



Advanced Placement® (AP®) Environmental Science (APENVIR) A Syllabus

Course Name

APENVIR A

Advanced Placement® (AP®) Environmental Science – Semester A

Course Information

APENVIR A is the first semester of this two-semester course.

AP Environmental Science provides students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world. The course draws upon various disciplines, including geology, biology, environmental studies, environmental science, chemistry, and geography in order to explore a variety of environmental topics. Topics explored include natural systems on Earth; biogeochemical cycles; the nature of matter and energy; the flow of matter and energy through living systems; populations; communities; ecosystems; ecological pyramids; renewable and nonrenewable resources; land use; biodiversity; pollution; conservation; sustainability; and human impacts on the environment. The equivalent of an introductory college-level science course, AP Environmental Science prepares students for the AP exam and for further study in science, health sciences, or engineering.

The AP Environmental Science course provides a learning experience focused on allowing students to develop their critical thinking skills and cognitive strategies. Scientific inquiry skills are embedded in the direct instruction; wherein students learn to ask scientific questions, deconstruct claims, form and test hypotheses, and use logic and evidence to draw conclusions about the concepts. Frequent no- and low-stakes assessments allow students to measure their comprehension and improve their performance as they progress through each activity.

Students perform hands-on labs and projects that give them insight into the nature of science and help them understand environmental concepts, as well as how evidence can be obtained to support those concepts. Virtual lab activities enable students to engage in investigations that would otherwise require long periods of observation at remote locations and to explore simulations that enable environmental scientists to test

predictions. During both hands-on and virtual labs, students form hypotheses; collect, analyze, and manipulate data; and report their findings and conclusions. Throughout this course, students are given an opportunity to understand how biology, earth science, and physical science are applied to the study of the environment and how technology and engineering are contributing solutions for studying and creating a sustainable biosphere.

Summative tests are offered at the end of each unit as well as at the end of each semester, and contain objective and constructed response items. Robust scaffolding, rigorous instruction, relevant material, and regular active learning opportunities ensure that students can achieve mastery of the skills necessary to excel on the AP exam.

Prerequisite: Two years of high school lab sciences (one year of life science and one year of physical science), and one year of Algebra

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Course Delivery Method

Online

Contacting Your Instructor

You may contact your instructor through the Blackboard messaging system. Technical support is available 24/7 at www.k12.ttu.edu.

Course Objectives

After completing this course, you should be able to:

1. understand the interrelationships of the natural world;
2. recognize and discuss natural systems on Earth; biogeochemical cycles; the nature of matter and energy; the flow of matter and energy through living systems; populations; communities; ecosystems; ecological pyramids; renewable and nonrenewable resources; land use; biodiversity; pollution; conservation; sustainability; and human impacts on the environment;
3. form hypotheses; collect, analyze, and manipulate data; and report your findings and conclusions; and
4. understand how biology, earth science, and physical science are applied to the study of the environment and how technology and engineering are contributing solutions for studying and creating a sustainable biosphere.

APENVIR addresses the required Texas Essential Knowledge and Skills (TEKS). These can be found at the [Texas Education Agency](http://www.tea.state.tx.us) website.

Textbook and Materials

Textbook(s)

There is no required text to purchase for this course.

Materials

- baking soda
- balance or precise scale
- balloons, medium (12 inches), 6
- bottles: clean, small-mouth, 6 (plastic or glass)
- burlap, linen, or cotton: large piece (approximately 3 feet long by 2 feet wide)
- calculator
- cardboard
- cereal, 100 pieces
- clock
- computer with Internet access
- containers, sealable (for collecting water samples), 3
- containers: shallow, flat (10 x 10 cm), 3
- craft sticks, 3 (for labels)
- cups, clear glass or plastic, 3 (for water testing)
- drinking glasses, large, 3 (clear plastic or glass)
- dry baker's yeast, 3 packets
- gloves, protective
- glue, tape, duct tape, toothpicks, etc. (for assembling the parts of a model house)
- granular sugar, 1/8 cup
- graph paper
- grasping devices (e.g., tweezers, tongs, fingers, etc.)
- grass sod, 3 pieces (10 x 10 cm) labeled 1 D, 1 R, and control, 2 D, 2 R (If sod is unavailable, soil and grass seeds grown for approximately 2 weeks is acceptable.)
- heat lamp or incandescent floodlight (needs to generate heat)
- housing materials (tile, wood, carpet samples, shingles samples, paint, and insulation materials such felt, plastic foam, bubble wrap, cotton, etc.)
- jar or sealed container, glass
- knife (optional)
- large books or heavy objects of equal size
- local natural water sources, 3 (including an upstream source and a downstream source)
- marker, permanent
- marking pen: nontoxic, fine-point (yellow, orange, or bright green)
- measuring cup

