

**Syllabus for Advanced Placement Environmental Science**  
**Creekside High School**  
 with Mrs. Pressel

Textbook: Environment: The Science Behind the Stories for AP, 4<sup>th</sup> ed. Jay Withgott and Scott Brennan. Pearson Education, Inc 2011.

1<sup>st</sup> Semester

<b>Weeks</b>	<b>Chapter(s)</b>	<b>Topic</b>	<b>Sample Activities</b>
2	1 and 2	Introduction to Environmental Science; Systems and Interactions; Basic Chemistry (Inorganic, Organic, Biochemistry, and Nuclear Chemistry)	<ul style="list-style-type: none"> <li>• Video – The Lorax</li> <li>• Tragedy of the Commons Lab</li> <li>• Ecological Footprints</li> <li>• PaleoMap Project</li> <li>• Rock Classification Lab</li> </ul>
2	3 and 5	Earth Systems and Cycles; Biogeochemical Cycles;	<ul style="list-style-type: none"> <li>• Biogeochemical Cycles Diagram</li> </ul>
1		Climate and Biomes	<ul style="list-style-type: none"> <li>• Lab: Biomes and Climatographs</li> <li>• Lab: Coriolis Effect, El Nino and La Nina</li> </ul>
4	4	Community Ecology: Structure, Species Interactions, Succession; Population Ecology; Evolution and Biodiversity; Niches and Adaptation	<ul style="list-style-type: none"> <li>• Predator/Prey Population Lab</li> <li>• Carrying Capacity Lab</li> <li>• Natural Selection Lab</li> </ul>
3	8 and 13	Human Population Dynamics; Human Demographics; Urbanization	<ul style="list-style-type: none"> <li>• Human Population and Age Structure Diagrams</li> <li>• Survivorship Lab</li> </ul>
4	2 and 9; 23	Earth Systems: Geology, Minerals, Soils, and Soil Composition	<ul style="list-style-type: none"> <li>• The DIRT on Soil Lab</li> <li>• Reading River Sediments</li> <li>• Exploring Physical Properties of Minerals</li> <li>•</li> </ul>
2		MIDTERM REVIEW and APES CollegeBoard Study Guide Part 1	

2<sup>nd</sup> Semester

<b>Weeks</b>	<b>Chapter(s)</b>	<b>Topic</b>	<b>Sample Activities</b>
3	10 and 14	Risk and Toxicology; Pesticides; Food Resources	<ul style="list-style-type: none"> <li>• Toxicology Lab</li> <li>• LC50 Lab</li> </ul>
3	15	Water and Water Pollution	<ul style="list-style-type: none"> <li>• Groundwater Pollution</li> <li>• Deposition of Sediments</li> <li>• Water Lab</li> </ul>
2	11, 12, and 16	Land Management Issues: Forestry, Rangeland, Terrestrial and Aquatic Biodiversity	<ul style="list-style-type: none"> <li>• Wanted Dead or Alive Project</li> <li>• Habitat: The Choice is Yours</li> <li>• Impacts of Forest Management</li> </ul>
3	19, 20, and 21	Nonrenewable Energy Resources; Energy Efficiency; Alternative Energy Resources	<ul style="list-style-type: none"> <li>• Hidden Energy Use Activity</li> <li>• Energy Practice Problems</li> <li>• *Research Paper on Alternative Energy Resources</li> </ul>
2	17 and 18	Air and Air Pollution: Regional and Global Problems, Ozone Depletion, Acid Deposition and Global Climate Change	<ul style="list-style-type: none"> <li>• Acid Deposition Lab</li> </ul>
2	22; 6 and 7	Solid and Hazardous Wastes; Environmental Economics, Politics, and Ethics	<ul style="list-style-type: none"> <li>• Cookie Mining Lab</li> <li>• Tires and the Environment Activity</li> </ul>
3		AP EXAM REVIEW and APES CollegeBoard Study Guide Part 2	

## Topic Outline for Course

\*Note – This Outline is subject to change and will be updated accordingly throughout the year. Check Edmodo reminders and In-Class Due Dates for specific course assignments.

