Subject Area: Science
Grade Level: 2

Unit 1 - Plant and Animal Survival

Dates: September - October	**Time Frame:** 8 weeks

Overview

Students are introduced to the unit's anchoring phenomenon of how one strawberry plant grew berries while another one wilted. In this unit, students explore what kinds of living things are present in an area, and why some plants and animals live in certain places, but others do not. Students discover what animals and plants need to survive and how sometimes that survival comes down to dependence on another plant or animal. Students explore the many different kinds of living things in an area as they examine case studies on how plants and animals survive in four different habitats: rainforest, desert, pond, and ocean. Then, using what they know about what plants need and biodiversity, students plan their own pond garden. Will students figure out what plants need to live to make their garden a success?

Essential Questions	**Enduring Understandings**
• What kinds of living things are there? • What do animals and plants need to survive? • How do plants and animals depend on each other? • Why do plants and animals live in some places but not others? • How do plants and animals survive in a rainforest? • How do plants and animals survive in a desert? • How do plants and animals survive in a pond? • How do plants and animals survive in the ocean?	• Plants and animals can look different from each other, behave differently from each other, and live in different areas, on land or in water. • Plants depend upon their environment to survive • A habitat is the place where plants and animals live and get what they need to survive. • There are many different types of habitats on Earth. • Scientists use measurements to make observations about habitats and to compare them.

Skill and Knowledge Objectives

SWBAT:

- Learn that there are many different kinds of plants and animals.

- Investigate to examine the requirements of sunlight and water for plants to live and grow.
- Learn that plants depend on animals for pollination or for moving their seeds around students develop a model that mimics the function of an animal in pollinating plants.
- Compare the diversity of life in different habitats by making observations from media.
- Compare the diversity of life in the rainforest by making observations from media.
- Compare the diversity of life in a desert by making observations in a game situation.
- Compare the diversity of life in a pond habitat by making observations during an activity in which they become a pond plant or animal.
- Compare the diversity of life in the ocean habitat by gathering data, synthesizing information, and reporting their findings

Assessments

Unit 1 Lesson 1
Unit 1 Lesson 2
Unit 1 Lesson 3
Unit 1 Lesson 4
Unit 1 Lesson 5
Unit 1 Lesson 6
Unit 1 Lesson 7
Unit 1 Lesson 8

Formative Assessments

Investigation

- The **discussion questions** in each section provide ample opportunities for formative assessment. Throughout the investigation, use student answers to the built-in discussion questions to gauge their three-dimensional learning. Typically, you can assess as a class, but you may wish to have individual students record their answers to certain questions. Use the +/- buttons to compare student answers to suggested answers. (Note that you shouldn't use suggested answers as a "script," but rather as a way to gauge student progress.) In the same way, use the Hint and Sample Answer buttons in the slideshows to drive the investigations forward and assess student understanding.
- **Interactive slides** provide opportunities for formative assessment before or after an investigation. These slides are often "drag and drop" or "graphing" slides that allow students to interact with the presentation and share what they have learned or hypothesize. You may wish to have individual students or groups of students come to the computer, interact with the slide, and then ask someone else if they agree or have a different hypothesis. These assessments can prompt rich classroom discussion and identify any holes in the learning.
- The **Wrap Up** at the end of the investigation should always be used for formative assessment. The questions are purposefully written to assess the three-dimensional objectives that have been taught throughout the investigation. Have students answer the questions in their notebooks, as exit tickets, or using your strategy of choice. You may wish to have students first brainstorm answers with a partner for some questions—reflecting on the investigation together—before writing their answers. If students struggle to answer the questions three-dimensionally, have them review their investigation prompts in their Interactive Student Notebooks and/or read the sections of Student Text connected to the investigation (as noted in the Suggested Reading buttons).

Student Journal

- As students complete the **investigation notes** in print or online, circulate the room, looking for evidence of a three-dimensional understanding of the lesson objectives and NGSS elements used during the investigation. Use the Answer Key (that has suggested answers and rubrics when applicable) to support the analysis of student answers. If students struggle with SEP elements, use the handouts in the SEP Toolkit buttons or the Science and Engineering Practices pages for more practice.
- As students complete the **reading section prompts** in their Interactive Student Notebooks, use the Answer Key to assess their answers and adjust instruction to address misconceptions or inaccuracies. If you notice students are struggling with the reading, allow them to use the text-to-speech feature online so they can follow along as the text is read, along with the Main Ideas feature to highlight the key concepts in the text (you can turn off these features for students who don't need them). Then have students retry the section prompts or select a few questions from the Question Bank to reassess their progress. (Note that the Question Bank includes the Notebook and Lesson Game questions so that you can easily give them as an assessment or modify them.)