- measuring tape
- paper for making observations
- paper lunch bag, small cup, or small box
- paper towels
- pen (optional)
- pencil
- ruler
- scissors
- small items (e.g., paper clips, beans, pasta, rice, etc.)
- small objects, 4 handfuls (e.g., beads, uncooked beans, pieces of cereal, paper clips, etc.)
- spoons, 2 the same size
- spray water bottle
- sprigs of a living plant (4-6 inches long), 3
- strong light source (e.g., sunny windowsill, table lamp, flashlight [no LEDs])
- table
- tape (clear or masking)
- teaspoon measure
- thermometer or CBL temperature probe
- timer or clock that shows seconds
- transparency film or cellophane for windows
- twine, roll of
- water test kit — the more detailed, the better (found at local store or aquarium store)
- water: distilled or dechlorinated tap

Technical Requirements

- Internet access – preferably high speed (for accessing Blackboard)
- Email
- Word processing software such as Microsoft Word
- Adobe Reader (download from Adobe.com)
- Audio and video capabilities (for watching/listening to course content)

Technical Skill Requirements

Be comfortable with the following:

- using a word processor
- Internet search engines and browsers

Course Organization

This course consists of five units and a final exam. Each unit contains the following:

- Introduction and Instructions
- Learning Objectives and Curriculum Standards
- Learning Activities
- Assignments

Each unit includes several activities that present content knowledge. Each unit also includes multiple graded assignments to ensure that you learn the content that has been presented in the activities. Some of the assignments are automatically-graded quizzes, and some are written assignments or activities that your instructor will grade. Be sure you read all instructions carefully and ask your instructor for help if something is not clear.

Course Outline

Please note that some assignments will be hidden from you when you start the course. As you move through the units and complete assignments, more will unlock for you.

Unit	Topic	Approximate Time for Completion
Unit 1	Introduction to AP Environmental Science	Four weeks
Lesson 1	Science and the Environment	
Lesson 2	Energy and Systems	
Lesson 3	Wrap-Up	
Unit 2	Earth's Physical Systems	Four weeks
Lesson 1	The Hydrosphere	
Lesson 2	The Atmosphere	
Lesson 3	The Geosphere	
Lesson 4	Wrap-Up	
Unit 3	Ecosystem Structure	Four weeks
Lesson 1	Nature of Ecosystems	
Lesson 2	Changes in Ecosystems	
Lesson 3	Ecosystems and Biomes	
Lesson 4	Wrap-Up	

Unit	Topic	Approximate Time for Completion
Unit 4	Population Ecology	Four weeks
Lesson 1	Population Biology	
Lesson 2	Human Populations	
Lesson 3	Impacts of Population Growth	
Lesson 4	Wrap-Up	
Unit 5	Semester Wrap-Up	One week
Lesson 1	Semester Review and Wrap-Up	
Final Exam	Units 1-5	

Assignment Schedule

Each of the following must be completed to complete the course. Items with an asterisk (*) indicate that these are summative assessments for the course.

Unit	Weeks	Assignments
1	1-4	1.1.2 Quiz: The Interdisciplinary Science 1.1.4 Quiz: Applied Science and Technology 1.1.5 Practice: Science and the Environment 1.1.7 Quiz: Science and the Environment 1.1.8 Explore: GPS and GIS Technology 1.1.9 Lab: Investigate Your Ecological Footprint 1.1.10 Discuss: Investigate Your Ecological Footprint 1.2.2 Quiz: Matter and Energy 1.2.4 Quiz: The Flow of Matter and Energy 1.2.6 Quiz: Biogeochemical Cycles 1.2.7 Practice: Matter and Energy in the Biosphere 1.2.8 Lab: Investigate Cycling of O ₂ and CO ₂ 1.2.9 Discuss: Investigate Cycling of O ₂ and CO ₂ *1.3.1 Test (CST): Introduction to AP Environmental Science
2	5-8	2.1.1 Project: Part I — Explore Your Local Physical Environment 2.1.3 Quiz: Bodies of Water 2.1.5 Quiz: Movements of the Hydrosphere 2.1.6 Practice: The Hydrosphere 2.1.8 Quiz: The Hydrosphere 2.1.9 Lab: Investigate Watershed Analysis 2.1.10 Discuss: Investigate Watershed Analysis

