

## Curriculum Map: Environmental Science 2020/21

Course: ENVIRO SCI Sub-topic: Uncategorized

Grade(s): 11 to 12

**Course Description:** Environmental science is broken up into two major units. The first two semesters will focus on environmental studies as it relates to forestry and wildlife. Students will be expected to identify types of trees, tree pests and why the sustainability of forests into the future is important. Students will also identify how wildlife populations are managed, and accounted for. Identifying new and improved 21st century techniques to protect wildlife will also be addressed.

The last two semesters are designed to bring student awareness to the major ecological concepts and problems plaguing today's modern society. By exposing students to real world environmental issues students will have a better understanding of how their actions today will impact their world tomorrow. Examples of topics of study include human population, environmental health, environmental issues and urbanization.

**Course Textbooks, Workbooks, Materials Citations:** There will be various materials used throughout the year used to enhance the curriculum and lessons. The primary platform of information will be found on the google classroom homepage of the students Earth science class. There is no text book nor workbook for this class.

**Course Interdisciplinary Connections:** Environmental science is an interdisciplinary science as it combines and draws upon sciences learned in previous science classes. Environmental science will focus on the social and natural sciences and their direct connections to the world. This class will use these sciences together to better understand the fragility of the world as a result of human behavior.

**Course Notes:** All course notes, agendas and resources will be found on the google classroom homepage.

### Unit: Forestry

Timeline: Week 1 to 5

**Unit Description:** This unit will cover a broad range of forestry science. Together students will identify the history, destruction, conservation, sustainability and benefits of trees and native plants. Local tree i.d. will be part of this unit as well as the interconnectedness between biodiversity and forests.

**Unit Essential Questions:** How can we use Earth's resources sustainably?

- Unit Big Ideas:**
- Describe the costs and benefits of different energy sources commonly used in PA.
  - Describe the processes involved in the manufacture of lumber.
  - Define the relationship that time scale and landscape scale have with sustainable forest management.
  - Identify social, economic, and ecological values associated with forests and explain how these values translate into management objectives.
  - Formulate solutions to forestry challenges using technology, forest management, and consumer action.
  - Explain how different forest challenges may change over time.

**Unit Materials:** Access to Google classroom lessons outside amongst tree's

**Unit Assignments:** TBD

**Unit Key Terminology & Definitions :** resource management

sustainable yield

clear cutting

selective cutting

old growth forest

new growth forest

cambium

xylem

phloem

**Unit Notes:** All notes, agendas and resources will be available on the google classroom page.

**STANDARDS: STANDARDS**

STATE: Pennsylvania State Anchors (2010)

[S11.A.1.2.1](#)  
(Advanced)

Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental health, energy).

[S11.A.1.3.4](#)  
(Advanced)

Compare the rate of use of natural resources and their impact on sustainability.

**Topic: History of PA forests**

Minutes for Topic: 44

**Topic: Forestry Jobs and Industry**

**Topic: Identify parts of a tree**

Minutes for Topic: 44

**Topic: Identify types of tree's**

Minutes for Topic: 44

**Topic: Primary vs Secondary forests**

Minutes for Topic: 44

**Topic: Forests pests**

Minutes for Topic: 44

**Topic: Sustainability and Benefits of Forests**

Minutes for Topic: 44

**Unit: Wildlife**

Timeline: Week 5 to 10

**Unit Description:** This lesson will focus on wildlife and the interactions between organisms and their environment. A large part of this unit will cover population ecology, community ecology, and the conservation taken place to protect biodiversity.

**Unit Essential Questions:**

- How do changes in population size relate to environmental conditions
- How do organisms affect one another's survival and environment
- How does the environment affect where and how an organism lives?
- Why is it important to protect biodiversity?

**Unit Big Ideas:** Big ideas that will be studied are:

- Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.

- Significant changes in conditions or population sizes may affect the functioning of ecosystem's resources and habitat availability. Population size and biodiversity remain relatively constant over time due to complex interactions within ecosystems.
- Ecosystems are resilient, in that they can withstand moderate biological or physical disturbances and return to their original state.

**Unit Materials:** Unit materials will be available via google classroom or on hand in the classroom.

There is no textbook for this class.

**Unit Assignments:** TBD

**Unit Key Terminology & Definitions :** ecology  
species  
population  
community  
ecosystem  
habitat  
population size  
population density  
population distribution  
age structure  
age structure diagram  
sex ratio  
survivorship curve  
immigration  
emmigratoin  
exponential growth  
limiting factor  
carrying capacity  
logistic growth  
density-dependent factor  
density-independent factor  
biotic potential

**Unit Notes:** All notes, resources and agendas can be found on google classroom.

**Topic: Population Ecology and wildlife**

Minutes for Topic: 44

**Topic: Wildlife Management: Tracking Populations**

Minutes for Topic: 44

**Topic: Wildlife Ecology**

Minutes for Topic: 44

**Topic: Wildlife Conservation**

Minutes for Topic: 44

**Topic: Wildlife Diseases**

Minutes for Topic: 44

## Unit: Human Population

**Unit Description:** This unit will look at the growing human population. It will cover the history of the human population and the future outlook as to why some countries are growing and some countries populations are shrinking. As well students will identify why and how the demographic transition model is used to determine a countries current and future outlook. Students will also learn how the human population affects the environment. Learning how to balance our needs for space, food, and fiber while taking care the needs of the environment will all be covered in this unit.

