this course offers compelling lessons that cover many different aspects of the field: ecology, the biosphere, land, forests and soil, water, energy and resources, and societies and policy. Through unique activities and material, high school students connect scientific theory and concepts to current, real-world dilemmas, providing them with opportunities for mastery in each of the segments throughout the semester.

**Textbook:** Environmental Science - Excel Education Systems, Inc.

**Course objectives:**

Throughout the course, you will meet the following goals:

Understand the interrelationships in the natural world.  
 Examine the natural cycles of energy flow and evaluate how human interaction affects these cycles.  
 Model real-world phenomena and determine possible consequences of specific actions.  
 Defend the best choices to protect the environment with changing trends in human demographics.  
 Interpret evidence and communicate scientifically about environmental conditions and hazards.

**Contents:****Semester A**

- 1: An Introduction to Environmental Science
- 2: Understanding Our Environment
- 3: Using the Scientific Method and Models
- 4: Our Changing Earth
- 5: Organization of Living Things
- 6: Ecosystems
- 7: Biomes
- 8: Aquatic Ecosystems
- 9: Exploring Populations
- 10: Understanding Human Populations
- 11: What is Biodiversity?
- 12: Water Resources

**Semester B**

- 13: Air and Pollution
- 14: Earth's Climate
- 15: Land Use and Conservation
- 16: Agriculture and Food
- 17: Earth's Mineral Resources
- 18: Nonrenewable Energy Sources
- 19: Renewable Energy Sources
- 20: Waste Management
- 21: Human Health and The Environment
- 22: Politics, Economics, and The Environment

**Grading Scale**

- A = 90-100%  
 B = 80-89%  
 C = 70-79%  
 D = 60-69%  
 F = under 59%

**Grade Weighting**

- Quizzes..... 35%  
 Written Assignments..... 35%  
 Final Exam..... 30%  
 100%

Unit	Essential Questions	Learning Objectives	Instructional Strategies	Resources	Assessments
Months 1-12					
Module 1: An Introduction to Environmental Science <i>(updated 3/9/20)</i>	What is environmental science?	Students will: Identify the multiple disciplines of science which make up environmental science	direct instruction	Module 1.1: An Introduction to Environmental Science	

**Curriculum Map - Science - Environmental Science**

<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
Module 2: Understanding Our Environment <i>(updated 3/11/20)</i>	Throughout history, how have humans altered the environment? What are current environmental issues and how are you effected?	Define environmental science and its importance to society Discuss the five major fields of study that contribute to environmental science Distinguish between renewable and nonrenewable resources Explain "The Tragedy of the Commons" Discuss what sustainability is and its importance in environmental science	direct instruction graphic aids note taking study guide	Module 2.1 What is Environmental Science? Module 2.2 The Environment and Society	CYU's quiz
Months 1-12					
Module 3: Using the Scientific Method and Models <i>(updated 3/11/20)</i>	Why is data important in the study of our environment? What factors are important when analyzing environmental issues?	Students will: Identify all of the steps in the experimental method Explain and have examples of what makes a good scientist Define statistics and explain how scientists use statistics Distinguish between the four models (physical, graphical, conceptual and mathematical) Understand the steps of the decision-making model	direct instruction graphic aids note taking study guide	Module 3.1 Scientific Methods Module 3.2 Statistics and Models Module 3.3 Making Informed Decisions	CYU's quiz
Months 1-12					
Module 4: Our Changing Earth <i>(updated 3/12/20)</i>	How is the structure of earth organized? What are the effects of our changing earth?	Students will: Understand and know the differences for the composition of the Earth Explain the how and where of earthquakes, volcanic eruptions and mountain formations Define each of the four layers of the atmosphere Distinguish between energy and heating in the atmosphere Identify the differences between the different types of water on Earth	direct instruction graphic aids note taking study guide	Module 4.1: The Geosphere Module 4.2 The Atmosphere Module 4.3 The Hydrosphere	CYU's quiz
Months 1-12					
Module 5: Organization of Living Things <i>(updated 3/11/20)</i>	What is the relationship between living things in an ecosystem? How can organisms adapt to their environment? What is bacteria's role in the world? How are animals classified?	Students will: Define an ecosystem and understand how they are connected and their components Understand the differences between populations, communities and habitat Explain the Charles Darwin observation in 1859 on natural selection Identify all of the different types of bacteria in the environment Distinguish between vertebrates and	direct instruction graphic aids note taking study guide	Module 5.1: Ecosystems: Everything is Connected Module 5.2 Evolution Module 5.3 The Diversity of Living Things	CYU's quiz