Unit	Weeks	Assignments
		2.2.2 Quiz: Structure and Movements of the Atmosphere 2.2.4 Quiz: Weather and Climate 2.2.5 Practice: The Atmosphere 2.2.6 Lab: Investigate Passive Heating and Cooling 2.2.7 Discuss: Investigate Passive Heating and Cooling 2.3.2 Quiz: Earth's Crust and Landforms 2.3.4 Quiz: Soil Composition and Structure 2.3.6 Quiz: Movements of Land and Soil 2.3.9 Quiz: The Geosphere 2.3.10 Explore: Earthquake Prediction and Readiness 2.4.1 Project: Part II — Explore Your Local Physical Environment *2.4.2 Test (CST): Earth's Physical Systems
3	9-12	3.1.1 Project: Part I — Explore Your Local Ecosystem 3.1.3 Quiz: What Is a Biological Community? 3.1.5 Quiz: Species Interactions 3.1.7 Quiz: Community Structure 3.1.8 Practice: Nature of Ecosystems 3.1.9 Explore: The Importance of Coral Reefs 3.2.2 Quiz: Natural Disturbances and Succession 3.2.4 Quiz: Evolution and Biodiversity 3.2.7 Quiz: Changes in Ecosystems 3.2.8 Lab: Investigate Using a Dichotomous Key 3.2.9 Discuss: Investigate Using a Dichotomous Key 3.3.2 Quiz: Aquatic Ecosystems 3.3.4 Quiz: Land Ecosystems 3.3.6 Quiz: Ecosystems and Biomes 3.3.8 Lab: Investigate Primary Productivity 3.3.9 Discuss: Investigate Primary Productivity 3.4.1 Project: Part II — Explore Your Local Ecosystem *3.4.2 Test (CST): Ecosystem Structure
4	13-16	4.1.2 Quiz: Characteristics of Populations 4.1.4 Quiz: Population Growth 4.1.5 Practice: Population Biology 4.1.6 Lab: Investigate Estimating Population Size 4.1.7 Discuss: Investigate Estimating Population Size 4.2.2 Quiz: Human Population Dynamics 4.2.4 Quiz: Human Communities 4.2.7 Quiz: Human Populations 4.2.8 Explore: Public Health Policies

Unit	Weeks	Assignments
		4.3.2 Quiz: Renewable Resources 4.3.4 Quiz: Nonrenewable Resources 4.3.5 Practice: Impacts of Population Growth 4.3.7 Quiz: Impacts of Population Growth 4.3.8 Lab: Investigate Resource Consumption 4.3.9 Discuss: Investigate Resource Consumption *4.4.1 Test (CST): Population Ecology
5	17	5.1.1 Final Exam: Semester 1 Computer-Scored Exam

Course Detailed Description

UNIT 1: INTRODUCTION TO AP ENVIRONMENTAL SCIENCE

LESSON 1 OVERVIEW: SCIENCE AND THE ENVIRONMENT

1.1.1 Study: The Interdisciplinary Science

Identify the many fields of science that contribute to the study and understanding of the interrelated, dynamic systems of Earth's environment. Relate examples of environmental studies and equipment to specialized fields of science. Recommend areas of expertise that might contribute information relevant to specific environmental issues.

Duration: 1 hr

1.1.2 Quiz: The Interdisciplinary Science

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 10 points

1.1.3 Study: Applied Science and Technology

Describe the role of technology in environmental science and human society. Identify commonly used devices and systems that are important to environmental studies. Describe the importance of technology and environmental studies to human health and well-being.

Duration: 1 hr

1.1.4 Quiz: Applied Science and Technology

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

1.1.5 Practice: Science and the Environment

Identify the many fields of science that contribute to the study and understanding of the interrelated, dynamic systems of Earth's environment. Relate examples of environmental studies and equipment to specialized fields of science. Recommend areas of expertise that might contribute information relevant to specific environmental issues. Describe the role of technology in environmental science and human society. Identify commonly used devices and systems that are important to environmental studies. Use the Internet to locate and collect information about GPS and GIS technology. Discuss the validity and impact of scientific research on environmental issues related to human activities.

Duration: 30 mins; Scoring: 10 points

1.1.6 Read: Science and the Environment

Read about science and the environment.

Duration: 1 hr 30 mins

1.1.7 Quiz: Science and the Environment

Take a quiz to assess your understanding of the material.

Duration: 45 mins; Scoring: 20 points

1.1.8 Explore: GPS and GIS Technology

Relate examples of environmental studies and equipment to specialized fields of science.

Describe the role of technology in environmental science and human society. Identify commonly used devices and systems that are important to environmental studies. Describe the importance of technology and environmental studies to human health and well-being.

Duration: 1 hr 30 mins; Scoring: 30 points

1.1.9 Lab: Investigate Your Ecological Footprint

Conduct a scientific investigation, using a scientific process and demonstrating the proper and safe use of laboratory equipment. Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error.

Duration: 1 hr 30 mins; Scoring: 40 points

Wet lab

1.1.10 Discuss: Investigate Your Ecological Footprint

Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error. Evaluate lab procedures and results in a discussion with your peers.

