



Pacing Guide

Level 3 Module 1

EARTH CHANGES

with Spotlight Lessons on Changes in Matter

Each *PhD Science*® *Texas* Level 3 lesson requires 45 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. Teacher choice days are also included in this pacing guide to allow for review, reteaching, assessment, and extension activities.

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.



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.



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

Module at a Glance

This module contains 25 lessons plus 10 spotlight lessons on Changes in Matter. Even with lesson splits and teacher choice days, this module should take no more than 49 days to complete. This maximum number of days ensures the implementation of all Level 3 modules within a school year that has 150 days of science instruction.

Earth Changes

ANCHOR PHENOMENON:

Transformation of Surtsey Island

ESSENTIAL QUESTION:

How can the island of Surtsey change shape over time?

| Concept | Recommended Number of Days | TEKS Alignment | ELPS Alignment |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <p>Concept 1 (Lessons 1–7): The Composition and Shape of Land</p> <p>Focus Question: How can we describe land?</p> <p>Land has shape and is made up of rocks, soil, and sand.</p> | 7–12 days | 3.1A, 3.1B, 3.1C, 3.1D, 3.1E, 3.1F, 3.1G, 3.2A, 3.2B, 3.3A, 3.3B, 3.3C, 3.5A, 3.5G, 3.6A, 3.6C, 3.10B, 3.10C | 2C, 2E, 3H, 4A, 4D |
| <p>Concept 2 (Lessons 8–13): The Changing Shape of Land</p> <p>Focus Question: How can land change?</p> <p>Wind and water can shape land by moving material from one place to another.</p> | 6–10 days | 3.1B, 3.1C, 3.1D, 3.1E, 3.1F, 3.1G, 3.2B, 3.2C, 3.3A, 3.3B, 3.4A, 3.5B, 3.5D, 3.5G, 3.6D, 3.10B, 3.10C, 3.11A | 3E, 3H, 4A, 4D, 4F |
| <p>Application of Concepts (Lessons 14–18): Engineering Challenge</p> <p>Phenomenon Question: How can we slow changes to the land of Montauk Point to protect the Montauk Point Lighthouse?</p> <p>People can apply knowledge of the natural world to slow or prevent land from changing.</p> | 5 days | 3.1A, 3.1B, 3.1C, 3.1E, 3.1F, 3.1G, 3.2B, 3.2D, 3.3A, 3.3B, 3.3C, 3.4A, 3.4B, 3.5C, 3.5D, 3.5G, 3.6D, 3.10C, 3.11A, 3.11B, 3.11C | 3E, 4D |
| <p>Concept 3 (Lessons 19–22): Timescale of Changes to Land</p> <p>Focus Question: How long do changes to land take?</p> <p>Earth events change land over short and long time spans.</p> | 4–7 days | 3.1A, 3.1E, 3.1F, 3.1G, 3.2A, 3.2B, 3.3A, 3.3B, 3.3C, 3.4A, 3.5C, 3.5G, 3.10B, 3.10C | 3D, 3E, 3H, 4F |
| <p>Application of Concepts (Lessons 23–25): End-of-Module Socratic Seminar, Assessment, and Debrief</p> <p>Essential Question: How can the island of Surtsey change shape over time?</p> <p>Natural events transform Earth's land as time passes.</p> | 3–4 days | 3.1E, 3.1F, 3.1G, 3.2B, 3.3A, 3.3B, 3.3C, 3.4A, 3.5C, 3.5D, 3.5G, 3.6D, 3.10B, 3.10C, 3.11A | 3E, 3F |

