

## Wilson Area School District Planned Course Guide

**Title of planned course:** Environmental Science

**Subject Area:** Science

**Grade Level:** 12

**Course Description:** Studies of environmental science are becoming more and more prevalent in contemporary society. The purpose of this course is to raise awareness about environmental issues, to think about the causes and consequences of these issues, to understand the importance of healthy ecosystems and biodiversity, and to determine what we, as individuals and a society, can do to help improve the biosphere.

**Time/Credit for this Course:** One Semester / .5 credit

**Curriculum Writing Committee:** Wendy Baltz

## Curriculum Map

### **Week 1:**

An Introduction to Environmental Science  
Environmental Ethics and Environmental Justice  
Common Trees of Pennsylvania Identification

### **Week 2:**

History of Environmental Policy  
Approaches to Environmental Policy  
Common Trees of Pennsylvania Identification

### **Week 3:**

Lehigh Gap Field Trip  
Human Population Growth  
Common Trees of Pennsylvania Identification

### **Week 4:**

Human Population Growth  
Common Trees of Pennsylvania Identification

### **Week 5:**

Environmental Health  
Common Songbirds of Pennsylvania Identification

### **Week 6:**

Tannersville Bog Field Trip  
Climate Change and Response to Climate Change  
Freshwater Resources and Water Treatment  
Common Songbirds of Pennsylvania Identification

### **Week 7:**

Freshwater Resources and Water Treatment  
Common Songbirds of Pennsylvania Identification

### **Week 8:**

Freshwater Resources and Water Treatment  
Air Pollution

### **Week 9:**

Air Pollution  
Waste Management

### **Week 10:**

Chrin Field Trip  
Waste Management

**Week 11:**

Fossil Fuels and Nuclear Power

**Week 12:**

Renewable Energy Alternatives

**Week 13:**

Population Ecology

**Week 14:**

Species Interactions and Ecological Communities

**Week 15:**

Biomes and Aquatic Ecosystems

**Week 16:**

Biomes and Aquatic Ecosystems

**Week 17:**

Biomes and Aquatic Ecosystems

**Week 18:**

Biomes and Aquatic Ecosystems  
Review for Final Exam

**Wilson Area School District  
Planned Course Materials**

**Course Title:** Environmental Science

**Textbook:**

Environment: The Science Behind the Stories  
(AP Edition / 3<sup>rd</sup> Edition)  
Pearson (Jay Withgott / Scott Brennan)  
2008

**Supplemental Books:**

Environmental Science: Your World, Your Turn  
Pearson (Jay Withgott)  
2011

Common Trees of Pennsylvania  
Department of Conservation and Natural Resources  
<http://www.dcnr.state.pa.us/forestry/commontr/index.aspx>

Birds of Eastern and Central North America (5<sup>th</sup> Edition)  
Peterson Field Guides  
Houghton Mifflin Company  
2002  
[www.houghtonmifflinbooks.com](http://www.houghtonmifflinbooks.com)

**Teacher Resources:**

Provided power point presentations  
Other ancillary materials

## Curriculum Scope & Sequence

**Planned Course:** Environmental Science

**Unit:** Introduction

1. An Introduction to Environmental Science
2. Environmental Ethics and Environmental Justice
3. History of Environmental Policy
4. Approaches to Environmental Policy

**Time frame:** 10 days

**State Standards:** 3.4.12.E2, 4.2.12A, 4.2.12B, 4.2.12C

**Essential content/objectives:** At end of the unit, students will be able to:

- Explain the focus of environmental science
- Describe the recent trends in human population and resource consumption
- Explain the study of environmental ethics
- Explain the purpose of environmental policy
- Describe the history of U.S. environmental policy
- Describe the direction of current U.S. environmental policy

**Core Activities:** Students will complete/participate in the following:

- Read and take notes on assigned textbook chapter
- Nightly homework assignments
- Chapter 1 power point review and class discussion
- “What’s Your Ecological Footprint” activity
- Environmental ethics and decision making model activity