Duration: 20 mins; Scoring: 10 points

LESSON 2 OVERVIEW: ENERGY AND SYSTEMS

1.2.1 Study: Matter and Energy

Recognize the major types of matter that make up the biosphere. Recognize the forms of energy that enter and flow through the geosphere. Identify the processes that transform energy as it moves through the geosphere. Compare the characteristics of different surfaces on Earth, including albedo and heat capacity. Differentiate among scavengers, decomposers, and detritivores. Trace the flow of matter and energy through a food chain and a food web.

Duration: 1 hr

1.2.2 Quiz: Matter and Energy

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

1.2.3 Study: The Flow of Matter and Energy

Differentiate among scavengers, decomposers, and detritivores. Trace the flow of matter and energy through a food chain and a food web.

Duration: 1 hr

1.2.4 Quiz: The Flow of Matter and Energy

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

1.2.5 Study: Biogeochemical Cycles

Trace the movement of water in the water cycle from one part of the environment to another.

Trace the movement of carbon in the carbon cycle from one part of the environment to another.

Trace the movement of nitrogen and phosphorus from one part of the environment to another.

Duration: 1 hr

1.2.6 Quiz: Biogeochemical Cycles

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

1.2.7 Practice: Matter and Energy in the Biosphere

Recognize the major types of matter that make up the biosphere. Recognize the forms of energy that enter and flow through the geosphere. Identify the processes that transform energy as it moves through the geosphere. Compare the characteristics of different surfaces on Earth, including albedo and heat capacity. Differentiate among scavengers, decomposers, and detritivores. Trace the flow of matter and energy through a food chain and a food web.

Duration: 30 mins; Scoring: 10 points

1.2.8 Lab: Investigate Cycling of O₂ and CO₂

Conduct a scientific investigation, using a scientific process and demonstrating the proper and safe use of laboratory equipment. Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error.

Duration: 1 hr 30 mins; Scoring: 40 points

Wet lab

1.2.9 Discuss: Investigate Cycling of O₂ and CO₂

Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error. Evaluate lab procedures and results in a discussion with your peers.

Duration: 20 mins; Scoring: 10 points

LESSON 3 OVERVIEW: INTRODUCTION TO AP ENVIRONMENTAL SCIENCE WRAP-UP

1.3.1 Test (CST): Introduction to AP Environmental Science

Take a computer-scored test to assess what you have learned in this unit.

Duration: 30 mins; Scoring: 50 points

UNIT 2: EARTH'S PHYSICAL SYSTEMS

LESSON 1 OVERVIEW: THE HYDROSPHERE

2.1.1 Project: Part I — Explore Your Local Physical Environment

Research and describe the physical features and abiotic factors that characterize the geographical area in which you live.

Duration: 1 hr 30 mins; Scoring: 10 points

2.1.2 Study: Bodies of Water

Identify the characteristics of the major types of bodies of water. Describe the formation of and characteristics of the major types of bodies of water.

Duration: 1 hr

2.1.3 Quiz: Bodies of Water

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

2.1.4 Study: Movements of the Hydrosphere

Relate solar energy to ocean currents and the distribution of heat around the globe. Describe the causes and effects of ocean waves and tides. Trace the path of groundwater from soil to the ocean.

Duration: 1 hr

2.1.5 Quiz: Movements of the Hydrosphere

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

2.1.6 Practice: The Hydrosphere

Describe the reasons that liquid water can exist on Earth. Describe the formation of and characteristics of the major types of bodies of water. Relate solar energy to ocean currents and the distribution of heat around the globe. Identify reasons for fluctuations in sea level. Describe the causes and effects of ocean waves and tides. Trace the path of groundwater from soil to the ocean.

Duration: 30 mins; Scoring: 10 points

2.1.7 Read: The Hydrosphere

Read about the hydrosphere.

Duration: 1 hr 30 mins

2.1.8 Quiz: The Hydrosphere

Take a quiz to assess your understanding of the material.

Duration: 45 mins; Scoring: 20 points

2.1.9 Lab: Investigate Watershed Analysis

Conduct a scientific investigation, using a scientific process and demonstrating the proper and safe use of laboratory equipment. Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error.

Duration: 1 hr 30 mins; Scoring: 40 points

Wet lab

2.1.10 Discuss: Investigate Watershed Analysis

Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error. Evaluate lab procedures and results in a discussion with your peers.

Duration: 20 mins; Scoring: 10 points

LESSON 2 OVERVIEW: THE ATMOSPHERE

2.2.1 Study: Structure and Movements of the Atmosphere

Describe the structure, composition, and temperature of Earth's atmosphere. Identify the processes of wind generation and relate them to different types of local and global wind systems.