Module	Topic
<b>APES Introduction</b>	<p>Syllabus; Classroom Guidelines and Expectations; Student Information Sheets; Bios Exploration</p> <p>The Lorax - video and Class Discussion</p> <p>Field Notebook Guidelines and Modeling</p> <p>APES CollegeBoard Topic Outline for the Advanced Placement Exam</p> <p>Diagnostic Test and FRQ Introductions</p> <p>Calculations without Calculators Discussion on the AP Exam</p>
<b>Unit 1 - Intro to Environmental Science (Chapters 1 and 2)</b>	<p>"Guided Learning" Reading and Notes for Unit 1</p> <p>Vocabulary for Unit 1</p> <p>Natural Resources Overview</p> <p>FRQ Practice on Natural Resources</p> <p>LAB: Tragedy of the Commons</p> <p>Case Study: Easter Island</p> <p>Class Discussion on Tragedy of the Commons by Garrett Hardin</p> <p>WebQuest: How Smelly Is Your Footprint?</p> <p>Case Study: Watch Your Step - Exploring Ecological Footprints</p> <p>Math Calculations: Ecological Footprints</p> <p>Mastering Environmental Science online activities due for Unit 1</p> <p>APES Basic Chemistry Discussion</p>
<b>Unit 2 - Earth's Systems and Cycles (Chapters 3 and 5)</b>	<p>Guided Learning Notes and Vocabulary for Unit 2</p> <p>Photosynthesis and Respiration Review</p> <p>WebQuest: Phases of Matter</p> <p>Plate Tectonics - Our Dynamic Earth</p> <p>PaleoMap Project</p>

Case Study: the New Geologic Epoch

LAB: Rock Classification

Discussion on Plate Tectonics and Geology

WebQuest: Biogeochemical Cycles

Biogeochemical Cycles Discussion and InfoGraphics

CollegeBoard Activity on The Nitrogen Cycle

FRQ Practice on Nutrients in the Chesapeake Bay

Discussion on Earth's Cycles

Mastering Environmental Science online activities due for Unit 2

### **Unit 3 - Climate and Biomes (Chapters 4 and 18)**

Guided Learning and Vocabulary for Unit 3

Biomes Review

Climatograph Practice - Jacksonville Biome Activity

Lab: Biomes

Class Discussion on Oceanic Circulation

Lab: The Coriolis Effect, El Nino and La Nina

Mastering Environmental Science online activities due for Unit 3

### **Unit 4 - Ecology and Ecosystems (Chapter 3 and 4)**

Guided Learning and Vocabulary for Unit 4

Natural Selection and Darwin's Finches

Energy Flow Review

Activity on Web Diagrams

Math Calculations: Energy Flow in Ecosystems

FRQ Practice on Energy Transfer and Biomagnification

Project: Keystone Species

Class Discussion on Populations and Niches

Lab: Parking Lot Biodiversity and the Hardy-Weinberg Principle

Activity: Species Interactions

Lab: Wolves vs. Hare System Interactions

Class Discussion on Populations, Mark and Recapture Studies

Lab: Something's Fishy

WebQuest on R and K Species

FRQ Practice on Ecology and Ecosystems

**Mastering Environmental Science online activities due for Unit 4**

### **Unit 5 - Human Populations and Urbanization (Chapter 8 and 13)**

**Guided Learning and Vocabulary for Unit 5**

World in the Balance - Global Population Changes

If the Population was 100

Nat Geo - Population at 7 Billion

Living in a Material World

Class Discussion on Human Population Dynamics

Demographic Facts of Life Activity

**Lab: World Population Growth**

Doubling Time in Exponential Growth

**Lab: All in the Family**

Global Population Trends

Class Discussion on Age Pyramids and Histograms

**Project: Population Pyramid Graphing**

FRQ Practice on Total Fertility Rates

**Mapping Global Urbanization Project**

Case Study: Sustainable Cities

Class Discussion on Human Population and Urbanization

The Most Isolated Man on the Planet

Case Study: Land Degradation

FRQ Practice on Urban Development

**Mastering Environmental Science online activities due for Unit 6**

### **Unit 6 - Earth's Geology and Soil Resources (Chapter 2, 9, and 23)**

**Guided Learning and Vocabulary for Unit 6**

Review of Plate Tectonics and Geology from Chapter 2

Dirt, The Movie

Activity: Building a Soil Profile

**Lab: Soil Properties and Soil Analysis**

Webquest: Soil Horizons  
Class Discussion on Soil Resources and Their Preservation  
Lab: Soil Salinization  
Activity: Nitrogen, Too Much of a Good Thing  
Class Discussion on Soils and Agriculture  
Pesticide Pyramids  
Rachel Carson and Silent Spring  
Modern Agriculture Changes in the U.S  
Food Mapping Project  
Humanity Against Hunger Activity  
King Corn  
Socratic Seminar on Genetically Modified Organisms  
Challenge Question on Fertilizers and Agriculture  
Mastering Environmental Science online activities due for Unit 6