Check for Understanding

Students can self-assess by using the Check for Understanding in their account. You should gather qualitative data by asking questions as students use the tutorials or project the tutorials and have students share their thinking.

Vocabulary Cards

Using the vocabulary flip cards in their subscriptions, you can assess students' grasp of key vocabulary terms in the lesson. You can have students self-assess by testing themselves or each other, or you can use the flip cards as part of a whole-class review game. For terms that students are struggling with, use one of the Vocabulary Development pages found in the Literacy Support info bar at the top of the Table of Contents.

Lesson Games

You can assign students the Lesson Game. In your gradebook, quantitative results are provided on both an individual student level and a whole-class level. Use the data to adjust your final activities and review of the lesson. For questions missed that use key vocabulary terms, use the Vocabulary Development pages. Use the Science and Engineering Practices or Crosscutting Concepts pages found in Other Resources for questions missed with SEP or CCC elements.

Summative Assessments

Lesson Assessments

Use the TCI Test for each lesson to assess the lesson objectives summatively. But also use these three-dimensional tests to formatively assess student progress toward the unit's targeted performance expectation(s) that will be assessed in the unit Performance Assessment. Use the quantitative data provided in your Gradebook to evaluate the progress of individual students or "view trends" to see whole-class data to know what to reteach.

Unit Progress (KWL Chart and Developing a Model to Explain a Phenomenon)

Finally, after the lesson, make sure students have added new three-dimensional knowledge to their unit KWL charts, noting topics they have a firm grasp on and others that you may need to return to or expand upon. Students should have been connecting their learning throughout the lesson's investigations to the unit's anchoring phenomenon, but give them time to reflect with a group about how their three-dimensional learning is helping them make sense of the anchoring phenomenon, revise their models, and ask questions of what else they need to know to more fully make sense of the anchoring phenomenon.

Resources

- Video Library
- Games Library
- My Notes
- Glossary
- Biographies
- Career Profiles
- Pacing Guide
- Assessments

Standards

Next Generation Science Standards
Performance Expectation

2-LS2-1 Plan and investigate to determine if plants need sunlight and water to grow.
2-LS4-1 Make observations of plants and animals to compare the diversity of life in different habitats.
2-LS2-2 Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants. **K-2-ETS1-2** Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
Science and Engineering Practices

Engaging in Argument from Evidence

- Distinguish between explanations that account for all gathered evidence and those that do not.

Analyzing and Interpreting Data

- Compare predictions (based on prior experiences) to what occurred (observable events).
- Use and share pictures, drawings, and/or writings of observations.
- Record information (observations, thoughts, and ideas).
- Analyze data from tests of an object or tool to determine if it works as intended.

Planning and Carrying Out Investigations

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.
- Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons.

Asking Questions and Defining Problems

- Ask and/or identify questions that can be answered by an investigation.
- Define a simple problem that can be solved through the development of a new or

improved object or tool.
- Ask questions based on observations to find more information about the natural and/or designed world(s).

Using Mathematics and Computational Thinking
- Describe, measure, and/or compare quantitative attributes of different objects and display the data using simple graphs.
- Use counting and numbers to identify and describe patterns in the natural and designed world(s).

Obtaining, Evaluating, and Communicating Information
- Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).
- Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question and/or supporting a scientific claim.

Constructing Explanations and Designing Solutions
- Generate and/or compare multiple solutions to a problem.
- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.

Developing and Using Models
- Develop a simple model based on evidence to represent a proposed object or tool.
- Distinguish between a model and the actual object, process, and/or events the model represents.
- Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s).

Crosscutting Concepts

Systems and System Models
- Objects and organisms can be described in terms of their parts.
- Systems in the natural and designed world have parts that work together.

Cause and Effect
- Events have causes that generate observable patterns.

Scale, Proportion, and Quantity
- Relative scales allow objects and events to be compared and described (e.g. bigger and smaller; hotter and colder; faster and slower).