Spotlight Lessons on Changes in Matter

| Lesson Sets | Recommended Number of Days | TEKS Alignment | ELPS Alignment |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------|----------------|
| <p>Lessons 1–2: Properties of Objects and Materials</p> <p>Phenomenon Question: What properties can be used to separate objects made of different materials?</p> <p>Objects and their materials can be described by their properties.</p> | 2 days | 3.1B, 3.1D, 3.1E, 3.2B, 3.3A, 3.3C, 3.5A, 3.6A, 3.11B, 3.11C | 1A |
| <p>Lessons 3–5: Changes in Matter</p> <p>Phenomenon Question: How are glass objects changed during the recycling process?</p> <p>Matter has properties that can change because of heating or cooling.</p> | 3 days | 3.1B, 3.1C, 3.1D, 3.1E, 3.1G, 3.2B, 3.3A, 3.3B, 3.5B, 3.5G, 3.6A, 3.6B, 3.6C | 1A, 3D |
| <p>Lessons 6–10: Crayon Recycling</p> <p>Phenomenon Question: How can we conserve resources by recycling used crayons?</p> <p>The properties of matter can be used to separate and change materials.</p> | 5–6 days | 3.1A, 3.1B, 3.1C, 3.1D, 3.1E, 3.1G, 3.2D, 3.3A, 3.3B, 3.3C, 3.5D, 3.6A, 3.6B, 3.6C, 3.11B, 3.11C | 4C |

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 5 days a week.

Module 1

- August
- September
- October

Module 2

- November
- December
- January

Module 3

- February
- March
- April



MODULE 1






Earth Changes

CONCEPT 1

How can we describe land? 7–12 days





Lessons 1–2: Transformation of Surtsey

TEKS 3.6C, 3.10C, 3.1A, 3.1B, 3.1D, 3.1E, 3.1G, 3.2A, 3.2B, 3.3B, 3.5G **ELPS** 4A, 4D

| Lessons | Pacing Options |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Lesson 1: Observe land areas and describe their natural features.</p> | <p> Day 1: Launch through Define Land</p> <p>Day 2: Explore Natural Features of Local Land through Land</p> <p> Use first Teacher Note in Explore Natural Features of Local Land.</p> <p> Use English Language Development note in Explore Natural Features of Local Land.</p> |
| <p>Lesson 2: Develop an anchor model that begins to explain the formation and transformation of Surtsey.</p> | <p> Day 1: Launch through Develop Initial Model</p> <p>Day 2: Develop Anchor Model through Land</p> <p> Use Differentiation note in Develop Initial Model.</p> |





Lessons 3–4: Land

TEKS 3.6A, 3.10B, 3.10C, 3.1B, 3.1C, 3.1E, 3.1F, 3.2B, 3.3A, 3.3B, 3.3C, 3.5G **ELPS** 2C, 3H

| Lessons | Pacing Options |
|--------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Lesson 3: Investigate solid materials found at or near Earth’s surface to describe the components of land.</p> | <p> Day 1: Launch through Observe Local Land Samples</p> <p>Day 2: Compare Land Samples through Land</p> <p> Think Aloud one material in Observe Common Land Samples.</p> |
| <p>Lesson 4: Investigate how rocks change by breaking into smaller pieces.</p> | <p> Day 1: Launch through Investigate Rocks</p> <p>Day 2: Construct an Argument About Rocks through Land</p> <p> Use second Teacher Note in Investigate Rocks.</p> |

Lessons 5–6: Landforms

TEKS 3.10C, 3.1A, 3.1B, 3.1D, 3.1E, 3.1F, 3.2B, 3.3A, 3.3B, 3.5A, 3.5G **ELPS** 2E

| Lessons | Pacing Options |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Lesson 5: Observe photographs of different landforms to describe their shapes.</p> | <p> Day 1: Launch through Observe Features of National Parks and Lands</p> <p>Day 2: Describe the Shape of Land through Land</p> <p> Use Differentiation note in Describe the Shape of Land.</p> |
| <p>Lesson 6: Compare photographs of landforms to identify the pattern of land changing shape over time.</p> | <p> Think Aloud one landform in Observe and Describe Landforms Over Time.</p> <p> Use Differentiation note in Observe and Describe Landforms Over Time.</p> |

