Pacing Guide

Level 1 Module 3

SURVIVAL

with Spotlight Lessons on Earth Materials

Each *PhD Science® Texas* Level 1 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. 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 31 lessons plus 8 spotlight lessons on Earth Materials. Even with lesson splits and teacher choice days, this module should take no more than 53 days to complete. This maximum number of days ensures the implementation of all Level 1 modules within a school year that has 150 days of science instruction.

Survival

ANCHOR PHENOMENON:

Life at a Pond

ESSENTIAL QUESTION:

How do pond plants and pond animals survive in their environment?

Concept	Recommended Number of Days	TEKS Alignment	ELPS Alignment
Concept 1 (Lessons 1–10): Body Parts **Focus Question:** How do plants and animals use their body parts to survive in their environment? Plants and animals use their body parts in ways that help the plants and animals survive. Plant and animal body parts have properties that relate to their functions.	10–15 days	1.1A, 1.1C, 1.1D, 1.1E, 1.1F, 1.1G, 1.2A, 1.2B, 1.3A, 1.3B, 1.5A, 1.5B, 1.5D, 1.5E, 1.5F, 1.11A, 1.12A, 1.12B, 1.12C, 1.13A, 1.13B	1D, 2E, 3C, 3D, 3H, 4C, 4D, 4G
Application of Concepts (Lessons 11–16): Engineering Challenge **Phenomenon Question:** How can we help protect scientists at a pond? Humans can solve some problems by mimicking how pond animals use their body parts.	6–7 days	1.1A, 1.1B, 1.1C, 1.1D, 1.1E, 1.1F, 1.1G, 1.2B, 1.2D, 1.3A, 1.3B, 1.3C, 1.4A, 1.4B, 1.5A, 1.5E, 1.5F, 1.6A, 1.13A	1E, 3E, 5B
Concept 2 (Lessons 17–22): Sense and Response **Focus Question:** How do plants and animals respond to their environment? Animals have body parts that capture and convey information in the animals' environment. Plants and animals respond to their environment in ways that help the plants and animals survive.	6–7 days	1.1A, 1.1B, 1.1D, 1.1E, 1.1F, 1.1G, 1.2A, 1.2B, 1.3A, 1.3B, 1.5A, 1.5B, 1.5D, 1.5G, 1.11A, 1.12B, 1.12C, 1.13A, 1.13B	2C, 3B, 3E, 3G, 4C, 4G
Concept 3 (Lessons 23–28): Parents and Offspring **Focus Question:** How do parents help their offspring survive? Individual plants or animals of the same kind are recognizable as similar, but they can also vary in many ways. Many animal parents engage in behaviors that help their offspring survive.	6–9 days	1.1C, 1.1D, 1.1E, 1.1F, 1.1G, 1.2B, 1.3A, 1.3B, 1.5A, 1.5B, 1.5C, 1.5G, 1.12A, 1.13B, 1.13C	2E, 2I, 3E, 3F, 4G

Concept	Recommended Number of Days	TEKS Alignment	ELPS Alignment
Application of Concepts (Lessons 29–31): End-of-Module Socratic Seminar, Assessment, and Debrief **Essential Question:** How do pond plants and pond animals survive in their environment? Plants and animals have body parts that function in ways that help the plants and animals survive in their environment.	3–4 days	1.1D, 1.1E, 1.1G, 1.3A, 1.3B, 1.3C, 1.5A, 1.5B, 1.5D, 1.5F, 1.5G, 1.11A, 1.12B, 1.12C, 1.13A, 1.13B, 1.13C	3E, 3F