Patterns
- Patterns in the natural and human designed world can be observed, used to describe

phenomena, and used as evidence.

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s).

Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems

- Plants depend on water and light to grow.
- Plants depend on animals for pollination or to move their seeds around.

LS4.D: Biodiversity and Humans

- There are many different kinds of living things in any area, and they exist in different places on land and in water.

ETS1.A: Defining and Delimiting Engineering Problems

- Before beginning to design a solution, it is important to clearly understand the problem.
- Asking questions, making observations, and gathering information are helpful in thinking about problems.
- A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions.

ETS1.C: Optimizing the Design Solution

- Because there is always more than one possible solution to a problem, it is useful to compare and test designs.

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.

Connections to Nature of Science

Science Knowledge Is Based on Empirical Evidence

- Scientists look for patterns and order when making observations about the world.

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Every human-made product is designed by applying some knowledge of the natural world and is built by using natural materials.

Complete NGSS Correlations

ELA Standards

Writing

Research to Build and Present Knowledge

- CC.2.W.8 Recall information from experiences or gather information from provided sources to answer a question.
- CC.2.W.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).

Speaking and Listening

Presentation of Knowledge and Ideas

- CC.2.SL.6 Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See grade 2 Language standards 1 and 3 on page 26 for specific expectations.)

Comprehension and Collaboration

- CC.2.SL.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

Math Standards and 9.2 21st Century Career Readiness Standards

Math

MP.Reason abstractly and quantitatively

- CC.K-12.MP.2.Mathematically proficient students make sense of the quantities and their relationships in problem situations. Students bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

MP.Model with mathematics

- CC.K-12.MP.4.Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those

relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

MD.Represent and interpret data

- CC.2.MD.10.Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

Information for Families

Set expectations at the start of the school year by sharing information about the NGSS standards and TCI's programs.

- **Lower Elementary (K-2)**
- **Upper Elementary (3-5)**

9.1.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job.

Unit 1- Plant and Animal Survival

Lesson 1: What Kinds of Living Things Are There? Lesson 1 Guide **Materials**: **What You Need** • Magnifying glass **Print** • Extension Handout • Interactive Student Notebook • Notebook Answer Key • Science Journal • Spanish: Interactive Student	**Lesson 2**: What Do Animals and Plants Need to Survive? Lesson 2 Guide **Materials**: **What You Need** • Apron, vinyl • Bag, paper • Bottle, spray • Cup, 9 oz • Gloves, safety • Marker, assorted colors • Seeds, Marigold • Soil • Water, tap **Print** • Handout:	**Lesson 3**: How Do Plants and Animals Depend on Each Other? Lesson 3 Guide **Materials**: • Bin, plastic, shoe box size • Clay, modeling, 4 colors • Cotton ball • Craft stick • Goggles, safety • Marble, 5/8" • Paper clip, large • Petri dish • Pipe cleaner • Sand, medium **(SDS)** • Spoon, plastic	**Lesson 4**: Why Do Plants and Animals Live in Some Places and Not Others? Lesson 4 Guide **Materials**: • Bottle, spray • Fan, electric • Hair dryer • Rain hat • Sun hat • Wool hat **Print** • Reading Notes Answer Key • Science Journal • Spanish: Science Journal • Super	**Lesson 5**: How Do Plants and Animals Survive in a Rainforest? Lesson 5 Guide **Materials**: • Glue **(SDS)** • Index card • Scissors • Tape, transparent • Yarn **Print** • Audio Transcripts • Extension Handout • Handout: Animals of the Rainforest • Handout: Plants of the

Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. **Investigation** You will observe and categorize the living things in an area. Then you will make a graph of your observations and share your results with the class. **Making Sense of Phenomena** You will show what you know by listing the different kinds of living things you see in a picture. **Video Lesson Extension**: Super Simple Science- Lots of plants and animals live along the Amazon River. How can you show the things that live there?	Our Marigold Experiment • Interactive Student Notebook • Notebook Answer Key • Science Journal • Spanish Handout: Our Marigold Experiment • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Observing Phenomena** Have you ever seen a wilted plant? What do you think causes this? **Investigation** Students grow plants with and without water or light to determine whether plants need water and light to grow, and then analyze their results. **Making Sense of Phenomena** Let's revisit the phenomenon: *This plant's wilted leaves lifted.* Think about: Why might a plant's	• Sticky notes, 3" x 3" • Stir Stick • Straw • Swab, cotton • Tape, transparent **Print** • Extension Handout • Reading Notes Answer Key • Science Journal • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities**: **Observing Phenomena** What do you know about bees? What do they do? **Investigation** Students design a tool for pollinating a flower by hand, build the pollinator, and test it on a model of a flower. **Making Sense of Phenomena** Let's revisit the phenomenon: *A beetle comes to a flower to eat nectar. Then, it leaves with something stuck to its body.* Think about: What is stuck to the beetle's body? Where might the beetle crawl to next?	Simple Science • Teacher's Guide **Activities**: **Observing Phenomena:** Can you think of any birds that cannot fly or can only fly very short distances? **Investigation:** Students visit three habitats, describe them, and identify plants and animals that belong and do not belong in each place. **Making Sense of Phenomena:** Let's revisit the phenomenon: Penguins move around in ways other than flying. • Think about: • How do penguins move from place to place? • Is this habitat cold or hot? Wet or dry? **Video Lesson Extension:** Super Simple Science- Pandas live in bamboo forests. The forests have what the pandas need to live. How can you show where a panda lives?	Rainforest • Reading Notes Answer Key • Science Journal • Spanish Handout: Animals of the Rainforest • Spanish Handout: Plants of the Rainforest • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities:** **Observing Phenomena:** Why do you think birds are able to get food where many other animals are not able to? **Investigation:** Students visit a rainforest habitat and identify the plants and animals that they see and hear. **Making Sense of Phenomena:** Let's revisit the phenomenon: *Toucans can reach food high in the treetops.* Think about: • Where do toucans live in the rainforest? • How does

	leaves wilt? What did this plant need? **Video Lesson Extension**: Super Simple Science- Bees store honey in honeycombs. They eat the honey to stay warm in winter. How do the honeycombs hold honey?	**Video Lesson Extension:** Super SImple Science- For protection, a crab has a shell. Nature can give ideas to engineers. What can you observe in nature to help you design a bicycle helmet?		they get food? **Video Lesson Extension:** Super Simple Science- Ants in a rainforest meet their needs by working together. How do insects meet their needs where you live?
Lesson 6: How Do Plants and Animals Survive in a Desert? Lesson 6 Guide **Materials**: Print • Extension Handout • Handouts: Animals of the Desert • Handouts: Desert Challenge! Answer Key and Double Challenge! Answer Key • Handouts: Plants of the Desert • Reading Notes Answer Key • Science Journal • Spanish Handouts: Animals of the Desert • Spanish Handouts: Desert Challenge! Answer Key and Double Challenge! Answer Key • Spanish	**Lesson 7**: How Do Plants and Animals Survive in a Pond? Lesson 7 Guide **Materials**: • String **Print** • Picture Cards A–L • Reading Notes Answer Key • Science Journal • Spanish: Picture Cards A–L • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities Observing Phenomena**:Why do you think desert animals drink less water compared to other animals? **Investigation:**Students learn how the needs of pond plants and animals are met by other pond plants and animals by	**Lesson 8**: How Do Plants and Animals Survive in the Ocean? Lesson 8 Guide **Materials**: • Picture Cards A–H • Picture Cards I–J • Reading Notes Answer Key • Science Journal • Spanish: Picture Cards A–H • Spanish: Picture Cards I–J • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities Observing Phenomena:** Can you think of animals that blend in to hide? What are some examples?		

• Handouts: Plants of the Desert • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities Observing Phenomena:** Why do you think desert animals drink less water compared to other animals? **Investigation:**Students play a game to learn how plants and animals survive in the desert. **Making Sense of Phenomena:** Let's revisit the phenomenon: *A desert tortoise rarely drinks water.* Think about: • Is its habitat wet or dry? • How does the tortoise get its water? **Video Lesson Extension:** Super Simple Science- A kangaroo rat does not need to find water. It gets water from the food it eats. What are some plant parts that contain water?	playing a game. **Making Sense of Phenomena:** Let's revisit the phenomenon: *A desert tortoise rarely drinks water.* Think about: • Is its habitat wet or dry? • How does the tortoise get its water? **Video Lesson Extension:** Super Simple Science- The legs of a water strider do not break through water. How can you make your own water strider?	**Investigation:**Students gather information about an ocean animal, put the data together as a group, and present a report to the class. **Making Sense of Phenomena:** Let's revisit the phenomenon: *This octopus changes color and uses objects around it to hide.* Think about: • Where in the ocean do you think this octopus lives? • Why do you think the octopus needs to hide? **Video Lesson Extension:** Super Simple Science- An anglerfish has a body part with a light that helps it see in the dark ocean. How can you build a light like a body part that will help you see in a dark place?		
Differentiate Instruction by:				