Lesson 7: The Composition and Shape of Land

TEKS 3.10B, 3.10C, 3.1E, 3.1F, 3.2B, 3.3A, 3.3B 3.5G **ELPS** 2C




| Lessons | Pacing Options |
|-------------------------------------------------------------------------------------------------|-------------------------------------|
| <p>Lesson 7: Use evidence from observations of landforms to describe Surtsey’s land.</p> | <p>Conceptual Checkpoint</p> |

CONCEPT 2

The Changing Shape of Land 6–10 days







Lessons 8–9: Water and Land Interactions

TEKS 3.6D, 3.10B, 3.10C, 3.11A, 3.1B, 3.1C, 3.1D, 3.1E, 3.1F, 3.1G, 3.2B, 3.2C, 3.3A, 3.3B, 3.4A, 3.5B, 3.5D, 3.5G
ELPS 3E, 4A

| Lessons | Pacing Options |
|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Lesson 8: Observe water and land interactions to describe how water can change the shape of land.</p> | <p> Day 1: Launch through Investigate Water and Land Interactions</p> <p>Day 2: Analyze Data through Land</p> <p> Use an alternative collaborative conversation routine in Analyze Data.</p> |
| <p>Lesson 9: Compare solutions to problems caused by water changing the shape of land.</p> | <p> Think Aloud one poster in Share Information About Landslide Solutions.</p> |



Lessons 10–12: Wind and Land Interactions

TEKS 3.10C, 3.11A, 3.1B, 3.1C, 3.1E, 3.1F, 3.1G, 3.2B, 3.3B, 3.4A, 3.5B, 3.5D, 3.5G **ELPS** 4D, 4F

| Lessons | Pacing Options |
|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Lesson 10: Plan an investigation to gather evidence about how wind and land interact.</p> | <p> Day 1: Launch through Read About the Sphinx</p> <p>Day 2: Prepare for Wind Investigation through Land</p> <p> Read <i>World Traveler: The Sphinx</i> by Catherine Schmidt and Molly O’Halloran (2018) before the lesson in Read About the Sphinx.</p> |
| <p>Lesson 11: Observe wind and land interactions to describe how wind can change the shape of land.</p> | <p> Day 1: Launch through Investigate Wind and Land Interactions</p> <p>Day 2: Construct an Argument About Wind and Land through Land</p> <p> Use Teacher Note in Investigate Wind and Land Interactions.</p> |
| <p>Lesson 12: Compare solutions to problems caused by wind changing the shape of land.</p> | <p> Share photographs while students record observations in Observe Images of Wind Changing Land.</p> <p> Use alternative collaborative conversation routine in Identify Solutions to Problems Caused by Wind Changing Land.</p> |

Lesson 13: The Changing Shape of Land

TEKS 3.10B, 3.10C, 3.1B, 3.1D, 3.1E, 3.1G, 3.2B, 3.3A, 3.3B, 3.5G **ELPS** 3E





| Lessons | Pacing Options |
|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Lesson 13: Construct an argument that uses evidence to support a claim about wind and water changing the shape of Surtsey’s land.</p> | <p> Day 1: Launch through Conceptual Checkpoint</p> <p>Day 2: Debrief Conceptual Checkpoint through Land</p> <p> Use alternative instructional routine in Land.</p> <p>Conceptual Checkpoint</p> |

ENGINEERING CHALLENGE

How can we slow changes to the land of Montauk Point to protect the Montauk Point Lighthouse? 5 days