Spotlight Lessons on Earth Materials

Lesson Sets	Recommended Number of Days	TEKS Alignment	ELPS Alignment
Lessons 1–3: Mata Ortiz Pottery **Phenomenon Question:** What is pottery made of? Pottery is made of clay that potters make wet and shape.	3–4 days	1.1A, 1.1B, 1.1C, 1.1D, 1.1E, 1.1F, 1.1G, 1.2C, 1.4B, 1.5D, 1.5E, 1.5G, 1.6A, 1.6B, 1.8A, 1.8B, 1.10A, 1.11A	3B, 4C, 4D
Lesson 4: Making Paint **Phenomenon Question:** How do the potters in Mata Ortiz make paint? People can use rocks, soil, and water to create objects.	1–2 days	1.1C, 1.1D, 1.1G, 1.3A, 1.3B, 1.5E, 1.5G, 1.6B, 1.10A, 1.11A	1A, 4F
Lessons 5–6: Heating and Cooling **Phenomenon Question:** What happens to objects and materials when the temperature changes? Heating and cooling can cause changes to objects and materials. Some changes caused by heating can be reversed and other changes cannot be reversed.	2 days	1.1A, 1.1B, 1.1C, 1.1D, 1.1E, 1.1F, 1.3A, 1.3B, 1.5A, 1.5B, 1.5E, 1.5G, 1.6B, 1.8A, 1.8B, 1.10A	4F
Lessons 7–8: Making Adobe Bricks **Phenomenon Question:** How are Mata Ortiz pottery and adobe bricks similar and different? Humans use natural resources and heat to make adobe bricks and Mata Ortiz pottery.	2–3 days	1.1D, 1.1E, 1.3A, 1.3B, 1.5A, 1.5B, 1.5C, 1.5D, 1.5E, 1.5G, 1.6B, 1.8A, 1.8B, 1.10A, 1.11A	4F

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	Module 2	Module 3
August	November	February
September	December	March
October	January	April

MODULE 1

Survival

CONCEPT 1

How do plants and animals use their body parts to survive in their environment? 10–15 days

Lessons 1–3: Life at a Pond

TEKS 1.13A, 1.1A, 1.1C, 1.1E, 1.1F, 1.1G, 1.2B, 1.3B, 1.5A, 1.5D **ELPS** 1D, 4C, 4D

Lessons	Pacing Options
Lesson 1: Observe the different parts of a pond environment.	**Day 1:** Launch through Discuss Pond Environments **Day 2:** Make Observations Through Reading through Land Use first Teacher Note in Launch.
Lesson 2: Observe and sort photographs to identify patterns in plant and animal body parts.	**Day 1:** Launch through Sort Plant Body Part Cards **Day 2:** Describe Similarities and Differences Between Body Parts through Land
Lesson 3: Begin a class model to show how plants and animals survive in a pond environment.	None

Lessons 4–6: Animal Body Parts

TEKS 1.12A, 1.13A, 1.13B, 1.1C, 1.1D, 1.1E, 1.1F, 1.1G, 1.2A, 1.2B, 1.3A, 1.3B, 1.5D, 1.5E, 1.5F **ELPS** 3H, 4G

Lessons	Pacing Options
Lesson 4: Use models, observe photographs, and view videos to describe the ways animals use their body parts.	**Day 1:** Launch through Prepare to Visit Animal Body Part Stations **Day 2:** Visit Animal Body Part Stations through Land Use inline Teacher Note in Launch. Think Aloud one station in Visit Animal Body Part Stations.
Lesson 5: Observe animal body parts to describe the relationship between the properties of animal body parts and their functions.	Think Aloud one station in Visit Protective Animal Body Part Stations. Use Differentiation note in Visit Protective Animal Body Part Stations.
Lesson 6: Explain that animal body parts work together to help the animals survive in a pond environment.	**Day 1:** Launch through Observe Porcupine Body Parts **Day 2:** Observe Crayfish Body Parts through Land Use an alternative instructional routine in Land.

Lesson 7: Food Chains

TEKS 1.12B, 1.12C, 1.1E, 1.1G, 1.3A, 1.5A, 1.5D **ELPS** 4D, 4G

Lessons	Pacing Options
Lesson 7: Identify and model how animals depend on other living things in their environment for food.	Use Differentiation note in Visit Feeding Relationship Station. Share pictures from feeding relationship stations while students record observations.

Lessons 8–9: Plant Body Parts

TEKS 1.11A, 1.12A, 1.1A, 1.1C, 1.1D, 1.1E, 1.1G, 1.3A, 1.3B, 1.5B, 1.5D, 1.5F **ELPS** 2E, 3D

Lessons	Pacing Options
Lesson 8: Use a model to observe roots, stems, and leaves and to identify their functions.	**Day 1:** Launch through Model Leaf Function **Day 2:** Model Root and Stem Functions through Land Preassemble plant models in soil or gravel in Model Leaf Function.
Lesson 9: Observe plant body parts to describe the relationship between the properties of plant body parts and their functions.	Use Differentiation note in Visit Protective Plant Body Part Stations.