ELA/ELD Support for IEPs, at-risk, MLL (ELL/ESL), Enriched G&T

TCI's commitment to universal access—and our fundamental belief that all children can learn—is shown in these support features.

1. **ELA/ELD Connections**

   Support students who need additional guidance and structure with reading, writing, or vocabulary development with ELA/ELD Connections. Make these toolkits available to your students as an independent tutorial, for class instruction, or for use with peer tutoring. Learn more about **Strategies for Integrating Language Arts.**

   - **ELA/ELD Connections: Reading Skills**
   - **ELA/ELD Connections: Writing Skills**
   - **ELA/ELD Connections: Speaking and Listening Toolkit**
   - **ELA/ELD Connections: Vocabulary Skills**

   Suggestions for how to use these pages are provided at point-of-use throughout the Lesson Guides.

2. **Differentiating Instruction**

   Lesson Guides include step-by-step suggestions for meeting the needs of English Learners, students below grade level in reading and writing, special education (plus G&T) students, and advanced learners within the context of whole class instruction and with minimal modifications needed on the teacher's part. For more support, see **Best Practices for Differentiating Instruction.**

3. **Reading Support**

   The Student Text and Interactive Student Notebook has built-in support for emerging to advanced readers. Learn more about **Literacy in Science.**

   - **Reading Support Buttons** allow students to change the text reading level, highlight main ideas, or use text-to-speech audio.
   - **Considerate Text** has a single-column layout, section titles, and subheads that divide content into meaningful and manageable chunks, carefully structured paragraphs with topic sentences and supporting details, images that are carefully
   - chosen to support the text, and captions that incorporate main ideas. Learn more about **Considerate Text features.**
   - **Vocabulary** is introduced in the Introduction and then defined in-line to support reading fluency. Glossary assists students with essential terms.
   - **Lesson Summaries** succinctly review main concepts.
   - **The graphically organized notebook** helps students record and remember what they read.

   Informational and literary texts are balanced with at least 50% of reading time devoted to expository texts.

4. **Graphic Organizer Toolkit**

   Use the graphic organizers in this **toolkit** when students need support processing information. These organizers are flexible visual aids that help students map concepts, organize thoughts, and identify relationships between abstract ideas.

   This toolkit includes:

   - Venn diagrams
   - Sequence chains
   - Prediction/inference diagrams
   - Decision trees
   - Webs, timelines, and more

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Subject Area: Science

Grade Level: 2

Unit 2: Materials and Their Uses

Dates: January- February	**Time Frame:** 7-8 weeks

Overview

Students are introduced to the unit's anchoring phenomenon of how sometimes ponds are filled with water, but other times, they appear icy. In this unit, students find out what everything is made of by classifying materials by their properties and comparing the differences between liquids and solids. Students understand how materials are used for different purposes, how materials are reused, what happens when materials are mixed, and what happens when materials are heated or cooled. Using what they know about materials, can students determine which materials to use in different weather, specifically to stay dry?

Essential Questions	**Enduring Understandings**
• What is everything made of? • How are liquids and solids different? • How are materials used for different purposes? • How can materials be reused? • What happens when materials are mixed? • What happens when materials are heated or cooled?	• Understand that objects are made of different materials. • Learn about properties of liquids and solids. • People use materials that have properties suited to different purposes. • Learn that objects can be broken apart into smaller pieces, put together to make larger pieces, or change shapes. • Learn about mixtures and what can and cannot be separated. • Observe changes caused by materials being heated and cooled.