**Extensions:**

- Chapter 1 viewpoints activity
- Chapter 1 keywords
- Thomas Malthus’ essay on population assignment
- Henry David Thoreau’s “Walden” excerpt

**Remediation:**

- Use of Study Island
- Peer Tutoring
- Extended time on assignments, if needed
- Power point packets for notes

**Instructional Methods:**

- Direct instruction with power point
- Individual reading
- In-class questioning
- Whole class and small group discussion

**Materials & Resources:**

- Textbook
- Chapter 1 Power Point
- Malthus essay

**Assessments:**

- Homework assignments and class activities
- Class discussion
- Quizzes
- Chapter 1 test

## Curriculum Scope & Sequence

**Planned Course:** Environmental Science

**Unit:** Common Trees of Pennsylvania

**Time frame:** 15 days (10 minutes each day)

**State Standards:** 4.1.12A, 4.1.12.C

**Essential content/objectives:** At the end of the unit, students will be able to:

- Identify features of 25 common trees of Pennsylvania
- More fully appreciate and value the plant diversity where they live

**Core Activities:** Students will complete/participate in the following:

- Review and study Common Trees of Pennsylvania booklet
- Complete tree identification chart

**Extensions:**

- Learning of additional trees of Pennsylvania
- Learning about trees in other parts of the country and adaptations that allow them to thrive there

**Remediation:**

- Extra time on tree identification chart

**Instructional Methods:**

- Direct instruction with PowerPoint
- Small group or individual work on identification chart
- In-class questioning

**Material & Resources**

- Common Trees of Pennsylvania PowerPoint
- Common Trees of Pennsylvania booklet from the Department of Conservation and Natural Resources

## Curriculum Scope & Sequence

**Planned Course:** Environmental Science

**Unit:** Songbirds of Eastern Pennsylvania

**Time frame:** 15 days (10 minutes each day)

**State Standards:** 4.1.12A

**Essential content/objectives:** At the end of the unit, students will be able to:

- Identify features and songs of 25 songbirds of Eastern Pennsylvania
- More fully appreciate and value the animal biodiversity where they live

**Core Activities:** Students will complete/participate in the following:

- Review and study songbird field guide
- Complete songbird identification chart

**Extensions:**

- Learning of additional songbirds and birds of prey
- Learning about birds in other parts of the world and adaptations that allow them to thrive there

**Remediation:**

- Extra time on songbird identification chart

**Instructional Methods:**

- Direct instruction with PowerPoint
- Small group or individual work on identification chart
- In-class questioning

**Material & Resources**

- Songbird PowerPoint
- Birds of Eastern and Central North America (5<sup>th</sup> Edition) / Peterson Field Guide



## Curriculum Scope & Sequence

**Planned Course:** Environmental Science

**Unit:** Human Population Growth

**Time frame:** 10 days

**State Standards:** 4.1.12.A

**Essential content/objectives:** At end of the unit, students will be able to:

- Assess the scope of human population growth
- Evaluate how human population, affluence, and technology affect the environment
- Explain and apply the fundamentals of demography
- Outline and assess the concept of demographic transition
- Describe how wealth and poverty, the status of women, and family planning programs affect population growth

**Core Activities:** Students will complete/participate in the following:

- Read and take notes on assigned textbook chapter
- Power point review and class discussion
- State/Country population activity

**Extensions:**

- Chapter viewpoints activity
- Chapter keywords

**Remediation:**

- Use of Study Island
- Peer Tutoring
- Extended time on assignments, if needed
- Power point packets for notes

**Instructional Methods:**

- Direct instruction with power point
- Individual reading
- In-class questioning
- Whole class and small group discussion

**Materials & Resources:**

- Textbook
- Chapter power point
- “World in Balance – Population Paradox” video

**Assessments:**

- Homework assignments and class activities
- Class discussion / Quizzes
- Chapter test