Lesson 10: Body Parts

TEKS 1.13A, 1.1C, 1.1D, 1.1E, 1.1F, 1.2A, 1.2B, 1.3A, 1.5F **ELPS** 3C, 3D

Lessons	Pacing Options
Lesson 10: Describe how a yellowjacket uses its body parts to help it survive.	**Conceptual Checkpoint**

APPLICATION OF CONCEPTS

How can we help protect scientists at a pond? 6–7 days

Lesson 11: Preparation for Engineering Challenge (Mimicry)

TEKS 1.6A, 1.13A, 1.1C, 1.1D, 1.1E, 1.1F, 1.2B, 1.3A, 1.4A, 1.4B, 1.5E, 1.5F **ELPS** 3E

Lessons	Pacing Options
Lesson 11: Examine two human-made products that mimic how plants and animals use their body parts.	Use second Teacher Note in Describe Different Fasteners. Use an alternative collaborative conversation routine in Describe Different Fasteners.

Lessons 12–16: Engineering Challenge

TEKS 1.6A, 1.13A, 1.1A, 1.1B, 1.1C, 1.1D, 1.1E, 1.1G, 1.2D, 1.3A, 1.3B, 1.3C, 1.4B, 1.5A, 1.5E, 1.5F **ELPS** 1E, 3E, 5B

Lessons	Pacing Options
Lesson 12: Apply the engineering design process to create a covering that protects scientists at a pond.	**Day 1:** Launch through Ask About an Engineering Problem (individual drawings) **Day 2:** Ask About an Engineering Problem (group drawing) through Land Use Differentiation note in Ask About an Engineering Problem. Use second Teacher Note in Revisit Protective Body Parts. **Engineering Challenge**
Lesson 13: Apply the engineering design process to create a covering that protects scientists at a pond.	Use Differentiation note in Imagine a Protective Covering. Use Differentiation note in Plan a Protective Covering. **Engineering Challenge**
Lesson 14: Apply the engineering design process to create a covering that protects scientists at a pond.	Preassemble the printer and carbon paper in preparation for students to test in Create a Protective Covering. Use Differentiation note in Create a Protective Covering. **Engineering Challenge**
Lesson 15: Apply the engineering design process to create a covering that protects scientists at a pond.	Use second Differentiation note in Brainstorm Improvements. **Engineering Challenge**
Lesson 16: Apply the engineering design process to create a covering that protects scientists at a pond.	**Engineering Challenge**

CONCEPT 2

How do plants and animals respond to their environment? 6–7 days

Lessons 17–18: Animal Responses

TEKS 1.12B, 1.12C, 1.13A, 1.13B, 1.1A, 1.1D, 1.1E, 1.1F, 1.2B, 1.3A, 1.3B, 1.5A, 1.5B **ELPS** 2C

Lessons	Pacing Options
Lesson 17: Make observations from videos to gather evidence that animals sense information in their environment.	Use inline Teacher Note in Observe Animal Responses.
Lesson 18: Make observations firsthand or from media to explain that animals use their body parts to sense information.	Use an alternative collaborative conversation routine in Observe Sensing in Videos. Use inline Teacher Note in Explain Crayfish Senses.

Lesson 19: Animal Communication

TEKS 1.12B, 1.13A, 1.13B, 1.1G, 1.2A, 1.3A, 1.3B, 1.5A, 1.5B **ELPS** 4C

Lessons	Pacing Options
Lesson 19: Analyze information from a modeling activity, videos, and a text to conclude that animals communicate to help themselves and others survive.	Use an alternative collaborative conversation routine in Land.

Lessons 20–21: Plant Responses

TEKS 1.12B, 1.1B, 1.1D, 1.1E, 1.1F, 1.2B, 1.3A, 1.5A, 1.5B, 1.5G **ELPS** 3B, 3E, 3G

Lessons	Pacing Options
Lesson 20: Plan and conduct an investigation to test whether plants respond to light.	Use first sidebar Teacher Note in Plan and Conduct Light Investigations. Use Teacher Note in Make a Prediction. Use English Language Development note in Make a Prediction. Use an alternative collaborative conversation routine in Land.
Lesson 21: Analyze data and observe photographs to notice the pattern that some plants respond to light in their environment.	**Day 1:** Launch through Analyze Investigation Data **Day 2:** Analyze Plant Photographs through Land Use first Teacher Note in Analyze Plant Photographs. Use the second Teacher Note in Analyze Plant Photographs.