Skill and Knowledge Objectives

SWBAT:

- **Find out what everything is made of by classifying materials by their properties and comparing the differences between liquids and solids.**
- **Understand how materials are used for different purposes.**
- **Understand how materials are reused.**
- **Find out what happens when materials are mixed**
- **Understand what happens when materials are heated or cooled.**
- **Use what they know about materials and determine which materials to use in different weather, specifically to stay dry.**

Assessments

[Unit 2 Lesson 1]
[Unit 2 Lesson 2]
[Unit 2 Lesson 3]
[Unit 2 Lesson 4]
[Unit 2 Lesson 5]
[Unit 2 Lesson 6]

Formative Assessments

Investigation

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Using the vocabulary flip cards in their subscriptions, you can assess students' grasp of key vocabulary terms in the lesson. You can have students self-assess by testing themselves or each other, or you can use the flip cards as part of a whole-class review game. For terms that students are struggling with, use one of the Vocabulary Development pages found in the Literacy Support info bar at the top of the Table of Contents.

Lesson Games

You can assign students the Lesson Game. In your gradebook, quantitative results are provided on both an individual student level and a whole-class level. Use the data to adjust your final activities and review of the lesson. For questions missed that use key vocabulary terms, use the Vocabulary Development pages. Use the Science and Engineering Practices or Crosscutting Concepts pages found in Other Resources for questions missed with SEP or CCC elements.

Summative Assessments

Lesson Assessments

Use the TCI Test for each lesson to assess the lesson objectives summatively. But also use these three-dimensional tests to formatively assess student progress toward the unit's targeted performance expectation(s) that will be assessed in the unit Performance Assessment. Use the quantitative data provided in your Gradebook to evaluate the progress of individual students or "view trends" to see whole-class data to know what to reteach.

Unit Progress (KWL Chart and Developing a Model to Explain a Phenomenon)

Finally, after the lesson, make sure students have added new three-dimensional knowledge to their unit KWL charts, noting topics they have a firm grasp on and others that you may need to return to or expand upon. Students should have been connecting their learning throughout the lesson's investigations to the unit's anchoring phenomenon, but give them time to reflect with a group about how their three-dimensional learning is helping them make sense of the anchoring phenomenon, revise their models, and ask questions of what else they need to know to more fully make sense of the anchoring phenomenon.

Resources

- Lesson Overview
- Materials
- Reading
- Video Lesson
- Lesson Games

- Vocabulary Cards
- Assessments
- Video Library
- Games Library
- My Notes
- Glossary
- Biographies
- Career Profiles
- Pacing Guide

Standards

Next Generation Science Standards

Performance Expectation

2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

2-PS1-2 Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

2-PS1-4 Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

2-PS1-3 Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.

Science and Engineering Practices

Planning and Carrying Out Investigations

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.
- Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons.

Constructing Explanations and Designing Solutions

- Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.
- Make observations (firsthand or from media) to construct an evidence-based account of natural phenomena.

Using Mathematics and Computational Thinking

- Use quantitative data to compare two alternative solutions to a problem.
- Describe, measure, and/or compare quantitative attributes of different objects and display the data using simple graphs.

Analyzing and Interpreting Data

- Analyze data from tests of an object or tool to determine if it works as intended.
- Record information (observations, thoughts, and ideas).

Developing and Using Models

- Develop a simple model based on evidence to represent a proposed object or tool.

Asking Questions and Defining Problems

- Ask questions based on observations to find more information about the natural and/or designed world(s).
- Define a simple problem that can be solved through the development of a new or improved object or tool.

Engaging in Argument from Evidence

- Construct an argument with evidence to support a claim.
- Identify arguments that are supported by evidence.

Obtaining, Evaluating, and Communicating Information

- Communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about scientific ideas, practices, and/or design ideas.

Crosscutting Concepts

Patterns

- Patterns in the natural and human-designed world can be observed, used to describe phenomena, and used as evidence.

Cause and Effect

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.
- Events have causes that generate observable patterns.

Stability and Change

- Some things stay the same while other things change.

Energy and Matter

- Objects may break into smaller pieces, be put together into larger pieces, or change shapes.

Scale, Proportion, and Quantity

- Standard units are used to measure length.
- Relative scales allow objects and events to be compared and described (e.g. bigger and smaller; hotter and colder; faster and slower).

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties.
- Different properties are suited to different purposes.
- A great variety of objects can be built up from a small set of pieces.

ETS1.A: Defining and Delimiting Engineering Problems

- Before beginning to design a solution, it is important to clearly understand the problem.
- Asking questions, making observations, and gathering information are helpful in thinking about problems.
- A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions.