Lessons 14–18: Engineering Challenge

TEKS 3.6D, 3.10C, 3.11A, 3.11B, 3.11C, 3.1A, 3.1B, 3.1C, 3.1E, 3.1F, 3.1G, 3.2B, 3.2D, 3.3A, 3.3B, 3.3C, 3.4A, 3.4B, 3.5C, 3.5D, 3.5G **ELPS** 3E, 4D




| Lessons | Pacing Options |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Lesson 14: Apply the engineering design process to develop, build, and test a solution for protecting the Montauk Point Lighthouse.</p> | <p>Engineering Challenge</p> |
| <p>Lesson 15: Apply the engineering design process to develop, build, and test a solution for protecting the Montauk Point Lighthouse.</p> | <p>Engineering Challenge</p> |
| <p>Lesson 16: Apply the engineering design process to develop, build, and test a solution for protecting the Montauk Point Lighthouse.</p> | <p> Use Differentiation note in Plan a Shoreline Protection System.</p> <p>Engineering Challenge</p> |
| <p>Lesson 17: Apply the engineering design process to develop, build, and test a solution for protecting the Montauk Point Lighthouse.</p> | <p> Use Differentiation note in Launch.</p> <p>Engineering Challenge</p> |
| <p>Lesson 18: Apply the engineering design process to develop, build, and test a solution for protecting the Montauk Point Lighthouse.</p> | <p> Use Teacher Note in Prepare for a Presentation.</p> <p> Use Differentiation note in Share a Solution.</p> <p>Engineering Challenge</p> |

CONCEPT 3

How long do changes to land take? 4–7 days



Lessons 19–20: Earth Events

TEKS 3.10C, 3.1A, 3.1E, 3.1F, 3.2B, 3.3B, 3.3C, 3.5C, 3.5G **ELPS** 3D, 3H

| Lessons | Pacing Options |
|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Lesson 19: Compare Earth events that change land to develop initial ideas about the time spans over which the events occur.</p> |  Use Teacher Note in Order Earth Event Cards. |
| <p>Lesson 20: Describe Earth events that change land as happening rapidly or slowly.</p> |  Day 1: Launch through Read About Time Spans of Earth Events Day 2: Compare Earth Events to Human Events through Land  Use an alternative instructional routine in Land. |


Lesson 21: Slow Earth Events

TEKS 3.10B, 3.10C, 3.1E, 3.1G, 3.2A, 3.3B, 3.3C, 3.4A, 3.5C, 3.5G **ELPS** 3E

| Lessons | Pacing Options |
|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Lesson 21: Use a model to show that some Earth events change land over time spans longer than one person can observe.</p> |  Day 1: Launch through Compare Time Spans of Events Day 2: Discuss Evidence of Change through Land  Use an alternative response technique for the On/Off the Bus instructional routine in Discuss Evidence of Change. |

Lesson 22: Timescales of Changes to Land

TEKS 3.10C, 3.1E, 3.1G, 3.2B, 3.3A, 3.3B, 3.5C, 3.5G **ELPS** 4F


| Lessons | Pacing Options |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Lesson 22: Use evidence to support a claim comparing the time spans of Earth events that have formed and shaped yardangs with those that have formed and shaped Surtsey.</p> |  Day 1: Launch through Conceptual Checkpoint Day 2: Debrief Conceptual Checkpoint through Land Conceptual Checkpoint |

APPLICATION OF CONCEPTS

How can the island of Surtsey change shape over time? 3–4 days

Lessons 23–25: End-of-Module Socratic Seminar, Assessment, and Debrief

TEKS 3.6D, 3.10B, 3.10C, 3.11A, 3.1E, 3.1F, 3.1G, 3.2B, 3.3A, 3.3B, 3.3C, 3.4A, 3.5C, 3.5D, 3.5G **ELPS** 3E, 3F


| Lessons | Pacing Options |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lesson 23: Explain how land changes over time. |  Use English Language Development note in Engage in Socratic Seminar. Socratic Seminar |
| Lesson 24: Explain how land changes over time. | End-of-Module Assessment |
| Lesson 25: Explain how land changes over time. | End-of-Module Assessment Debrief |
| Teacher Choice Day | Review, reteach, assess, or complete extension activities |