Lesson 22: Sense and Response

TEKS 1.11A, 1.12B, 1.12C, 1.1E, 1.1G, 1.3A, 1.5D **ELPS** 4G

Lessons	Pacing Options
Lesson 22: Use observations to determine how a pika can survive in a terrarium.	**Conceptual Checkpoint**

CONCEPT 3

How do parents help their offspring survive? 6–9 days

Lessons 23–24: Plants or Animals of the Same Kind

TEKS 1.13B, 1.13C, 1.1D, 1.1E, 1.2B, 1.5A **ELPS** 2E, 2I, 3F

Lessons	Pacing Options
Lesson 23: Observe similarities and differences between plants or animals of the same kind.	**Day 1:** Launch through Observe Similarities Between Plants or Animals of the Same Kind **Day 2:** Observe Differences Between Plants or Animals of the Same Kind though Land Use first Teacher Note in Observe Similarities Between Plants or Animals of the Same Kind.
Lesson 24: Use evidence to explain that young plants and animals look very much, but not exactly, like their parents.	Use an alternative collaborative conversation routine in Match a Plant Parent and Offspring. Use Differentiation note in Match a Plant Parent and Offspring.

Lesson 25: Animal Life Cycles

TEKS 1.13B, 1.13C, 1.1D, 1.1E, 1.1F, 1.1G, 1.2B, 1.3A, 1.5A **ELPS** 3F

Lessons	Pacing Options
Lesson 25: Arrange photographs to determine that animals' life cycles include birth, growth, adulthood, and reproduction.	Pretrim trout and moose life cycle cards to prepare for placement in Science Logbooks in Create Life Cycle Model.

Lessons 26–27: Parent and Offspring Behaviors

TEKS 1.12A, 1.13B, 1.13C, 1.1C, 1.1E, 1.1G, 1.2B, 1.3A, 1.3B, 1.5A, 1.5B, 1.5G **ELPS** 2E, 3E

Lessons	Pacing Options
Lesson 26: Use information from storyboards to explain that many, but not all, animal parents engage in behaviors that help their offspring survive.	**Day 1:** Launch through Analyze Storyboards **Day 2:** Sort Storyboards through Land Think Aloud robin storyboard in Analyze Storyboards.
Lesson 27: Describe animal parent and offspring behaviors that help the offspring survive.	**Day 1:** Launch through Analyze Storyboards **Day 2:** Act Out Parent and Offspring Behaviors through Land Use second sidebar Teacher Note in Analyze Storyboards.

Lesson 28: Parents and Offspring

TEKS 1.13B, 1.13C, 1.1E, 1.2B, 1.3A, 1.3B, 1.5A, 1.5C **ELPS** 4G

Lessons	Pacing Options
Lesson 28: Use observations of parents and offspring as evidence that offspring are very much, but not exactly, like their parents and will change as they get older.	Use an alternative collaborative conversation routine in Land. **Conceptual Checkpoint**

APPLICATION OF CONCEPTS

How do pond plants and pond animals survive in their environment?

3–4 days

Lessons 29–31: End-of-Module Socratic Seminar, Assessment, and Debrief

TEKS 1.11A, 1.12B, 1.12C, 1.13A, 1.13B, 1.13C, 1.1D, 1.1E, 1.1G, 1.3A, 1.3B, 1.3C, 1.5A, 1.5B, 1.5D, 1.5F, 1.5G **ELPS** 3E, 3F

Lessons	Pacing Options
Lesson 29: Explain the ways plants and animals survive in a pond environment. (Socratic Seminar)	Use Differentiation note in Launch. Use an alternative instructional routine in Launch. Use Teacher Note in Engage in Socratic Seminar.
Lesson 30: Explain the ways a koala survives in a forest environment. (End-of-Module Assessment)	**End-of-Module Assessment**
Lesson 31: Explain the ways plants and animals survive in their environment. (End-of-Module Debrief)	**End-of-Module Debrief**
Teacher Choice Day	Review, reteach, assess, or complete extension activities.