ETS1.C: Optimizing the Design Solution

- Because there is always more than one possible solution to a problem, it is useful to compare and test designs.

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.

PS1.B: Chemical Reactions

- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not.

Connections to Nature of Science

Science Knowledge is Based on Empirical Evidence

- Scientists look for patterns and order when making observations about the world.

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

- Science searches for cause and effect relationships to explain natural events.

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Every human-made product is designed by applying some knowledge of the natural world and is built by using natural materials.

Complete NGSS Correlations

ELA Standards

Reading

Integration of Knowledge and Ideas

- CC.2.R.I.8 Describe how reasons support specific points the author makes in a text.

Key Ideas and Details

- CC.2.R.I.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate an understanding of key details in a text.

Writing

Research to Build and Present Knowledge

- CC.2.W.8 Recall information from experiences or gather information from provided sources to answer a question.

Speaking and Listening

Comprehension and Collaboration

- CC.2.SL.3 Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.
- CC.2.SL.1 Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
- CC.2.SL.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

Presentation of Knowledge and Ideas

- CC.2.SL.4 Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.

Math Standards and 9.2 Career Readiness

Math

MD. Represent and interpret data

- CC.2.MD.10.Draw a picture graph and a bar graph (with a single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

9.1.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job.

Unit Name/Theme

Lesson 1: What Is Everything Made Of?	**Lesson 2**: How Are Liquids And Solids Different?	**Lesson 3**: How Are Materials Used For Different Purposes?	**Lesson 4**: How Can Materials Be Reused?	**Lesson 5**: What Happens When Materials Are Mixed?
Lesson 1 Guide **Materials**: • Aluminum foil, roll • Bin, plastic, shoe box size • Cardboard • Clay, modeling, 4 colors • Cloth, cotton • Cube, wood, 1" • Glue **(SDS)** • Paper, 8 ½" x 14" • Paper, construction, assorted colors • Paper, construction, black • Pipe cleaner • Sandpaper • Sponge • Wax paper **Print** • Reading Notes Answer Key • Science Journal • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities**: **Investigation** Students observe and explain a series of demonstrations. Then they describe	Lesson 2 Guide **Materials**: • Bin, plastic, shoe box size • Container, deli, 16 oz • Cup, paper, 2 oz • Jar, plastic, 12 oz • Jar, plastic, 16oz • Water **Print** • Extension Handout • Reading Notes Answer Key • Science Journal • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities**: **Investigation** Students examine various measuring tools. Then they measure how much water three different containers can hold and graph and analyze the results. **Observing Phenomena** Students watch ice melt in a container and observe how it	Lesson 3 Guide **Materials**: • Aluminum foil, roll • Bottle, spray • Cardboard • Clay, modeling, 4 colors • Cloth, cotton • Craft stick • Cube, wood, 1" • Glue **(SDS)** • Newspaper • Paper, construction, blue • Pipe cleaner • Scissors • Tape, transparent • Tube, cardboard • Water • Wax paper **Print** • Extension Handout • Reading Notes Answer Key • Science Journal • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities**: **Investigation** Students are presented with a	Lesson 4 Guide **Materials**: • Clay, modeling, 4 colors • Craft stick • Cube, wood, 1" • Glue **(SDS)** • Markers, assorted colors • Paper, construction, assorted colors • Paper, white • Pipe cleaner • Scissors • Stir Stick **Print** • Handout: Tangram Puzzle Pieces • Picture Cards A-F • Reading Notes Answer Key • Science Journal • Spanish Handout: Tangram Puzzle Pieces • Spanish: Picture Cards A-F • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities**:	Lesson 5 Guide **Materials**: • Bead • Bin, plastic, shoe box size • Bowl, paper • Bowl, plastic, 6 qt • Cube, wood, 1" • Cup, paper, 2 oz • Flour • Marble, 5/8" • Newspaper • Oil, vegetable • Pepper • Salt, non-iodized • Spoon, plastic • Sticky notes, 3" x 3" • Water, tap **Print** • Extension Handout • Extension Handout • Extension Handout • Reading Notes Answer Key • Science Journal • Spanish: Science Journal • Super Simple Science • Teacher's Guide