Duration: 1 hr

2.2.2 Quiz: Structure and Movements of the Atmosphere

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

2.2.3 Study: Weather and Climate

Describe the major climate zones and their characteristics. Explain how ocean currents, wind patterns, and topography affect climate. Explain how Earth's orbit, tilt, and wobble affect the planet's climate. Describe the effects of El Niño and La Niña on global weather patterns.

Duration: 1 hr

2.2.4 Quiz: Weather and Climate

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

2.2.5 Practice: The Atmosphere

Describe the structure, composition, and temperature of Earth's atmosphere. Identify the processes of wind generation and relate them to different types of local and global wind systems. Describe the major climate zones and their characteristics. Explain how ocean currents, wind patterns, and topography affect climate. Explain how Earth's orbit, tilt, and

wobble affect the planet's climate. Describe the effects of El Niño and La Niña on global weather patterns. Discuss the validity and impact of scientific research on environmental issues related to human activities.

Duration: 30 mins; Scoring: 10 points

2.2.6 Lab: Investigate Passive Heating and Cooling

Conduct a scientific investigation, using a scientific process and demonstrating the proper and safe use of laboratory equipment. Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error.

Duration: 1 hr 30 mins; Scoring: 40 points

Wet lab

2.2.7 Discuss: Investigate Passive Heating and Cooling

Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error. Evaluate lab procedures and results in a discussion with your peers.

Duration: 20 mins; Scoring: 10 points

LESSON 3 OVERVIEW: THE GEOSPHERE

2.3.1 Study: Earth's Crust and Landforms

Relate the surface features of Earth's crust to the theory of plate tectonics. Distinguish erosional features and depositional features of Earth's crust.

Duration: 1 hr

2.3.2 Quiz: Earth's Crust and Landforms

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

2.3.3 Study: Soil Composition and Structure

Identify the types of weathering and the agents of each type of weathering. Describe the types of soil and the processes of soil formation.

Duration: 1 hr

2.3.4 Quiz: Soil Composition and Structure

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

2.3.5 Study: Movements of Land and Soil

Identify the types of erosion and their effects on Earth's crust. Relate the different types of faults to the different types of tectonic plate boundaries.

Duration: 1 hr

2.3.6 Quiz: Movements of Land and Soil

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

2.3.7 Checkup: The Geosphere

Relate the surface features of Earth's crust to the theory of plate tectonics. Distinguish erosional features and depositional features of Earth's crust. Identify the types of weathering and the agents of each type of weathering. Describe the types of soil and the processes of soil formation. Identify the types of erosion and their effects on Earth's crust. Relate the different types of faults to the different types of tectonic plate boundaries. Discuss the validity and impact of scientific research on environmental issues related to human activities.

Duration: 30 mins

2.3.8 Read: The Geosphere

Read about the geosphere.

Duration: 1 hr 30 mins

2.3.9 Quiz: The Geosphere

Take a quiz to assess your understanding of the material.

Duration: 45 mins; Scoring: 20 points

2.3.10 Explore: Earthquake Prediction and Readiness

Recognize areas on Earth where earthquakes are likely to occur. Distinguish the three types of earthquake waves. Describe how geologists rate the destructive force of an earthquake. Identify ways that human communities in earthquake zones can prepare for and limit damages caused by strong earthquakes.

Duration: 1 hr 30 mins; Scoring: 30 points

LESSON 4 OVERVIEW: EARTH'S PHYSICAL SYSTEMS WRAP-UP

2.4.1 Project: Part II — Explore Your Local Physical Environment

Research and describe the physical features and abiotic factors that characterize the geographical area in which you live.

Duration: 1 hr 30 mins; Scoring: 40 points

2.4.2 Test (CST): Earth's Physical Systems

Take a computer-scored test to assess what you have learned in this unit.

Duration: 30 mins; Scoring: 50 points

UNIT 3: ECOSYSTEM STRUCTURE

LESSON 1 OVERVIEW: NATURE OF ECOSYSTEMS

3.1.1 Project: Part I — Explore Your Local Ecosystem

Recognize the major types of biotic factors in an ecosystem and their roles in the biosphere. Distinguish biological species, populations, and communities. Identify the abiotic factors in an ecosystem and their importance to living organisms. Explain how biotic factors interact with the abiotic factors of an ecosystem.

Duration: 1 hr 30 mins; Scoring: 10 points

3.1.2 Study: What Is a Biological Community?

Distinguish biological communities from populations and ecosystems. Identify major types of biological communities.

Duration: 1 hr

3.1.3 Quiz: What Is a Biological Community?

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

3.1.4 Study: Species Interactions

Describe the types of interactions that occur among the species in biological communities. Analyze food chains and food webs that describe the interactions of species in a biological community. Explain the nature and importance of ecological niches.

