

Pacing Guide

Level 2 Module 2

Biomes

Each *PhD Science® TEKS Edition* Level 2 lesson requires 35 minutes of instructional time. This guide is intended for teachers who are providing in-person instruction. This guide presents lesson objectives and activities by concept and multiple pacing options to allow teachers to maximize instructional time while remaining responsive to student needs. Choose one or more options for each lesson. Note that pacing options do not omit parts of lessons.

Pacing Option Key



Lesson Split: This symbol identifies single lessons teachers may split across 2 days.



Cross-Curricular Activity: This symbol identifies parts of lessons teachers may incorporate during instructional time for other content areas, such as English, math, social and emotional learning, and center time. Teachers may implement these parts before or after science instruction; for example, if the class reads a *PhD Science* core text during English instruction, students can discuss the core text during science instruction rather than reading the full text during that time.



Investigation Preparation: This symbol identifies preparation the teacher may do in advance of an investigation. This advance preparation does not interfere with student learning.



Instructional Routine: This symbol identifies opportunities to use alternative instructional routines. See the Implementation Guide for information on instructional routines.



Teacher Think Aloud: This symbol identifies activities that are appropriate for a teacher Think Aloud. Suggested primarily for use during station activities, this option allows completion of these activities as a class. During a teacher Think Aloud, the teacher assumes the role of a student and verbalizes the thought process of a student completing the activity to engage students with intentional questioning techniques. The teacher may also ask students to model appropriate procedures and participate in collaborative conversations.



Shared Media Experience: This symbol identifies media (e.g., videos, images) that the teacher may share with the whole class rather than having students view the media individually or in groups. After students observe the media as a class, they complete an activity.



Focal Point: This symbol identifies parts of lessons teachers should emphasize. For example, in an activity with multiple resources (e.g., videos, texts, charts), a focal point identifies the most important resources, thus ensuring the coherence of the lessons.



Instructional Note: This symbol identifies parts of lessons that have instructional notes that describe time-saving strategies. Examples of such instructional notes are Differentiation supports that provide sentence frames for writing assignments and Teacher Notes that suggest alternative activities.

Module at a Glance

This module contains 29 lessons and 5 spotlight lessons on Weather. Even with lesson splits, this module should take no more than 44 days to complete. This maximum number of days ensures the implementation of all Level 2 modules within a school year that has 150 days of science instruction.

Biomes

Anchor Phenomenon: Environments On and Below Mount Everest Essential Question: Why do so many kinds of plants and animals live below Mount Everest but so few live on it?	Recommended Number of Days	TEKS and ELPS Alignment
Concept 1 (Lessons 1-11): Environments Focus Question: How can we describe an environment? An environment can be described by its living and nonliving components.	11–16 days	2.2A, 2.2C, 2.2D, 2.2E, 2.3C, 2.4A, 2.4B, 2.7A, 2.7B, 2.9A, 2.9B, 2.9C, 2.10A, 2.10B, 2.10C ELPS: 1A, 1C, 3H, 4A, 4E
Concept 2 (Lessons 12-19): Biomes Focus Question: How do biomes compare with one another? A biome supports many kinds of plants and animals. These species generally differ from the species of other biomes.	8–10 days	2.2A, 2.2B, 2.2C, 2.2D, 2.2E, 2.2F, 2.3C, 2.4A, 2.4B, 2.7B, 2.9A, 2.9B, 2.9C, 2.10A, 2.10B ELPS: 1C, 3E, 4A, 4E, 4F
Application of Concepts (Lessons 20-23): Science Challenge Phenomenon Question: What kinds of plants and animals live in our schoolyard? The kinds of plants and animals that live in an area are identifiable and countable.	4–6 days	2.2A, 2.2B, 2.2C, 2.2D, 2.2E, 2.2F, 2.3C, 2.4A, 2.4B, 2.9B, 2.10A, 2.10B ELPS: 2C, 3H
Concept 3 (Lessons 24-26): Biodiversity Focus Question: How does biodiversity compare between environments? Earth’s environments support different species. Some environments support more species than others.	3–4 days	2.2A, 2.2C, 2.2D, 2.2E, 2.3C, 2.4B, 2.7B, 2.9B, 2.9C ELPS: 1C
Application of Concepts (Lessons 27-29): End-of-Module Socratic Seminar, Assessment, and Debrief Essential Question: Why do so many kinds of plants and animals live below Mount Everest but so few live on it? Earth’s land and water environments support many different species.	3 days	2.2E, 2.3C, 2.7A, 2.7B, 2.9A, 2.9B, 2.9C, 2.10A, 2.10B, 2.10C ELPS: 3E

