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

This course has been authorized by the College Board® to use the AP® designation.

*Advanced Placement® and AP® are registered trademarks and/or owned by the College Board®, which was not involved in the production of, and does not endorse this product.*

**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 website.
Textbook and Materials

Textbook(s)
AP Environmental Science requires a college-level environment textbook. Students may use any college-level environment textbook to successfully complete the course.

Though students may use any college-level textbook, resources such as page references and scaffolded reading guides are provided in the course to support students who use either of the following texts:


Materials
AP Environmental Science requires the completion of hands-on lab activities and has been approved by the College Board as meeting all requirements for a laboratory science course. For a list of hands-on lab materials, go to Apex Learning Help: Course Materials.

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)
- PDF app (free options available)

Technical Skill Requirements

Be comfortable with the following:

- using a word processor
- Internet search engines and browsers
- creating PDFs (see Requirements for Creating PDFs in the Syllabus section of your course)

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.

**Submitting Assignments**

You will submit all assignments through the Blackboard Assignment Tool, rather than by mail or email.

All course work will be completed in the Apex system (quizzes, discussions, practice assignments, journals, etc.). When submitting a Practice Assignment, you will submit it through the Apex system > Messages > New Message tool and choose your instructor. This will be the place where you upload file attachments showing your work on the assignment. Your instructor will receive the assignment submission and grade it, then provide feedback that will be sent back to you through Apex messages.

**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.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Topic</th>
<th>Approximate Time for Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit 1</strong></td>
<td>Introduction to AP Environmental Science</td>
<td>Four weeks</td>
</tr>
<tr>
<td>Lesson 1</td>
<td>Science and the Environment</td>
<td></td>
</tr>
<tr>
<td>Lesson 2</td>
<td>Energy and Systems</td>
<td></td>
</tr>
<tr>
<td>Lesson 3</td>
<td>Wrap-Up</td>
<td></td>
</tr>
<tr>
<td><strong>Unit 2</strong></td>
<td>Earth’s Physical Systems</td>
<td>Four weeks</td>
</tr>
</tbody>
</table>
### Unit Topic Approximate Time for Completion

<table>
<thead>
<tr>
<th>Unit</th>
<th>Topic</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson 1</td>
<td>The Hydrosphere</td>
<td></td>
</tr>
<tr>
<td>Lesson 2</td>
<td>The Atmosphere</td>
<td></td>
</tr>
<tr>
<td>Lesson 3</td>
<td>The Geosphere</td>
<td></td>
</tr>
<tr>
<td>Lesson 4</td>
<td>Wrap-Up</td>
<td></td>
</tr>
<tr>
<td><strong>Unit 3</strong></td>
<td>Ecosystem Structure</td>
<td>Four weeks</td>
</tr>
<tr>
<td>Lesson 1</td>
<td>Nature of Ecosystems</td>
<td></td>
</tr>
<tr>
<td>Lesson 2</td>
<td>Changes in Ecosystems</td>
<td></td>
</tr>
<tr>
<td>Lesson 3</td>
<td>Ecosystems and Biomes</td>
<td></td>
</tr>
<tr>
<td>Lesson 4</td>
<td>Wrap-Up</td>
<td></td>
</tr>
<tr>
<td><strong>Unit 4</strong></td>
<td>Population Ecology</td>
<td>Four weeks</td>
</tr>
<tr>
<td>Lesson 1</td>
<td>Population Biology</td>
<td></td>
</tr>
<tr>
<td>Lesson 2</td>
<td>Human Populations</td>
<td></td>
</tr>
<tr>
<td>Lesson 3</td>
<td>Impacts of Population Growth</td>
<td></td>
</tr>
<tr>
<td>Lesson 4</td>
<td>Wrap-Up</td>
<td></td>
</tr>
<tr>
<td><strong>Unit 5</strong></td>
<td>Semester Wrap-Up</td>
<td>One week</td>
</tr>
<tr>
<td>Lesson 1</td>
<td>Semester Review and Wrap-Up</td>
<td></td>
</tr>
<tr>
<td><strong>Final Exam</strong></td>
<td>Units 1-5</td>
<td></td>
</tr>
</tbody>
</table>

### 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.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Weeks</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-4</td>
<td>1.1.2 Quiz: The Interdisciplinary Science</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.1.4 Quiz: Applied Science and Technology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.1.5 Practice: Science and the Environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.1.7 Quiz: Science and the Environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.1.8 Explore: GPS and GIS Technology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.1.9 Lab: Investigate Your Ecological Footprint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.1.10 Discuss: Investigate Your Ecological Footprint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.2.2 Quiz: Matter and Energy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.2.4 Quiz: The Flow of Matter and Energy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.2.6 Quiz: Biogeochemical Cycles</td>
</tr>
<tr>
<td>Unit</td>
<td>Weeks</td>
<td>Assignments</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
|      |       | 1.2.7 Practice: Matter and Energy in the Biosphere  
|      |       | 1.2.8 Lab: Investigate Cycling of O₂ and CO₂  
|      |       | 1.2.9 Discuss: Investigate Cycling of O₂ and CO₂  
|      |       | *1.3.1 Test (CS): 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  
|      |       | 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 (CS): 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  
<p>|      |       | 3.3.9 Discuss: Investigate Primary Productivity |</p>
<table>
<thead>
<tr>
<th>Unit</th>
<th>Weeks</th>
<th>Assignments</th>
</tr>
</thead>
</table>
|      |       | 3.4.1 Project: Part II — Explore Your Local Ecosystem  
*3.4.2 Test (CS): 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  
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 (CS): 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: 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: 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.
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: INTRODUCTION TO AP ENVIRONMENTAL SCIENCE WRAP-UP

1.3.1 Test (CS): 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: 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: 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*

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: 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: 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 (CS): 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: 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: 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.
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: 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: 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 (CS): 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: 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*

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: 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: 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.
**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: POPULATIONS WRAP-UP**

4.4.1 Test (CS): 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: 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.

**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

- Students may not complete the course in less than 30 days.
- All courses expire six months after the enrollment date.

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.
- Apex Messages will be used for submitting assignments that your instructor must grade.

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.