## Curriculum Scope & Sequence

**Planned Course:** Environmental Science

**Unit:** Environmental Health

**Time frame:** 5 days

**State Standards:** 4.5.12.E

**Essential content/objectives:** At end of the unit, students will be able to:

- List the types of environmental health hazards
- Compare and contrast epidemiology and toxicology
- Describe the reasons why individuals respond differently to the same environmental hazards
- Describe how infectious diseases spread
- Explain why emerging diseases are important to monitor and control
- Explain what makes chemicals hazardous
- Discuss how chemical hazards affect human health
- Discuss where chemical hazards can be found in the environment
- Describe biomagnification
- Discuss how physical events in the environment affect quality of health

**Core Activities:** Students will complete/participate in the following:

- Read and take notes on assigned textbook chapter
- Chapter power point review and class discussion
- Research and present information on organic pollutant
- Read and discuss articles on radon and asbestos

**Extensions:**

- Use of Study Island
- Chapter viewpoints activity
- Chapter keywords

**Remediation:**

- Use of Study Island
- Peer Tutoring
- Extended time on assignments, if needed
- Power point packets for notes

**Instructional Methods:**

- Direct instruction with power point
- Individual reading
- In-class questioning
- Whole class and small group discussion

**Materials & Resources:**

- Textbook
- Chapter power point

**Assessments:**

- Homework assignments and class activities
- Class discussion / Quizzes
- Chapter test
- Population debate

## Curriculum Scope & Sequence

**Planned Course:** Environmental Science

**Unit:** Climate Change

**Time frame:** 3 days

**State Standards:** 4.5.12.A, 4.5.12.C,

**Essential content/objectives:** At end of the unit, students will be able to:

- Identify evidence of global warming
- State probable cause of global climate change
- State ways in which the warming atmosphere affects ecosystems and organisms
- List ways to reduce greenhouse gases

**Core Activities:** Students will complete/participate in the following:

- Read and take notes on assigned textbook chapter
- Chapter power point review and class discussion

**Extensions:**

- Chapter viewpoints activity
- Chapter keywords

**Remediation:**

- Use of Study Island
- Peer Tutoring
- Extended time on assignments, if needed
- Power point packets for notes

**Instructional Methods:**

- Direct instruction with power point
- Individual reading
- In-class questioning
- Whole class and small group discussion

**Materials & Resources:**

- Textbook
- Chapter power point
- Climate Change documentary

**Assessments:**

- Homework assignments and class activities
- Class discussion / Quizzes
- Chapter quiz

## Curriculum Scope & Sequence

**Planned Course:** Environmental Science

**Unit:** Freshwater Resources and Water Treatment

**Time frame:** 12 days

**State Standards:** 4.2.12.A, 4.2.12.B, 4.2.12.C

**Essential content/objectives:** At end of the unit, students will be able to:

- Discuss how fresh water can be both renewable and limited
- Explain the significance of a watershed
- Explain how most groundwater is accessed
- List three primary categories of freshwater use
- Relate the causes of surface water depletion to their effects
- Explain the major causes and effects of groundwater depletion
- Explain how wastewater is treated
- Discuss the main causes of water pollution
- Describe how water is regulated and treated

**Core Activities:** Students will complete/participate in the following:

- Read and take notes on assigned textbook chapter
- Chapter power point review and class discussion
- Easton Suburban Water Authority guest speaker
- Water Quality Study
- "Oil Spill" lab
- Mercury articles
- Watershed lab

**Extensions:**

- Chapter viewpoints activity
- Chapter keywords

**Remediation:**

- Use of Study Island
- Peer Tutoring
- Extended time on assignments, if needed
- Power point packets for notes

**Instructional Methods:**

- Direct instruction with power point
- Individual reading
- In-class questioning
- Whole class and small group discussion
- Presentation by ESWA representative