Spotlight Lessons on Weather

Lesson Sets	Recommended Number of Days	TEKS and ELPS Alignment
<p>Lessons 1–2: Describing Weather Phenomenon Question: How can we describe and measure weather? Tools and observations can be used to describe and measure weather.</p>	<p>2 days</p>	<p>2.2D, 2.4A, 2.8A ELPS: 1A, 3H</p>
<p>Lessons 3–4: Weather Patterns Phenomenon Question: What can we find out by looking at weather data? People can use weather data to reveal patterns and describe weather conditions over time.</p>	<p>2 days</p>	<p>2.2D, 2.8A ELPS: 1C, 4A</p>
<p>Lesson 5: Seasonal Weather Phenomenon Question: How does weather information affect the choices we make? People use seasonal weather patterns to make choices about clothing, transportation, and activities.</p>	<p>1 day</p>	<p>2.2D, 2.3C, 2.8B ELPS: 1A, 3H</p>








Year at a Glance











This year at a glance chart shows where all three modules fit in a year. To ensure completion of each module, it is recommended to teach science five days a week.

Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Module 1			Module 2			Module 3				



Module 2: Biomes

Concept 1: How can we describe an environment?			11–16 days
Focus Standards			
<p>2.7A Observe, describe, and compare rocks by size, texture, and color.</p> <p>2.7B Identify and compare the properties of natural sources of freshwater and saltwater.</p> <p>2.9A Identify the basic needs of plants and animals.</p> <p>2.9B Identify factors in the environment, including temperature and precipitation, that affect growth and behavior such as migration, hibernation, and dormancy of living things.</p> <p>2.9C Compare the ways living organisms depend on each other and on their environments such as through food chains.</p> <p>2.10A Observe, record, and compare how the physical characteristics and behaviors of animals help them meet their basic needs.</p> <p>2.10B Observe, record, and compare how the physical characteristics of plants help them meet their basic needs such as stems carry water throughout the plant.</p> <p>2.10C Investigate and record some of the unique stages that insects such as grasshoppers and butterflies undergo during their life cycle.</p>			
Lessons 1–3: Journey to Mount Everest			Lessons 4–7: Maps
Lesson 1: Observe and describe changes in the environment from Kathmandu to Mount Everest.	Lesson 2: Examine and sort photographs to describe patterns in the kinds of plants and animals that live below Mount Everest.	Lesson 3: Develop an anchor model to show how environments change with elevation in the Mount Everest region.	Lesson 4: Draw a map to realize that maps show the prominent features of an area.
 <p>Day 1: Launch through Describe the Journey to Mount Everest’s Summit</p> <p>Day 2: Compare Maps and Photographs through Land</p>  <p>Think aloud elevation diagram cards in Land.</p>	 <p>Day 1: Launch through Explore Mount Everest’s Environment</p> <p>Day 2: Sort Plant and Animal Cards through Land</p>  <p>Use an alternative instructional routine in Sort Plant and Animal Cards.</p>	 <p>Day 1: Launch through Develop Initial Models</p> <p>Day 2: Develop Anchor Model through Land</p>	 <p>Obtain a photograph of the outdoor area in or near the schoolyard in Draw Schoolyard Map.</p>  <p>Use an alternative collaborative conversation routine in Draw Schoolyard Map.</p>