SPOTLIGHT LESSONS ON

Earth Materials

How do people in Mata Ortiz make pottery? 8–11 days

Lessons 1–3: Mata Ortiz Pottery

TEKS 1.6A, 1.6B, 1.8A, 1.8B, 1.10A, 1.11A, 1.1A, 1.1B, 1.1C, 1.1D, 1.1E, 1.1F, 1.1G, 1.2C, 1.4B, 1.5D, 1.5E, 1.5G **ELPS** 3B, 4C, 4D

Lessons	Pacing Options
Lesson 1: Begin an anchor model to explain how people make Mata Ortiz pottery.	Use second sidebar Teacher Note in Read About Mata Ortiz Pottery.
Lesson 2: Describe and record properties of soil parts and different kinds of soil.	**Day 1:** Launch through Investigate Soil Sample Parts (sifting of soil samples) **Day 2:** Investigate Soil Sample Parts (observe prepared plastic bags) through Land Use second Differentiation note in Investigate Soil Sample parts.
Lesson 3: Explore how to use clay and water to make pottery.	Use an alternative collaborative conversation routine in Make Pottery.

Lesson 4: Making Paint

TEKS 1.6B, 1.10A, 1.11A, 1.1C, 1.1D, 1.1G, 1.3A, 1.3B, 1.5E, 1.5G **ELPS** 1A, 4F

Lessons	Pacing Options
Lesson 4: Model how to make paint from rocks and water.	**Day 1:** Launch through Make Paint **Day 2:** Discuss Making Paint through Land Use Teacher Note in Discuss Making Paint.

Lessons 5–6: Heating and Cooling

TEKS 1.6B, 1.8A, 1.8B, 1.10A, 1.1A, 1.1B, 1.1C, 1.1D, 1.1E, 1.1F, 1.3A, 1.3B, 1.5A, 1.5B, 1.5E, 1.5G **ELPS** 4F

Lessons	Pacing Options
Lesson 5: Predict and explain the effects of heating on chocolate.	Use first Teacher Note in Launch.
Lesson 6: Identify patterns in the effects of heating and cooling on objects.	None

Lessons 7–8: Making Adobe Bricks

TEKS 1.6B, 1.8A, 1.8B, 1.10A, 1.11A, 1.1D, 1.1E, 1.3A, 1.3B, 1.5A, 1.5B, 1.5C, 1.5D, 1.5E, 1.5G **ELPS** 4F

Lessons	Pacing Options
Lesson 7: Explain the similarities and differences between Mata Ortiz pottery and adobe bricks. (End-of-Spotlight Assessment)	Use Differentiation note in Launch. Use an alternative instructional routine in Launch. **End-of-Spotlight Assessment**
Lesson 8: Explain the similarities and differences between Mata Ortiz pottery and adobe bricks. (End-of-Spotlight Assessment Debrief)	**End-of-Spotlight Assessment Debrief**
Teacher Choice Day	Review, reteach, assess, or complete extension activities.

Texas Essential Knowledge and Skills (TEKS)

Content Standards

1.6 Matter and its properties. The student knows that objects have physical properties that determine how they are described and classified. The student is expected to

- **1.6A** classify objects by observable physical properties, including, shape, color, and texture, and attributes such as larger and smaller and heavier and lighter; and
- **1.6B** explain and predict changes in materials caused by heating and cooling.

1.8 Force, motion, and energy. The student knows that energy is everywhere and can be observed in everyday life. The student is expected to

- **1.8A** investigate and describe applications of heat in everyday life such as cooking food or using a clothes dryer; and
- **1.8B** describe how some changes caused by heat may be reversed such as melting butter and other changes cannot be reversed such as cooking an egg or baking a cake.

1.10 Earth and space. The student knows that the natural world includes earth materials that can be observed in systems and processes. The student is expected to

- **1.10A** investigate and document the properties of particle size, shape, texture, and color and the components of different types of soils such as topsoil, clay, and sand.

1.11 Earth and space. The student knows that earth materials and products made from these materials are important to everyday life. The student is expected to

- **1.11A** identify and describe how plants, animals, and humans use rocks, soil, and water.

1.12 Organisms and environments. The student knows that the environment is composed of relationships between living organisms and nonliving components. The student is expected to

- **1.12A** classify living and nonliving things based upon whether they have basic needs and produce young;
- **1.12B** describe and record examples of interactions and dependence between living and nonliving components in terrariums or aquariums; and
- **1.12C** identify and illustrate how living organisms depend on each other through food chains.

1.13 Organisms and environments. The student knows that organisms resemble their parents and have structures and undergo processes that help them interact and survive within their environments. The student is expected to

- **1.13A** identify the external structures of different animals and compare how those structures help different animals live, move, and meet basic needs for survival;
- **1.13B** record observations of and describe basic life cycles of animals, including a bird, a mammal, and a fish; and
- **1.13C** compare ways that young animals resemble their parents.