**Materials & Resources:**

- Textbook
- Chapter power point
- “Love Canal” video
- A Civil Action
- Sewage Treatment Plant
- Easton Suburban Water Authority

**Assessments:**

- Homework assignments and class activities
- Class discussion
- Quizzes
- Chapter test

## Curriculum Scope & Sequence

**Planned Course:** Environmental Science

**Unit:** Air Pollution

**Time frame:** 5 days

**State Standards:** 4.5.12.C

**Essential content/objectives:** At end of the unit, students will be able to:

- Explain how both natural processes and human activities can cause air pollution
- Describe how air pollutants affect human health
- Explain what causes smog and how temperature inversions affect it and other forms of air pollution
- Explain how acid deposition occurs and describe its effects
- Explain how the provisions of the Clean Air Act have reduced pollution in the United States
- Describe international efforts to reduce the ozone hole

**Core Activities:** Students will complete/participate in the following:

- Read and take notes on assigned textbook chapter
- Chapter power point review and class discussion
- Indoor air pollution home survey

**Extensions:**

- Chapter viewpoints activity
- Chapter keywords
- Current Events

**Remediation:**

- Use of Study Island
- Peer Tutoring
- Extended time on assignments, if needed
- Power point packets for notes

**Instructional Methods:**

- Direct instruction with power point
- Individual reading
- In-class questioning
- Whole class and small group discussion

**Materials & Resources:**

- Textbook
- Chapter power point

**Assessments:**

- Homework assignments and class activities
- Class discussion
- Quizzes
- Chapter test

## Curriculum Scope & Sequence

**Planned Course:** Environmental Science

**Unit:** Waste Management

**Time frame:** 5 days

**State Standards:** 4.3.12.D

**Essential content/objectives:** At end of the unit, students will be able to:

- Identify the three categories of waste
- Describe conventional waste disposal methods
- Discuss the importance of reducing waste
- Describe how composting and recycling help reduce the amount of waste
- Define hazardous waste
- Describe some of the sources of hazardous wastes
- Describe current methods for hazardous waste disposal
- Describe the danger of radioactive wastes
- Identify agencies that regulate hazardous waste

**Core Activities:** Students will complete/participate in the following:

- Read and take notes on assigned textbook chapter.
- Chapter power point review and class discussion
- Current Events presentations and discussions
- Chrin Landfill field trip

**Extensions:**

- Use of Study Island
- Chapter viewpoints activity
- Chapter keywords

**Remediation:**

- Use of Study Island
- Extended time on assignments, if needed
- Power point packets for notes

**Instructional Methods:**

- Direct instruction with power point
- Individual reading
- In-class questioning
- Whole class and small group discussion

**Materials & Resources:**

- Textbook
- Landfill video
- "The Story of Stuff" video
- Chrin Educator



**Assessments:**

- Homework assignments and class activities
- Class discussion
- Quizzes
- Chapter test

## Curriculum Scope & Sequence

**Planned Course:** Environmental Science

**Unit:** Fossil Fuels, Energy Alternatives, and Energy Conservation

**Time frame:** 10 days

**State Standards:** 4.3.12.A, 4.3.12.B, 4.3.12.C

**Essential content/objectives:** At end of the unit, students will be able to:

- Explain how fossil fuels formed
- Describe the uses of coal and how it is removed from the ground
- Describe the uses of oil and how it is extracted
- Explain the characteristics and uses of natural gas
- Explain how pollutants released by fossil fuels damage health and the environment
- Explain why energy conservation is important
- Describe how a nuclear power plant generated electricity
- Identify the advantages and disadvantages of nuclear power
- Explain the benefits and current status of renewable energy resources
- Define biomass energy and explain how it is used
- Describe how geothermal energy is harnessed and used
- Identify benefits and costs of hydropower, solar power, and wind energy

**Core Activities:** Students will complete/participate in the following:

- Read and take notes on assigned textbook chapter
- Chapter power point review and class discussion
- Energy packet jigsaw activity