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Months 1-12					
Module 6: Ecosystems <i>(updated 3/11/20)</i>	How does human interaction affect ecosystems? How do natural processes create and shape life's unity and diversity?	Students will: Distinguish between a producer and a consumer How these organisms obtain energy (herbivore, omnivore, carnivore and decomposer) Understand each of the cycles of materials and what each process involves Distinguish between the primary and secondary succession Provide examples of each ecological succession in the ecosystem	direct instruction graphic aids note taking study guide	Module 6.1: Energy Flow in Ecosystems Module 6.2: The Cycling of Materials Module 6.3: How Ecosystems Change	CYU's quiz
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
Module 7: Biomes <i>(updated 3/12/20)</i>	What features determine a biome? How are biomes classified?	Distinguish between latitude and altitude measured in degrees Explain each of the most common biomes in the world and their ecosystems Identify the four different layers of the rain forest in which various plants grow Distinguish between savannas, grasslands, chaparrals, deserts and tundra biomes Understand what permafrost is and its effect in the tundra biome	direct instruction graphic aids note taking study guide	Module 7.1: What is a Biome? Module 7.2: Classifications of Biomes Module 7.3: Grassland, Desert, and Tundra Biomes	CYU's quiz
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
Module 8: Aquatic Ecosystems <i>(updated 3/13/20)</i>	What are the characteristics of aquatic biomes? Why is it important to protect our aquatic biomes?	Students will: Identify each of the freshwater ecosystems and how they can be formed Distinguish between the littoral zone and the benthic zone Understand the impact of eutrophication in lakes Explain how estuaries form and why they are important to the ecosystem Understand why and what causes coral reefs to be in danger today	direct instruction graphic aids note taking study guide	Module 8.1: Freshwater Ecosystems Module 8.2: Marine Ecosystems	CYU's quiz
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
Module 9: Exploring Populations <i>(updated 3/12/20)</i>	What are the effects of population changes and interactions in our environment?	Students will: Define population and distinguish between density and dispersion Explain how a population grows and how fast it can grow Understand exponential growth and give an example of how it occurs Distinguish between competition and	direct instruction graphic aids note taking study guide	Module 9.1: How Populations Change in Size Module 9.2: How Species Interact with Each Other	CYU's quiz

**Curriculum Map - Science - Environmental Science**

		indirect competition Identify the different ways species interact in an organism			
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
Module 10: Understanding Human Populations <i>(updated 3/12/20)</i>	How does a growing global human population affect our environment?	Students will: Explain why the human population growth rate experienced growth in the 1800s Understand death rates and explain how it has declined over the last 200 years Identify what the demographic transition model is and why it matters in populations Explain rapid growth and what natural resources are most affected by it Distinguish between the least developed countries and the more developed countries	direct instruction graphic aids note taking study guide	Module 10.1: Studying Human Populations Module 10.2: Changing Populations Trends	CYU's quiz
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
Module 11: What is Biodiversity? <i>(updated 3/12/20)</i>	Why should we care about biodiversity? How are we responsible for living and non-living things? What human actions are associated with biodiversity loss?	Students will: Define biodiversity and identify the three different levels (species, genetic and ecosystem) Distinguish between endangered species and threatened species Understand how harvesting, hunting and poaching has caused extinction of certain species Explain what the Endangered Species Act is that passed Congress in 1973 Understand the Biodiversity Treaty and what groups it affected	direct instruction graphic aids note taking study guide	Module 11.1: What is Biodiversity? Module 11.2: Biodiversity at Risk Module 11.3: The Future of Biodiversity	CYU's quiz
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
Module 12: Water Resources <i>(updated 3/12/20)</i>	Where does your water come from? Where do water pollutants come from and what effects do they have?	Students will: Identify how much of the earth's surface is water and the percentages of salt and fresh Distinguish between porosity and permeability when it comes to a rock Explain residential water use, industrial water use and agricultural water use Define water pollution and distinguish between point-source and nonpoint-source pollution Understand and explain thermal, groundwater and ocean pollution and their impact Choose from a list of given topics/writing prompts and produce a research paper	direct instruction graphic aids note taking study guide	Module 12.1: Water Resources Module 12.2: Water Use and Management Module 12.3: Water Pollution	CYU's quiz research paper
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>

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Months 1-12					
Module 13: Air and Pollution <i>(updated 3/12/20)</i>	What are the sources of air pollutants? How can we ensure everyone has clean air to breath?	Students will: Distinguish between primary pollutants and secondary pollutants •Understand the Clean Air Act and how it impacts industries Distinguish between short-term and long-term effects of air pollution on health Define acid precipitation and what causes it to occur and fall to earth's surface Understand pH (power of hydrogen) and know where it varies geographically	direct instruction graphic aids note taking study guide	Module 13.1: What Cause Air Pollution? Module 13.2: Air, Noise, and Light Pollution Module 13.3 :Acid Precipitation	CYU's quiz
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
Module 14: Earth's Climate <i>(updated 3/12/20)</i>	What is the evidence that Earth's atmosphere is changing?	Students will: Define weather and climate and understand the difference between them Distinguish and explain the difference between El Nino and La Nina Identify the ozone hole along with where and when it occurs in the stratosphere Explain the Greenhouse Effect and its impact on global warming Understand how meteorologists and other scientists use models to predict weather changes	direct instruction graphic aids note taking study guide	Module 14.1: Climate and Climate Change Module 14.2: The Ozone Shield Module 14.3: Global Warning	CYU's quiz
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
Module 15: Land Use and Conservation <i>(updated 3/12/20)</i>	How do natural resources enhance the quality of life? What are the implications of urban land use?	Students will: Distinguish between and urban land and a rural area Define urbanization and the impact that it has had in the United States Understand the geographic information system (GIS) and how it is used Distinguish between deforestation and reforestation Explain the benefits and the threats to protected areas for endangered species	direct instruction graphic aids note taking study guide	Module 15.1: How We Use Land Module 15.2: Urban Land Use Module 15.3: Land Management and Conservation	CYU's quiz
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
Module 16: Agriculture and Food <i>(updated 3/12/20)</i>	How is our food supply dependent on our ecosystems? What can be done to safeguard modern agriculture?	Students will: Define malnutrition and what food sources causes it to occur Describe what makes a healthy diet and how diets change around the world Distinguish between traditional agriculture and modern agriculture Understand the different types of activity to monitor pest control Identify the different types of domesticated animals that affect	direct instruction graphic aids note taking study guide	Module 16.1: Feeding the World Module 16.2 Crops and Soil	CYU's quiz