Scientific and Engineering Practices

1.1 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

- **1.1A** ask questions and define problems based on observations or information from text, phenomena, models, or investigations;
- **1.1B** use scientific practices to plan and conduct simple descriptive investigations and use engineering practices to design solutions to problems;
- **1.1C** identify, describe, and demonstrate safe practices during classroom and field investigations as outlined in Texas Education Agency–approved safety standards;
- **1.1D** use tools, including hand lenses, goggles, heat-resistant gloves, trays, cups, bowls, beakers, sieves/sifters, tweezers, primary balance, notebooks, terrariums, aquariums, stream tables, soil samples (loam, sand, gravel, rocks, and clay), seeds, plants, windsock, pinwheel, student thermometer, demonstration thermometer, rain gauge, straws, ribbons, non-standard measuring items, flashlights, sandpaper, wax paper, items that are magnetic, non-magnetic items, a variety of magnets, hot plate, aluminum foil, Sun-Moon-Earth model, and plant and animal life cycle models to observe, measure, test, and compare;
- **1.1E** collect observations and measurements as evidence;
- **1.1F** record and organize data using pictures, numbers, words, symbols, and simple graphs; and
- **1.1G** develop and use models to represent phenomena, objects, and processes or design a prototype for a solution to a problem.

1.2 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

- **1.2A** identify basic advantages and limitations of models such as their size, properties, and materials;
- **1.2B** analyze data by identifying significant features and patterns;
- **1.2C** use mathematical concepts to compare two objects with common attributes; and
- **1.2D** evaluate a design or object using criteria to determine if it works as intended.

1.3 Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to

- **1.3A** develop explanations and propose solutions supported by data and models;
- **1.3B** communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and
- **1.3C** listen actively to others' explanations to identify important evidence and engage respectfully in scientific discussion.

1.4 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

- **1.4A** explain how science or an innovation can help others; and
- **1.4B** identify scientists and engineers such as Katherine Johnson, Sally Ride, and Ernest Just and explore what different scientists and engineers do.

Recurring Themes and Concepts

1.5 Recurring themes and concepts. The student uses recurring themes and concepts to make connections across disciplines. The student is expected to

- **1.5A** identify and use patterns to describe phenomena or design solutions;
- **1.5B** investigate and predict cause-and-effect relationships in science;
- **1.5C** describe the properties of objects in terms of relative size (scale) and relative quantity;
- **1.5D** examine the parts of a whole to define or model a system;
- **1.5E** identify forms of energy and properties of matter;
- **1.5F** describe the relationship between structure and function of objects, organisms, and systems; and
- **1.5G** describe how factors or conditions can cause objects, organisms, and systems to either change or stay the same.

English Language Proficiency Standards (ELPS)

- **1A** Use prior knowledge and experiences to understand meanings in English.
- **1D** Speak using learning strategies such as requesting assistance, employing non-verbal cues, and using synonyms and circumlocution (conveying ideas by defining or describing when exact English words are not known).
- **1E** Internalize new basic and academic language by using and reusing it in meaningful ways in speaking and writing activities that build concept and language attainment.
- **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.
- **2I** Demonstrate listening comprehension of increasingly complex spoken English by following directions, retelling or summarizing spoken messages, responding to questions and requests, collaborating with peers, and taking notes commensurate with content and grade-level needs.
- **3B** Expand and internalize initial English vocabulary by learning and using high-frequency English words necessary for identifying and describing people, places, and objects, by retelling simple stories and basic information represented or supported by pictures, and by learning and using routine language needed for classroom communication.
- **3C** Speak using a variety of grammatical structures, sentence lengths, sentence types, and connecting words with increasing accuracy and ease as more English is acquired.
- **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.

3G Express opinions, ideas, and feelings ranging from communicating single words and short phrases to participating in extended discussions on a variety of social and grade-appropriate academic topics.

3H Narrate, describe, and explain with increasing specificity and detail as more English is acquired.

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 pretaught 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.

4G Demonstrate comprehension of increasingly complex English by participating in shared reading, retelling or summarizing material, responding to questions, and taking notes commensurate with content area and grade level needs.

5B Write using newly acquired basic vocabulary and content-based grade-level vocabulary.