Duration: 1 hr

3.1.5 Quiz: Species Interactions

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

3.1.6 Study: Community Structure

Model the makeup of communities using ecological pyramids. Understand the factors that affect community stability and biodiversity.

Duration: 1 hr

3.1.7 Quiz: Community Structure

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

3.1.8 Practice: Nature of Ecosystems

Distinguish biological communities from populations and ecosystems. Identify major types of biological communities. Describe the types of interactions that occur among the species in biological communities. Analyze food chains and food webs that describe the interactions of species in a biological community. Explain the nature and importance of an ecological niche. Model the makeup of communities using ecological pyramids. Understand the factors that affect community stability and biodiversity.

Duration: 30 mins; Scoring: 10 points

3.1.9 Explore: The Importance of Coral Reefs

Describe characteristics of aquatic ecosystems. Evaluate the importance of individual ecosystems to the health of biomes and the biosphere.

Duration: 1 hr 30 mins; Scoring: 30 points

LESSON 2 OVERVIEW: CHANGES IN ECOSYSTEMS

3.2.1 Study: Natural Disturbances and Succession

Describe how destructive natural events in the geosphere can affect ecosystems. Predict the effects of the removal of species from biological communities. Predict the effects of the introduction of nonnative species on communities.

Duration: 1 hr

3.2.2 Quiz: Natural Disturbances and Succession

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

3.2.3 Study: Evolution and Biodiversity

Identify the sources and importance of genetic diversity in natural populations, ecosystems, and the biosphere. Summarize the process of natural selection and its role in biological evolution. Predict changes that may occur in an ecosystem when its amount of biodiversity changes.

Duration: 1 hr

3.2.4 Quiz: Evolution and Biodiversity

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

3.2.5 Checkup: Changes in Ecosystems

Describe how destructive natural events in the geosphere can affect ecosystems. Predict the effects of the removal of species from biological communities. Predict the effects of the introduction of nonnative species on communities. Recognize the sources and importance of genetic diversity in natural populations, ecosystems, and the biosphere. Summarize the process of natural selection and its role in biological evolution. Predict changes that may occur in an ecosystem when its amount of biodiversity changes. Discuss the validity and impact of scientific research on environmental issues related to human activities.

Duration: 30 mins

3.2.6 Read: Changes in Ecosystems

Read about changes in ecosystems.

Duration: 1 hr 30 mins

3.2.7 Quiz: Changes in Ecosystems

Take a quiz to assess your understanding of the material.

Duration: 45 mins; Scoring: 20 points

3.2.8 Lab: Investigate Using a Dichotomous Key

Conduct a scientific investigation, using a scientific process and demonstrating the proper and safe use of laboratory equipment. Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error

Duration: 1 hr 30 mins; Scoring: 40 points

Wet lab

3.2.9 Discuss: Investigate Using a Dichotomous Key

Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error. Evaluate lab procedures and results in a discussion with your peers.

Duration: 20 mins; Scoring: 10 points

LESSON 3 OVERVIEW: ECOSYSTEMS AND BIOMES

3.3.1 Study: Aquatic Ecosystems

Describe characteristics of aquatic ecosystems.

Duration: 1 hr

3.3.2 Quiz: Aquatic Ecosystems

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

3.3.3 Study: Land Ecosystems

Identify the major land and aquatic biomes. Describe the distinguishing biotic and abiotic features of a given biome. Compare the plants and animals of your local biome with those of the other major biomes found in North America.

Duration: 1 hr

3.3.4 Quiz: Land Ecosystems

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

3.3.5 Read: Ecosystems and Biomes

Read about ecosystems and biomes.

Duration: 1 hr 30 mins

3.3.6 Quiz: Ecosystems and Biomes

Take a quiz to assess your understanding of the material.

Duration: 45 mins; Scoring: 20 points

3.3.7 Checkup: Ecosystems and Biomes

Describe characteristics of land ecosystems. Describe characteristics of aquatic ecosystems. Identify the major land and aquatic biomes. Describe the distinguishing biotic and abiotic features of a given biome. Compare the plants and animals of your local biome with those of the other major biomes found in North America. Evaluate the importance of individual ecosystems to the health of biomes and the biosphere. Discuss the validity and impact of scientific research on environmental issues related to human activities.

Duration: 30 mins

3.3.8 Lab: Investigate Primary Productivity

Conduct a scientific investigation, using a scientific process and demonstrating the proper and safe use of laboratory equipment. Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error.

Duration: 1 hr 30 mins; Scoring: 40 points

Wet lab

3.3.9 Discuss: Investigate Primary Productivity

Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error. Evaluate lab procedures and results in a discussion with your peers.