SPOTLIGHT LESSONS

Changes in Matter 11 days




Lessons 1–2: Properties of Objects and Materials

TEKS 3.6A, 3.11B, 3.11C, 3.1B, 3.1D, 3.1E, 3.2B, 3.3A, 3.3C, 3.5A **ELPS** 1A

| Lessons | Pacing Options |
|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lesson 1: Describe methods to conserve natural resources. | None |
| Lesson 2: Observe and describe the properties of objects and their materials. |  Think Aloud one object (Lesson 2 Activity Guide B) in Explore Additional Properties. |



Lessons 3–5: Changes in Matter

TEKS 3.6A, 3.6B, 3.6C, 3.1B, 3.1C, 3.1D, 3.1E, 3.1G, 3.2B, 3.3A, 3.3B, 3.5B, 3.5G **ELPS** 1A, 3D

| Lessons | Pacing Options |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lesson 3: Investigate and identify changes to properties of matter when a solid becomes a liquid. |  Prepare 6 ice cubes per group before the lesson in Observe Properties of Ice. |
| Lesson 4: Use evidence to explain that air is made of matter. |  Use an alternative collaborative conversation routine for the Mix and Mingle instructional routine in Determine Whether Air Is Matter. |
| Lesson 5: Investigate changes to properties of matter during heating and cooling to identify and describe state changes during evaporation and solidification. |  Use sidebar English Language Development note in Change a Liquid to a Solid. |

Lessons 6–10: Crayon Recycling

TEKS 3.6A, 3.6B, 3.6C, 3.11B, 3.11C, 3.1A, 3.1B, 3.1C, 3.1D, 3.1E, 3.1G, 3.2D, 3.3A, 3.3B, 3.3C, 3.5D **ELPS** 4C

| Lessons | Pacing Options |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lesson 6: Apply the engineering design process to create a process for recycling crayons. | Engineering Challenge |
| Lesson 7: Apply the engineering design process to create a process for recycling crayons. |  Use Differentiation Note in Ask About an Engineering Problem. Engineering Challenge |
| Lesson 8: Apply the engineering design process to create a process for recycling crayons. | Engineering Challenge |
| Lesson 9: Apply the engineering design process to create a process for recycling crayons. | Engineering Challenge |
| Lesson 10: Apply the engineering design process to create a process for recycling crayons. |  Use Differentiation Note in Share a Design Solution. Engineering Challenge |
| Teacher Choice Day | Review, reteach, assess, or complete extension activities |

Texas Essential Knowledge and Skills (TEKS)

Content Standards

- 3.6** Matter and energy. The student knows that matter has measurable physical properties that determine how matter is identified, classified, changed, and used. The student is expected to
- 3.6A** measure, test, and record physical properties of matter, including temperature, mass, magnetism, and the ability to sink or float in water.
 - 3.6B** describe and classify samples of matter as solids, liquids, and gases and demonstrate that solids have a definite shape and that liquids and gases take the shape of their container;
 - 3.6C** predict, observe, and record changes in the state of matter caused by heating or cooling in a variety of substances such as ice becoming liquid water, condensation forming on the outside of a glass, or liquid water being heated to the point of becoming water vapor (gas); and
 - 3.6D** demonstrate that materials can be combined based on their physical properties to create or modify objects such as building a tower or adding clay to sand to make a stronger brick and justify the selection of materials based on their physical properties.
- 3.10** Earth and space. The student knows that there are recognizable processes that change Earth over time. The student is expected to
- 3.10B** investigate and explain how soils such as sand and clay are formed by weathering of rock and by decomposition of plant and animal remains; and
 - 3.10C** model and describe rapid changes in Earth's surface such as volcanic eruptions, earthquakes, and landslides.
- 3.11** Earth and space. The student understands how natural resources are important and can be managed. The student is expected to
- 3.11A** explore and explain how humans use natural resources such as in construction, in agriculture, in transportation, and to make products;
 - 3.11B** explain why the conservation of natural resources is important; and
 - 3.11C** identify ways to conserve natural resources through reducing, reusing, or recycling.