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Months 1-12					
Module 17: Earth's Mineral Resources <i>(updated 3/12/20)</i>	How are minerals useful to society? What are the environmental concerns regarding mining?	Students will: Define mineral and distinguish between metallic and nonmetallic minerals Distinguish between subsurface, longwall, solution, surface, placer and undersea mining Understand the quarrying process and what it is used for in mining Identify what type of mining is a cause of air and noise pollution Explain the SMCRA of 1977 and how it is important in reclamation of mines	direct instruction graphic aids note taking study guide	Module 17.1: Minerals and Mineral Resources Module 17.2: Mineral Exploration and Mining Module 17.3: Mining Regulations and Mine Reclamation	CYU's quiz
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
Module 18: Nonrenewable Energy Sources <i>(updated 3/12/20)</i>	What are the characteristics of nonrenewable energy sources? Is nuclear power a better alternative to burning fossil fuels?	Students will: Identify all of main uses of fuel in the world today and how they differ Define coal and how it is used in mining and in the environment Explain the projections on fossil fuels in the future along with available oil fields Understand nuclear energy and the advantages and disadvantages Explain the future of nuclear power and why nuclear fusion is safer than nuclear fission	direct instruction graphic aids note taking study guide	Module 18.1: Energy Resources and Fossil Fuels Module 18.2: Nuclear Energy	CYU's quiz
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
Module 19: Renewable Energy Sources <i>(updated 3/12/20)</i>	What are the characteristics of renewable energy sources? How can energy be used more efficiently?	Students will: Distinguish between passive solar heating and active solar heating Describe how wind power and wind farms are becoming common in the United States Identify how geothermal energy and heat pumps energize home and power from the earth Explain ocean thermal energy conversion (OTEC) and how it is useful Define energy efficiency and how it relates to transportation in America	direct instruction graphic aids note taking study guide	Module 19.1: Renewable Energy Today Module 19.2: Alternative Energy and Conservation	CYU's quiz
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					

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<p>Module 20: Waste Mangement <i>(updated 3/12/20)</i></p>	<p>Why is all waste not equal?</p>	<p>Students will: Distinguish between solid waste, space and waste, and population and waste Define landfills and understand the problems with and safeguarding of landfills Define recycling and understand the series of steps involved in recycling Explain hazardous waste and the different types of hazardous waste in the environment Explain the Resource Conservation and Recovery Act (RCRA)</p>	<p>direct instruction graphic aids note taking study guide</p>	<p>Module 20.1: Solid Waste Module 20.2: Reducing Solid Waste Module 20.3: Hazardous Waste</p>	<p>CYU's quiz</p>
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
<p>Module 21: Human Health and The Environment <i>(updated 3/12/20)</i></p>	<p>How do human activities cause pollution in our environment?</p>	<p>Students will: Define toxicology and explain how dangerous it is to the environment Explain how human activities have caused pollution and the recent improvements Understand the environment's role is diseases, specifically infectious diseases Distinguish between cholera and malaria and how they can affect humans Identify what scientists referenced when they made a cross-species transfer</p>	<p>direct instruction graphic aids note taking study guide</p>	<p>Module 21.1: Pollution and Human Health Module 21.2: Biological Hazards</p>	<p>CYU's quiz</p>
<b>Unit</b>	<b>Essential Questions</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>Resources</b>	<b>Assessments</b>
Months 1-12					
<p>Module 22: Politics, Economics, and The Environment <i>(updated 3/12/20)</i></p>	<p>How is the world collaborating to address environmental issues? What can individuals do to help protect the environment?</p>	<p>Students will: Explain MARPOL and the international agreement that has produced results Describe environmental agencies and laws, specifically the EPA Define local governments and their impact in local communities Distinguish between the influential individuals and describe their importance <b>Understand the steps</b></p>	<p>direct instruction graphic aids note taking study guide</p>	<p>Module 22.1: Economics and International Cooperation Module 22.2: Environmental Policies in the United States Module 22.3: The Importance of the Individual</p>	<p>CYU's quiz research paper</p>