Duration: 20 mins; Scoring: 10 points

LESSON 4 OVERVIEW: ECOSYSTEM STRUCTURE WRAP-UP

3.4.1 Project: Part II — Explore Your Local Ecosystem

Recognize the major types of biotic factors in an ecosystem and their roles in the biosphere. Distinguish biological species, populations, and communities. Identify the abiotic factors in an ecosystem and their importance to living organisms. Explain how biotic factors interact with the abiotic factors of an ecosystem.

Duration: 1 hr 30 mins; Scoring: 40 points

3.4.2 Test (CST): Ecosystem Structure

Take a computer-scored test to assess what you have learned in this unit.

Duration: 30 mins; Scoring: 50 points

UNIT 4: POPULATION ECOLOGY

LESSON 1 OVERVIEW: POPULATION BIOLOGY

4.1.1 Study: Characteristics of Populations

Identify characteristics used to describe populations. Identify limiting factors that affect populations and their characteristics. Describe a population's carrying capacity and the factors that determine the carrying capacity. Explain how populations change in size.

Duration: 1 hr

4.1.2 Quiz: Characteristics of Populations

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

4.1.3 Study: Population Growth

Describe the factors that produce both positive and negative population growth. Compare exponential and logistic patterns of population growth. Explain the significance of studying populations over time.

Duration: 1 hr

4.1.4 Quiz: Population Growth

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

4.1.5 Practice: Population Biology

Identify characteristics used to describe populations. Identify limiting factors that affect populations and their characteristics. Describe a population's carrying capacity and the factors that determine the carrying capacity. Explain how populations change in size. Describe the factors that produce both positive and negative population growth. Compare exponential and logistic patterns of population growth. Explain the significance of studying populations over time.

Duration: 30 mins; Scoring: 10 points

4.1.6 Lab: Investigate Estimating Population Size

Conduct a scientific investigation, using a scientific process and demonstrating the proper and safe use of laboratory equipment. Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error.

Duration: 1 hr 30 mins; Scoring: 40 points

Wet lab

4.1.7 Discuss: Investigate Estimating Population Size

Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error. Evaluate lab procedures and results in a discussion with your peers.

Duration: 20 mins; Scoring: 10 points

LESSON 2 OVERVIEW: HUMAN POPULATIONS

4.2.1 Study: Human Population Dynamics

Describe historical trends in human population growth and distribution. Identify characteristics of human populations.

Duration: 1 hr

4.2.2 Quiz: Human Population Dynamics

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

4.2.3 Study: Human Communities

Describe the purposes of human communities. Identify different kinds of human communities. Explain how individuals work together in groups. Explain how individuals and groups work together in communities.

Duration: 1 hr

4.2.4 Quiz: Human Communities

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

4.2.5 Checkup: Human Populations

Describe historical trends in human population growth and distribution. Identify characteristics of human populations. Describe the purposes of human communities. Identify different kinds of human communities. Explain how individuals work together in groups. Explain how individuals and groups work together in communities.

Duration: 30 mins

4.2.6 Read: Human Populations

Read about human populations.

Duration: 1 hr 30 mins

4.2.7 Quiz: Human Populations

Take a quiz to assess your understanding of the material.

Duration: 45 mins; Scoring: 20 points

4.2.8 Explore: Public Health Policies

Research objectives and accomplishments of public health policies.

Duration: 1 hr 30 mins; Scoring: 30 points

LESSON 3 OVERVIEW: IMPACTS OF POPULATION GROWTH

4.3.1 Study: Renewable Resources

Identify renewable resources on which humans depend. Differentiate between renewable and nonrenewable resources. Evaluate the cost-benefit trade-offs of using renewable resources instead of nonrenewable resources.

Duration: 1 hr

4.3.2 Quiz: Renewable Resources

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

4.3.3 Study: Nonrenewable Resources

Identify nonrenewable resources on which humans depend. Differentiate between renewable and nonrenewable resources. Describe how the use of natural resources will affect future generations of humans.

Duration: 1 hr

4.3.4 Quiz: Nonrenewable Resources

Take a quiz to assess your understanding of the material.

Duration: 15 mins; Scoring: 20 points

4.3.5 Practice: Impacts of Population Growth

Identify renewable resources on which humans depend. Identify nonrenewable resources on which humans depend. Differentiate between renewable and nonrenewable resources. Evaluate the cost-benefit trade-offs of using renewable resources instead of nonrenewable resources. Describe how the use of natural resources will affect future generations of humans. Describe alternative forms of energy production.

Duration: 30 mins; Scoring: 10 points

4.3.6 Read: Impacts of Population Growth

Read about impacts of population growth.

