

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

Weeks 1 & 2:

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

Weeks 3 & 4:

Approaches to Environmental Policy
Lehigh Gap Field Trip
Human Population Growth
Common Trees of Pennsylvania Identification

Weeks 5 & 6:

Tannersville Bog Field Trip
Human Population Growth
Common Trees of Pennsylvania Identification
Environmental Health

Weeks 7 & 8:

Environmental Health

Weeks 9 & 10:

Waste Management
Chrin Field Trip
Climate Change and Response to Climate Change
Common Songbirds of Pennsylvania Identification

Weeks 11 & 12

Climate Change and Response to Climate Change
Common Songbirds of Pennsylvania Identification

Weeks 13 & 14

Freshwater Resources and Water Treatment
Common Songbirds of Pennsylvania Identification

Weeks 15 & 16

Freshwater Resources and Water Treatment
Air Pollution

Weeks 17 & 18

Fossil Fuels and Nuclear Power
Renewable Energy Alternatives

**Wilson Area School District
Planned Course Materials**

Course Title: Environmental Science

Textbook:
Environmental Science: Your World, Your Turn
SAVVAS Learning Company (Jay Withgott)
2021

Supplemental Books:

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 (5th Edition)
Peterson Field Guides
Houghton Mifflin Company
2002
www.houghtonmifflinbooks.com

Teacher Resources:

- Provided powerpoint 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: 5 Blocks

State Standards: 3.4.9-12.A, 3.4.9-12.G, 3.4.9-12.H, 3.4.9-12.I, 3.3.9-12.O

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:

- Group Slideshow, Create About me Introductory Slide
- Read and take notes on assigned textbook chapter
- Chapter 1 powerpoint review and class discussion
- “What’s Your Ecological Footprint” activity
- Tragedy of the Commons Simulation
- Environmental ethics and decision-making collaborative learning 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
- Powerpoint packets for notes

Instructional Methods:

- Direct instruction with powerpoint
- Individual reading
- Whole class and small group discussion
- Quizlet review

Materials & Resources:

- Textbook
- Chapter 1 Powerpoint
- Malthus essay
- Ecological Footprint

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 Blocks (10 minutes each day)

State Standards: 3.4.9-12.H, 3.1.6-8.U

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
- Create Tree ID book in Book Creator App.
- Tannersville Bog field trip

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
- Go Formative Tree ID Practice

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 Blocks (10 minutes each day)

State Standards: 3.4.9-12.H, 3.1.6-8.U

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
- Go Formative Bird Id Practice with pictures and ID

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

Material & Resources

- Songbird PowerPoint
- Birds of Eastern and Central North America (5th Edition) / Peterson Field Guide
- Cornell Lab or Ornithology Website

Curriculum Scope & Sequence

Planned Course: Environmental Science

Unit: Human Population Growth

Time frame: 5 Blocks

State Standards: 3.1.9-12.I, 3.4.9-12.B, 3.4.9-12.D

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
- CER: World Population Clock Data Analysis
- World in Balance - Population Paradox Video - Watch, answer questions, and discuss.
- Population Pyramid Mathematical Representation (Power of the Pyramids)
- Powerpoint review and class discussion

Extensions:

- Chapter viewpoints activity
- Chapter keywords

Remediation:

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

Instructional Methods:

- Direct instruction with powerpoint
- Individual reading
- Whole class and small group discussion
- Quizlet Review

Materials & Resources:

- Textbook
- Chapter powerpoint
- “World in Balance – Population Paradox” video
- U.S. and World Population Clock

Assessments:

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

Curriculum Scope & Sequence

Planned Course: Environmental Science

Unit: Environmental Health

Time frame: 5 Blocks

State Standards: 3.4.9-12.D, 3.4.9-12.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 powerpoint review and class discussion
- Complete Pandemic/Epidemic WHO Disease Chart
- PhenBL: CDC Solve the Outbreak Activity
- Complete Homefacts Activity, identifying local environmental hazards
- POGIL: The Spread of Pathogens
- Research and present information on environmental catastrophes in history
- Read and discuss articles on radon and asbestos
- Lehigh Gap Nature Center field trip