Lessons 4–7: Maps			Lessons 8–9: A Temperate Forest Environment
Lesson 5: Develop a map of a mountain model to illustrate the model’s shape and elevation.	Lesson 6: Analyze images to describe water bodies near Mount Everest and in other places around the world.	Lesson 7: Examine rock samples and a map to determine that different kinds of rocks make up Mount Everest.	Lesson 8: Analyze data to describe yearly temperature and precipitation patterns in a red panda habitat.
 Day 1: Launch through Explore Elevation with Models Day 2: Compare Models through Land  Use Differentiation note in Compare Models.	 Think aloud one water body card in Discuss Water Bodies.		 Create the headings and row labels for the weather patterns class chart in Identify Weather Patterns before the lesson.
Lessons 8–9: A Temperate Forest Environment	Lesson 10: Savanna and Alpine Tundra Environments	Lesson 11: Environments	
Lesson 9: Develop a model of a temperate forest to describe how living things interact with their environment to meet their needs.	Lesson 10: Compare the savanna and alpine tundra environments below Mount Everest.	Lesson 11: Use evidence to evaluate arguments about animals that live in Barnum Pond.	
 Think aloud plant comparison chart in Compare Plant and Animal Needs.	 Day 1: Launch through Engage in Argumentation About Environments Day 2: Describe Environments through Land  Think aloud environment data for Location A in Analyze Environment Data.  Use first Teacher Note in Engage in Argumentation About Environments.	 Read pond life article with the whole class in Prepare for Conceptual Checkpoint.  Use an alternative collaborative conversation routine in Land.	
		Conceptual Checkpoint	

Concept 2: How do biomes compare with one another?






8–10 days








Focus Standards

- 2.7B** Identify and compare the properties of natural sources of freshwater and saltwater.
- 2.9A** Identify the basic needs of plants and animals.
- 2.9B** Identify factors in the environment, including temperature and precipitation, that affect growth and behavior such as migration, hibernation, and dormancy of living things.
- 2.9C** Compare the ways living organisms depend on each other and on their environments such as through food chains.
- 2.10A** Observe, record, and compare how the physical characteristics and behaviors of animals help them meet their basic needs.
- 2.10B** Observe, record, and compare how the physical characteristics of plants help them meet their basic needs such as stems carry water throughout the plant.

Lessons 12–14: Environments on Earth			Lessons 15–17: Land Biomes
Lesson 12: Analyze information to describe living and nonliving components common to all temperate forest environments on Earth.	Lesson 13: Analyze information to describe living and nonliving components common to all savanna and alpine tundra environments on Earth.	Lesson 14: Use biome maps to develop a claim about the weather, plants, and animals in an unknown location.	Lesson 15: Examine maps to identify Earth’s major biomes.
 Use a timer to pace stations in Visit Forest Environment Stations.  Use an alternative collaborative conversation routine in Describe Similarities Between Forest Environments.  Use Differentiation note in Describe Similarities Between Forest Environments.	 Think aloud one station in Visit Savanna and Alpine Tundra Environment Stations.	 Use Differentiation note in Analyze Biome Overlay Maps.	 Use an alternative collaborative conversation routine in Launch.



Lessons 15–17: Land Biomes		Lessons 18–19: Biomes	
Lesson 16: Analyze information to describe and compare Earth’s major biomes.	Lesson 17: Compare living and nonliving components of Earth’s major biomes.	Lesson 18: Identify and compare properties of fresh water and salt water.	Lesson 19: Use evidence to support a claim that compares freshwater and marine biomes.
 Day 1: Launch through Describe Biomes (Check for Understanding) Day 2: Describe Biomes (Gallery Walk) through Land	 Day 1: Launch through Explore Plant Needs Day 2: Compare Biomes through Land	 Display Weighing Water Station as students record observations in Observe Properties of Fresh Water and Salt Water.  Use Differentiation note in Observe Properties of Fresh Water and Salt Water.	 Use Spotlight on Knowledge and Skills note in Conceptual Checkpoint. <p style="text-align: center;">Conceptual Checkpoint</p>