Duration: 1 hr 30 mins

4.3.7 Quiz: Impacts of Population Growth

Take a quiz to assess your understanding of the material.

Duration: 45 mins; Scoring: 20 points

4.3.8 Lab: Investigate Resource Consumption

Conduct a scientific investigation, using a scientific process and demonstrating the proper and safe use of laboratory equipment. Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error.

Duration: 1 hr 30 mins; Scoring: 40 points

Wet lab

4.3.9 Discuss: Investigate Resource Consumption

Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error. Evaluate lab procedures and results in a discussion with your peers.

Duration: 20 mins; Scoring: 10 points

LESSON 4 OVERVIEW: POPULATIONS WRAP-UP

4.4.1 Test (CST): Population Ecology

Take a computer-scored test to assess what you have learned in this unit.

Duration: 30 mins; Scoring: 50 points

UNIT 5: SEMESTER 1 WRAP-UP

LESSON OVERVIEW: SEMESTER 1 WRAP-UP

5.1.1 Exam: Semester 1 Computer-Scored Exam

Take a computer-scored exam to demonstrate your mastery of concepts and skills covered in this semester.

Duration: 40 mins; Scoring: 100 points

Course Credit

The course grade will be calculated as follows:

- 50% coursework average;
- 50% summative assessment average, including the final exam;
- A passing course grade is 70 or higher.

Students must attempt all assignments in the course. The final exam will not be available until all assignments have been accepted and graded by the teacher.

Students who score below 70% on the final exam will be eligible for one re-exam opportunity.

Coursework

The graded assignments within each unit are formative in nature. This means that they are designed to assist you in applying and demonstrating the unit concepts, as well as identifying areas in which you need additional review. You may use all the unit's learning activities to assist you as you complete the graded assignments.

Summative Assessments

Summative assessments are those that allow you to demonstrate mastery of the course objectives. For summative assessments, you will NOT be allowed to use the learning materials. These are opportunities for you to show what you have learned by that point in the course. The summative assessments for this course are as follows:

- Unit Tests **(20% of Course Grade)**
- Final Exam **(30% of Course Grade)**

Course Completion and Extensions

- Students may not complete the course in less than 30 days.
- All courses expire six months after the enrollment date. Student may purchase a single three-month extension for a fee.
- Extensions are non-refundable and non-transferrable.

Academic Integrity

It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.

“Scholastic dishonesty” includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

Student Expectations

You will be expected to log into the Blackboard course regularly to be aware of possible announcements/reminders and to pace your progress in the course.

Students are expected to maintain an online environment conducive to learning, which includes “netiquette” (Internet etiquette). Please review the basic rules for [Online Discussion Netiquette](#). Ensure that your email messages, discussion board postings, and other electronic communications are thoughtful and respectful. Diverse opinions are welcome in this course, and you are expected to demonstrate an open mind and courtesy when responding to the thoughts and ideas of others.

The following are prohibited:

- making offensive remarks in email or the discussion board;
- using inappropriate language or discussing inappropriate topics online;
- spamming;
- hacking;
- using TTU or Blackboard email or discussion boards for commercial purposes;
- using all caps (considered shouting in online communications); and
- cyber-bullying or online harassment of any type.

Inappropriate behavior shall result in consequences ranging from a request to correct the problem, to removal from the course or even the university, depending on the severity of the behavior. Disciplinary actions will be taken according to the TTU K-12 Student Handbook.

Communication

- You can expect a reply from your instructor within 2 business days.
- Use the Blackboard Course Messages tool for sending messages to your instructor.

Submitting Assignments

You will submit all assignments through the Blackboard Assignment Tool, rather than by email. For assignments that require you to upload a PDF or other document, please title your assignment files "lastName_firstName_assignmentName.xxx (.pdf, .doc, .xl, .jpg, etc.)".

Technical Difficulties

Getting Help

For student assistance with Blackboard, visit [TTU K-12 Support](#).

Computer Problems

A working computer is necessary for online coursework. Computer problems will not be accepted as a valid reason for failure to complete course activities within the allotted time frame. Identify a second computer, before the course begins, that you can use if you experience computer problems.

Server Problems

When the Blackboard server needs to be taken down for maintenance, the Blackboard administrator will post an announcement in your course informing you of the time and date. If the server experiences unforeseen problems, your course instructor will notify you.

Lost or Corrupted Files

You must keep/save a copy of every project/assignment on an external disk or personal computer. In the event of any kind of technology failure (e.g., Blackboard server crash or virus infection, students' own computer problems, loss of files in cyberspace, etc.) or any disputes, the instructor may request or require you to resubmit the files. In some instances, the instructor may need to open another attempt within Blackboard, so communication with your instructor is critical in these circumstances.