Extensions:

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

Remediation:

- Use of Study Island
- Peer tutoring
- Extended time on assignments, if needed
- Powerpoint packets for notes

Instructional Methods:

- Direct instruction with powerpoint
- Individual reading
- Whole class and small group discussion
- Quizlet review

Materials & Resources:

- Textbook
- Chapter powerpoint
- Websites:
 - Homefacts
 - WHO
 - CDC Solve the Outbreak Activity

Assessments:

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

Curriculum Scope & Sequence

Planned Course: Environmental Science

Unit: Climate Change

Time frame: 6 Blocks

State Standards: 3.4.9-12.D, 3.4.9-12.E, 3.4.9-12.H, 3.3.9-12.M, 3.3.9-12.S

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 powerpoint review and class discussion
- PhenBL: Global Warming Graphing Lab
- Climate Change Webquest
- View a climate change documentary and respond to questions regarding each scene.

Extensions:

- Chapter viewpoints activity
- Chapter keywords

Remediation:

- Use of Study Island
- Peer tutoring
- Extended time on assignments, if needed
- Powerpoint packets for notes

Instructional Methods:

- Direct instruction with powerpoint
- Individual reading
- Whole class and small group discussion
- Quizlet review

Materials & Resources:

- Textbook
- Chapter powerpoint
- Climate change documentary

Assessments:

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

Curriculum Scope & Sequence

Planned Course: Environmental Science

Unit: Waste Management

Time frame: 4 Blocks

State Standards: 3.4.9-12.A, 3.4.9-12.D, 3.4.9-12E, 3.4.9-12G, 3.4.9-12.H

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 the assigned textbook chapter.
- Chapter powerpoint review and class discussion
- Current events presentations and discussions
- CER: Great Pacific Garbage Patch
- Complete Edpuzzle on Modern Landfills.
- Waste Sorting Game
- 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
- Powerpoint packets for notes

Instructional Methods:

- Direct instruction with powerpoint
- Individual reading
- Whole class and small group discussion
- Quizlet review

Materials & Resources:

- Textbook
- Landfill video
- "The Story of Stuff" video
- Chrin Educator (guest speaker)

Assessments:

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

Curriculum Scope & Sequence

Planned Course: Environmental Science

Unit: Freshwater Resources and Water Treatment

Time frame: 6 Blocks

State Standards: 3.4.9-12.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 powerpoint review and class discussion
- Burden of Thirst Reading and Questions
- Easton Suburban Water Authority guest speaker
- Water Quality Study
- PhenBL: "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
- Powerpoint packets for notes

Instructional Methods:

- Direct instruction with powerpoint
- Individual reading
- Whole class and small group discussion
- Presentation by ESWA representative
- Quizlet review

Materials & Resources:

- Textbook
- Chapter powerpoint
- “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: 4 Blocks

State Standards: 3.4.9-12.D, 3.4.9-12.I

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 powerpoint review and class discussion
- Indoor air pollution home survey
- Examine global air quality index data

Extensions:

- Chapter viewpoints activity
- Chapter keywords
- Current events

Remediation:

- Use of Study Island
- Peer tutoring
- Extended time on assignments, if needed
- Powerpoint packets for notes

Instructional Methods:

- Direct instruction with powerpoint
- Individual reading
- Whole class and small group discussion
- Quizlet review

Materials & Resources:

- Textbook
- Chapter powerpoint

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: 5 Blocks

State Standards: 3.4.9-12.G, 3.4.9-12.H, 3.4.9-12.B, 3.3.9-12.P, 3.3.9-12.O

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 powerpoint review and class discussion
- Energy packet jigsaw activity
- Pinwheel Wind Energy Lab
- CER: Should nuclear energy replace fossil fuels?

Extensions:

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

Remediation:

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

Instructional Methods:

- Direct instruction with powerpoint
- Individual reading
- Whole class and small group discussion
- Quizlet review

Materials & Resources:

- Textbook
- Fukushima video
- Human footprint video

Assessments:

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