Science Challenge: What kinds of plants and animals live in our schoolyard?		4–6 days	
Focus Standards			
<p>2.9B Identify factors in the environment, including temperature and precipitation, that affect growth and behavior such as migration, hibernation, and dormancy of living things.</p> <p>2.10A Observe, record, and compare how the physical characteristics and behaviors of animals help them meet their basic needs.</p> <p>2.10B Observe, record, and compare how the physical characteristics of plants help them meet their basic needs such as stems carry water throughout the plant.</p> <p>2.10C Investigate and record some of the unique stages that insects such as grasshoppers and butterflies undergo during their life cycle.</p>			
Lessons 20: Preparation for Science Challenge		Lessons 21–23: Science Challenge	
Lesson 20: Observe stages of the butterfly life cycle to compare how the body parts of butterflies and caterpillars help them survive.		Lesson 21: Plan an investigation to measure the biodiversity of a schoolyard.	
Lesson 22: Conduct an investigation to measure the biodiversity of a schoolyard.		Lesson 23: Analyze and interpret data to describe the biodiversity of a schoolyard.	
 Use an alternative instructional routine in Land.	 Day 1: Launch through Observe Schoolyard  Day 2: Plan Investigation through Land Use questions in Check for Understanding note to support groups in Plan Investigation.  Use an alternative collaborative conversation routine in Land.	 Use an alternative collaborative conversation routine in Land.	 Day 1: Launch through Compile and Categorize Data  Day 2: Graph and Analyze Data through Land Think aloud one graph in Graph and Analyze Data.
Science Challenge		Science Challenge	

Application of Concepts: Why do so many kinds of plants and animals live below Mount Everest but so few live on it? 3 days





Focus Standards

- 2.7A** Observe, describe, and compare rocks by size, texture, and color.
- 2.7B** Identify and compare the properties of natural sources of freshwater and saltwater.
- 2.9A** Identify the basic needs of plants and animals.
- 2.9B** Identify factors in the environment, including temperature and precipitation, that affect growth and behavior such as migration, hibernation, and dormancy of living things.
- 2.9C** Compare the ways living organisms depend on each other and on their environments such as through food chains.
- 2.10A** Observe, record, and compare how the physical characteristics and behaviors of animals help them meet their basic needs.
- 2.10B** Observe, record, and compare how the physical characteristics of plants help them meet their basic needs such as stems carry water throughout the plant.
- 2.10C** Investigate and record some of the unique stages that insects such as grasshoppers and butterflies undergo during their life cycle.

Lessons 27–29: Journey to Mount Everest

Lesson 27: Explain why so many kinds of plants and animals live in environments below Mount Everest but so few live on it.	Lesson 28: Explain the similarities and differences between environments of Yellowstone National Park.	Lesson 29: Explain why different kinds of plants and animals live in different environments.
 Use Teacher Note in Engage in Socratic Seminar.		
Socratic Seminar	End-of-Module Assessment	End-of-Module Debrief

Spotlight Lessons: Weather

Focus Standards:		5 days	
<p>2.8A Measure, record, and graph weather information, including temperature, wind conditions, precipitation, and cloud coverage, in order to identify patterns in the data.</p> <p>2.8B Identify the importance of weather and seasonal information to make choices in clothing, activities, and transportation.</p>			
Lessons 1–2: Describing Weather		Lessons 3–4: Weather Patterns	
Lesson 1: Describe cloud coverage, rain or snow, and wind conditions.	Lesson 2: Measure temperature and record weather information.	Lesson 3: Analyze weather data to identify monthly and yearly patterns in temperature.	Lesson 4: Create and analyze bar graphs to look for patterns in rain or snow.
 Use an alternative instructional routine in Launch.	 Use second Teacher note in Record Weather Information.	 Use Differentiation note in Analyze Temperature Data.	
Lesson 5: Seasonal Weather			
<p>Lesson 5: Use weather data to identify appropriate clothing, transportation, and activities for weather conditions associated with each season.</p>			
 Use an alternative collaborative conversation routine in Launch.			