**Extensions:**

- Use of Study Island
- Chapter viewpoints activity
- Chapter keywords
- Current Events

**Remediation:**

- Use of Study Island
- Extended time on assignments, if needed
- Power point packets for notes

**Instructional Methods:**

- Direct instruction with power point
- Individual reading
- In-class questioning
- Whole class and small group discussion

**Materials & Resources:**

- Textbook
- Fukushima video
- Human footprint video

**Assessments:**

- Homework assignments and class activities
- Class discussion
- Quizzes
- Chapter test

## Curriculum Scope & Sequence

**Planned Course:** Environmental Science

**Unit:** Population, Community Ecology, and Species Interactions

**Time frame:** 10 days

**State Standards:** 4.1.12.A, 4.1.12.B, 4.5.12.D, 4.1.12.E

**Essential content/objectives:** At end of the unit, students will be able to:

- Explain the difference between biotic and abiotic factors
- Define population density
- Describe three ways populations can be distributed
- Describe the factors that influence a population's growth rate
- Explain exponential growth and logistic growth
- Explain how limiting factors and biotic potential affect population growth
- Discuss the factors that influence an organism's niche
- Compare and contrast predation, parasitism, and herbivory
- Describe mutualism and commensalism
- Describe how feeding relationships can have both direct and indirect effects on community members
- Describe what happens to a community after a disturbance
- Explain the conditions necessary for a species to become invasive

**Core Activities:** Students will complete/participate in the following:

- Read and take notes on assigned textbook chapter
- Nightly homework assignments
- Chapter power point review and class discussion
- Mark and recapture population lab
- "Peppered Moth" lab
- Current Events presentations and discussions

**Extensions:**

- Use of Study Island
- Chapter viewpoints activity
- Chapter keywords
- Endangered Species Articles

**Remediation:**

- Use of Study Island
- Peer Tutoring
- Extended time on assignments, if needed
- Power point packets for notes

**Instructional Methods:**

- Direct instruction with power point
- Individual reading
- In-class questioning
- Whole class and small group discussion

**Materials & Resources:**

- Textbook
- Chapter power point
- “Killers in Eden” video

**Assessments:**

- Homework assignments and class activities
- Class discussion
- Quizzes
- Chapter test

## Curriculum Scope & Sequence

**Planned Course:** Environmental Science

**Unit:** Biomes and Aquatic Ecosystems

**Time frame:** 15 days

**State Standards:** 4.1.12.A, 4.5.12.D, 4.1.12.E, 4.2.12.B

**Essential content/objectives:** At end of the unit, students will be able to:

- Explain how biomes are characterized
- Explain how organisms are adapted to the conditions of their biomes
- Describe the criteria ecologists use to classify aquatic ecosystems
- List the major categories of freshwater ecosystems
- Explain the ecological importance of estuaries
- List the three major zones of the ocean

**Core Activities:** Students will complete/participate in the following:

- Read and take notes on assigned textbook chapter
- Chapter power point review and class discussion
- Biomes of the World Informational Chart
- Biomes of the world – project
- Climatogram activity
- Predator/Prey lab
- Deep sea vent activity
- Food web mobile project

**Extensions:**

- Chapter keywords
- Further depth in biome project

**Remediation:**

- Use of Study Island
- Peer Tutoring
- Extended time on assignments, if needed
- Power point packets for notes
- Modified biome project

**Instructional Methods:**

- Direct instruction with power point
- Individual reading
- In-class questioning
- Whole class and small group discussion

**Materials & Resources:**

- Textbook
- Chapter power point
- “Planet Earth” series
- “Blue Planet” series
- “Strange Days on Planet Earth” video
- “Volcanoes of the Deep Sea” video

**Assessments:**

- Homework assignments and class activities
- Class discussion
- Quizzes
- Chapter test
- Biomes of the world project
- Food web mobile project