**Unit Essential Questions:** How have technological advances contributed to human population growth?  
What is demographic transition and how does it help to project future world population?  
What is total fertility and replacement rate? How does age structure and sex ratio of a population define its potential for future growth?  
How do social factors affect human population growth?  
Why is the United States census important?

**Unit Big Ideas:** Determine how and why technological advances have helped spur population growth.  
What are past, current and future trends of human population growth as it relates to things such as fertility rate, and social factors.  
What are the negative and positive impacts of technology on the environment as it relates to demographic transition.

**Unit Materials:** Google classroom resources  
Hard copy of notes

**Unit Assignments:** TBD

**Unit Key Terminology & Definitions :** Industrial Revolution  
infant mortality  
life expectancy  
growth rate  
demography  
total fertility rate  
replacement fertility  
demographic transition  
wealth gap  
carbon foot print

**Unit Notes:** All notes, resources and agendas can be found on the google classroom page.

**STANDARDS: STANDARDS**  
NGSS Arranged by Topic - Science (2013)  
[HS-ETS1-1 \(Advanced\)](#) Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.  
[HS-ETS1-2 \(Advanced\)](#) Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems

that can be solved through engineering.

[HS-LS2-1 \(Advanced\)](#) Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.

[HS-LS2-2 \(Advanced\)](#) Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

**Topic: History of the Human Population**

Minutes for Topic: 44

**Topic: Predicting Human Population growth**

Minutes for Topic: 44

**Topic: People and Their environments**

Minutes for Topic: 44

**Unit: Environmental Health**

**Unit Description:** This unit will focus on various types of environmental health hazards. Students will be able to describe how infectious diseases are spread and how they have played a role in global pandemics. As well it will be important to understand how to monitor and control infectious diseases and health hazards.

**Unit Essential Questions:** What are the types of environmental health hazards? and How do they differ?  
How are toxicology and epidemiology alike? how are they different?  
How do infectious diseases spread?  
Why are emerging diseases important to monitor and control?  
What are chemical hazards and how does it relate to biomagnification?  
What are the environmental dangers of natural disasters?

**Unit Big Ideas:** Environmental health hazards can be biological, social, chemical and physical.

Epidemiology and the study of infectious diseases helps to determine when, where and how the next diseases will be spread.

Understand how and why people respond differently to environmental hazards.

What roles do natural disasters play in environmental health hazards?

**Unit Materials:** Google classroom

hard copy of notes

**Unit Assignments:** TBD

**Unit Key Terminology & Definitions :** environmental health  
hazard  
pathogen  
epidemiology  
toxicology  
toxicity  
dose

dose-response relationship  
risk assessment  
infectious disease  
emerging disease  
carcinogen  
asbestos  
biomagnification  
teratogen  
neurotoxin  
radon

**Unit Notes:** All notes, resources and agendas can be found on the google classroom page.

**Topic: What is environmental health**

Minutes for Topic: 44

**Topic: Biological and Social hazards**

Minutes for Topic: 44

**Topic: Chemical health hazards**

Minutes for Topic: 44

**Topic: Natural disasters**

Minutes for Topic: 44

**Unit: Urbanization**

**Unit**

**Description:**

In this unit we will discuss the different types of land uses and covers. As well we will be discussing why and where urbanization occurs and what environmental impacts it brings. Topics will include sprawl, sustainable cities and geographic information systems. By the end students will have a better understanding of the challenges of maintaining a sprawling city with respect to peoples rights and the costs to the environment.

**Unit Essential Questions:**

What is urbanization and what impacts does it have on the environment?

What is sprawl and what impacts does it have on the environment?

What are sustainable cities?

**Unit Big Ideas:** How can we balance our needs for space with the needs of the environment.

Be able to identify the different land uses and covers of the United States.

How and or why do big cities pop up where they do? What makes them successful.

As people move from cities to suburbs be able to determine the impacts of land consumption.

Be able to provide examples of what sustainable cities may look like.

**Unit Materials:** access to google classroom

had copy of notes

**Unit Assignments:**

TBD

**Unit Key Terminology & Definitions :**

land use

land cover

urban area  
rural area  
urbanization  
sprawl  
infrastructure  
heat island  
city planning  
geographic information system  
zoning  
urban growth boundary  
smart growth  
ecological restoration  
greenway

**Unit Notes:** All notes, agendas and resources can be found on google classroom.

This Curriculum Map Unit has no Topics to display

### **Unit: Environmental Issues**

**Unit Description:** Environmental issues is a unit that is reserved for the end of the year. It is a broad unit that looks to identify current issues that are in the news and environmentally driven. Issues could be things such as insect problems (crops, bed bugs, zika, etc), cost and benefits of using resources, genetically modified food, invasive species, and more.

The topics may vary as new issues are sure to arise. Taking experience from information gained throughout the year students will look for solutions to real world problems.

**Unit Essential Questions:** What is an environmental issue?  
What are the pros and cons to using technology to solve environmental issues?

**Unit Big Ideas:** Students need to be able to identify an environmental issue when it arises and be able think with reason and logic solutions to the problem. As well they need to identify the environmental impacts of the issue and what if any technological solutions there are.

**Unit Materials:** Access to google classroom  
hard copy of notes

**Unit Assignments:** TBD

**Unit Key Terminology & Definitions :** Environmental issue  
genetic engineering  
Zika  
and more TBD depending on current events.

**Unit Notes:** All notes, resources and agendas can be found on google classroom.

This Curriculum Map Unit has no Topics to display