Texas Essential Knowledge and Skills (TEKS)

Focus Standards	
2.7	<p>Earth and space. The student knows that the natural world includes earth materials. The student is expected to</p> <p>2.7A observe, describe, and compare rocks by size, texture, and color; and</p> <p>2.7B identify and compare the properties of natural sources of freshwater and saltwater.</p>
2.8	<p>Earth and space. The student knows that there are recognizable patterns in the natural world and among objects in the sky. The student is expected to</p> <p>2.8A measure, record, and graph weather information, including temperature, wind conditions, precipitation, and cloud coverage, in order to identify patterns in the data; and</p> <p>2.8B identify the importance of weather and seasonal information to make choices in clothing, activities, and transportation.</p>
2.9	<p>Organisms and environments. The student knows that living organisms have basic needs that must be met for them to survive within their environment. The student is expected to</p> <p>2.9A identify the basic needs of plants and animals;</p> <p>2.9B identify factors in the environment, including temperature and precipitation, that affect growth and behavior such as migration, hibernation, and dormancy of living things; and</p> <p>2.9C compare the ways living organisms depend on each other and on their environments such as through food chains.</p>
2.10	<p>Organisms and environments. The student knows that organisms resemble their parents and have structures and processes that help them survive within their environments. The student is expected to</p> <p>2.10A observe, record, and compare how the physical characteristics and behaviors of animals help them meet their basic needs;</p> <p>2.10B observe, record, and compare how the physical characteristics of plants help them meet their basic needs such as stems carry water throughout the plant; and</p> <p>2.10C investigate and record some of the unique stages that insects such as grasshoppers and butterflies undergo during their life cycle.</p>
Investigation and Reasoning Standards	
2.1	<p>Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures. The student is expected to</p> <p>2.1A identify, describe, and demonstrate safe practices as outlined in Texas Education Agency-approved safety standards during classroom and outdoor investigations, including wearing safety goggles or chemical splash goggles, as appropriate, washing hands, and using materials appropriately; and</p> <p>2.1B identify and demonstrate how to use, conserve, and dispose of natural resources and materials such as conserving water and reuse or recycling of paper, plastic, and metal.</p>

- 2.2 Scientific investigation and reasoning. The student develops abilities necessary to do scientific inquiry in classroom and outdoor investigations. The student is expected to
- 2.2A** ask questions about organisms, objects, and events during observations and investigations;
 - 2.2B** plan and conduct descriptive investigations;
 - 2.2C** collect data from observations using scientific tools;
 - 2.2D** record and organize data using pictures, numbers, and words;
 - 2.2E** communicate observations and justify explanations using student-generated data from simple descriptive investigations; and
 - 2.2F** compare results of investigations with what students and scientists know about the world.
- 2.3 Scientific investigation and reasoning. The student knows that information and critical thinking, scientific problem solving, and the contributions of scientists are used in making decisions. The student is expected to
- 2.3C** identify what a scientist is and explore what different scientists do.
- 2.4 Scientific investigation and reasoning. The student uses age-appropriate tools and models to investigate the natural world. The student is expected to
- 2.4A** collect, record, and compare information using tools, including computers, hand lenses, rulers, plastic beakers, magnets, collecting nets, notebooks, and safety goggles or chemical splash goggles as appropriate; timing devices; weather instruments such as thermometers, wind vanes, and rain gauges; and materials to support observations of habitats of organisms such as terrariums and aquariums; and
 - 2.4B** measure and compare organisms and objects.