Scientific and Engineering Practices

- 3.1** Scientific and engineering practices. The student asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. The student is expected to
- 3.1A** ask questions and define problems based on observations or information from text, phenomena, models, or investigations;
 - 3.1B** use scientific practices to plan and conduct descriptive investigations and use engineering practices to design solutions to problems;
 - 3.1C** demonstrate safe practices and the use of safety equipment during classroom and field investigations as outlined in Texas Education Agency–approved safety standards;
 - 3.1D** use tools, including hand lenses; metric rulers; Celsius thermometers; wind vanes; rain gauges; graduated cylinders; beakers; digital scales; hot plates; meter sticks; magnets; notebooks; Sun, Earth, Moon system models; timing devices; materials to support observation of habitats of organisms such as terrariums, aquariums, and collecting nets; and materials to support digital data collection such as computers, tablets, and cameras, to observe, measure, test, and analyze information;
 - 3.1E** collect observations and measurements as evidence;
 - 3.1F** construct appropriate graphic organizers to collect data, including tables, bar graphs, line graphs, tree maps, concept maps, Venn diagrams, flow charts or sequence maps, and input-output tables that show cause and effect; and
 - 3.1G** develop and use models to represent phenomena, objects, and processes or design a prototype for a solution to a problem.
- 3.2** Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. The student is expected to
- 3.2A** identify advantages and limitations of models such as their size, scale, properties, and materials;
 - 3.2B** analyze data by identifying any significant features, patterns, or sources of error;
 - 3.2C** use mathematical calculations to compare patterns and relationships; and
 - 3.2D** evaluate a design or object using criteria.
- 3.3** Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to
- 3.3A** develop explanations and propose solutions supported by data and models;
 - 3.3B** communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and
 - 3.3C** listen actively to others' explanations to identify relevant evidence and engage respectfully in scientific discussion.
- 3.4** Scientific and engineering practices. The student knows the contributions of scientists and recognizes the importance of scientific research and innovation for society. The student is expected to
- 3.4A** explain how scientific discoveries and innovative solutions to problems impact science and society; and
 - 3.4B** research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field to investigate STEM careers.

Recurring Themes and Concepts

- 3.5** Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. The student is expected to
- 3.5A** identify and use patterns to explain scientific phenomena or to design solutions;
 - 3.5B** identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;
 - 3.5C** use scale, proportion, and quantity to describe, compare, or model different systems;
 - 3.5D** examine and model the parts of a system and their interdependence in the function of the system; and
 - 3.5G** explain how factors or conditions impact stability and change in objects, organisms, and systems.

English Language Proficiency Standards (ELPS)

- 1A** Use prior knowledge and experiences to understand meanings in English.
- 2C** Learn new language structures, expressions, and basic and academic vocabulary heard during classroom instruction and interactions.
- 2E** Use visual, contextual, and linguistic support to enhance and confirm understanding of increasingly complex and elaborated spoken language.
- 3D** Speak using grade-level content area vocabulary in context to internalize new English words and build academic language proficiency.
- 3E** Share information in cooperative learning interactions.
- 3F** Ask and give information ranging from using a very limited bank of high-frequency, high-need, concrete vocabulary, including key words and expressions needed for basic communication in academic and social contexts, to using abstract and content-based vocabulary during extended speaking assignments.
- 3H** Narrate, describe, and explain with increasing specificity and detail as more English is acquired.
- 4A** Learn relationships between sounds and letters of the English language and decode (sound out) words using a combination of skills such as recognizing sound-letter relationships and identifying cognates, affixes, roots, and base words.
- 4C** Develop basic sight vocabulary, derive meaning of environmental print, and comprehend English vocabulary and language structures used routinely in written classroom materials.
- 4D** Use prereading supports such as graphic organizers, illustrations, and pre-taught topic-related vocabulary and other prereading activities to enhance comprehension of written text.
- 4F** Use visual and contextual support and support from peers and teachers to read grade-appropriate content area text, enhance and confirm understanding, and develop vocabulary, grasp of language structures, and background knowledge needed to comprehend increasingly challenging language.