### CollegeBoard Study Guide Part 1 DUE

### Unit 7 - Environmental Health, Toxicology, and Impacts (Chapter 10 and 14)

Guided Learning and Vocabulary for Unit 7  
Lab: Cats of Borneo  
Class Discussion on Biomagnification and Review of Pesticide Impacts  
Case Study: Top of the Food Chain  
Basics of Toxicology  
WebQuest on Environmental Health and Toxicology  
Lab: Risk Perception  
Lab: Dose Response and LD50  
Challenge Question on Endocrine Disruptors  
Project: Environmental Legislation in U.S. History  
WebQuest: Toxic Sites in your Neighborhood  
FRQ on Environmental Health  
Mastering Environmental Science online activities due for Unit 7

### Unit 8 - Water Resources (Chapter 15)

### Guided Learning and Vocabulary on Unit 8

Tapped

Case Study: Eating PCBs from Lake Ontario

Water Cycle Game

Lab: Water, Water Everywhere (Water Chemistry)

Lab: Water Loss Drop by Drop

APES Water Audit

USGS Water Sustainability Report

Class Discussion on Water Resources and Water Conflict

Lab: Water Eutrophication and Hypoxia

Point vs. Nonpoint Pollution

WebQuest: Field Trip to a Water Treatment Facility

Blue Gold

Water as Energy Socratic Seminar: Three Gorges Dam

Lab: Water Diversions

FRQ Practice on Water Resources and the Everglades

Mastering Environmental Science online activities due for Unit 8

### Unit 9 - Land Management and Resource Impacts (Chapters 11, 12, and 16)

#### Guided Learning and Vocabulary for Unit 9

Case Study: Protecting the Great Bear Rainforest

The Guide

HHMI WebQuest: Gorongosa National Park

Project: Wanted Dead or Alive?

Lab: Biodiversity

Class Discussion on Biodiversity, Land Management and Human Interactions

Forests in a Modern World

Planet Earth: Seasonal Forests

Case Study: Turning Genetically-Altered Trees into Toxic Avengers

Class Discussion on Succession, Carbon Sinks and Forest Management

WebQuest: Global Marine Biodiversity Project

Case Study: The Great Barrier Reef

Challenge Question on Tropical Fish Demand

Phytoplankton - Earth's Superfood

The Tremendous Travels of Ocean Trash

Lab: Oil Spill!

Case Study: Wetland Preservation

Class Discussion on Aquatic Ecosystems

FRQ on Biodiversity

Mastering Environmental Science online activities due for Unit 8

### **Unit 10 - Energy Resources (Chapters 19, 20, 21)**

Guided Learning and Vocabulary for Unit 10

Oil on Ice

Personal Energy Use Audit

Lab: Cookies and Carbon Dioxide

Energy Projects

CollegeBoard Math Problems on Energy Resources

Case Study: Oil Spill in the Gulf

Lab: Half Life Problems

Class Discussion on Energy Resources

Radioactive Wolves

Lab: Watts the Cost?

Renewables Research Project

FRQ on Energy Resources

Mastering Environmental Science online activities due for Unit 10

### **Unit 11 - Air Pollution and Climate Science in a Modern World (Chapters 17 and 18)**

Guided Learning and Vocabulary on Unit 11

Atmospheric Riddles Activity

Class Discussion on the Atmosphere and the Greenhouse Effect

Case Study: Asia's Brown Cloud

Activity: Primary vs. Secondary Air Pollutants Infographics

Criteria Pollutants Graphing

Class Discussion on The Chemistry of Pollution and Criteria Pollutants

Lab: Acid Deposition

NO<sub>x</sub> vs SO<sub>x</sub>

Indoor Air Pollution

WebQuest: Atmospheric CO<sub>2</sub> Correlation

Case Study: Climate Change will Rob Us of Coral Reefs

Lab: Coral Bleaching

Lab: Global Climate Change

Case Study: Polar Bears

FRQ on Climate Science

Mastering Environmental Science online activities due for Unit 11

## Unit 12 - Waste Management (Chapters 22, 23 ; 6, 7)

Guided Learning and Vocabulary for Unit 12

Lab: Mining

Webquest: Coal Mining

Class Discussion on Mining and Mineral Resources

Math Calculations on Metal Consumption

Project: Garbage Through the Ages

Activity: Tires and the Environment

Lab: Solid Waste Inventory

Trashed

WebQuest Field Trip to a Landfill

Landfill Design

Class Discussion on Hazardous Wastes

Case Study: Waste to Incineration

WebQuest on Waste to Energy

Corn Plastic to the Rescue

Class Discussion on SUPERFUND and Waste Management

FRQ Practice on Energy

Mastering Environmental Science online activities due for Unit 12