and classify materials by their properties. **Observing Phenomena** Students describe the properties of a slimy substance they have played with, such as how it looks, feels, and behaves. **Making Sense of Phenomena** As a class, discuss how students can use what they have learned to explain the Lesson Phenomenon: *This green stuff is slimy and gooey.* • What properties does this green stuff have? • How do those properties compare to the other materials you have studied? **Video Lesson Extension:** Super Simple Science- Natural rubber comes from the rubber tree. Scientists make rubber with other materials. What are some objects you see that are made of	takes the shape of the container. Then they observe what happens when water in a container freezes. **Making Sense of Phenomena** As a class, discuss how students can use what they have learned to explain the Lesson Phenomenon: *Ice cannot fit in the glass. But it can fit after it melts.* • Ice is a solid. How does it become a liquid? • What shape does the water take as it melts? **Video Lesson Extension:** Super Simple Science- A liquid takes the shape of its container, but a solid keeps its shape. Does oobleck act like a liquid or a solid?	design challenge. Then they design a bridge using various materials and test its strength when wet and dry. **Observing Phenomena** Students analyze a picture of a bridge. They discuss bridges around them and consider what they are made of. **Making Sense of Phenomena** As a class, discuss how students can use what they have learned to explain the Lesson Phenomenon: *Bridges can be made from many different materials.* • What material is each bridge made from? They are made from stone, rope and wood, and metal. • Why are the bridges made from different materials? Some bridges need to be stronger because of who or what is crossing them. **Video Lesson**	**Investigation** Students observe and explain examples of how materials are reused. Then they use materials to copy a design and reuse them to create their own design. **Observing Phenomena** Students explore how materials such as toy blocks can be rearranged to form different shapes. **Making Sense of Phenomena** As a class, discuss how students can use what they have learned to explain the Lesson Phenomenon: *Toy blocks can be rearranged to make many different shapes.* • Is the girl reusing materials? • Can someone else reuse the blocks after the girl is done building? **Video Lesson Extension:** Super Simple Science- Thousands of toy bricks were put together to build an animal figure.	**Activities**: **Investigation** Students describe the properties of several materials. Then they mix materials, make observations, and note patterns. **Observing Phenomena** Students describe the properties of several materials. Then they mix materials, make observations, and note patterns. **Making Sense of Phenomena** As a class, discuss how students can use what they have learned to explain the Lesson Phenomenon: *Adding food coloring to icing makes a colorful treat!* • What two materials are being mixed? • What happens when these materials are mixed? **Video Lesson Extension:** Super Simple Science- Some materials are mixtures. Is black ink made with a mixture of different colors?

rubber?		**Extension:** Super Simple Science- Many spiders build webs to catch insects to eat. How can you build a web to catch something?	What animal figure can you build using other objects?	
Lesson 6: What Happens When Materials Are Heated or Cooled? Lesson 6 Guide **Materials**: • Bag, plastic sandwich size • Bananas • Cup, paper, 2 oz • Lettuce or other types of greens • Milk **Print** • Reading Notes Answer Key • Science Journal • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities:** **Investigation** Students compare foods that have been cooled to foods that have not and analyze the changes that occurred.				

Observing Phenomena Students explore the effects of heat on objects as they describe an ice cube melting. **Making Sense of Phenomena** As a class, discuss how students can use what they have learned to explain the Lesson Phenomenon: *Ice cream melts on a hot day.* • Is the ice cream being heated or cooled? The ice cream is being heated because it is sitting out on a hot day. • What happens to the ice cream? The ice cream melts. It can freeze again if it gets cold in the freezer or on a cold day. **Video Lesson Extension:** Super Simple Science- The properties of cocoa beans are changed to make chocolate.				

How can the properties of chocolate be changed?				

Differentiate Instruction by:

ELA/ELD Support for IEPs, at-risk, MLL (ELL/ESL), Enriched G&T

TCI's commitment to universal access—and our fundamental belief that all children can learn—is shown in these support features.

1. **ELA/ELD Connections**

   Support students who need additional guidance and structure with reading, writing, or vocabulary development with ELA/ELD Connections. Make these toolkits available to your students as an independent tutorial, for class instruction, or for use with peer tutoring. Learn more about **Strategies for Integrating Language Arts.**

   - **ELA/ELD Connections: Reading Skills**
   - **ELA/ELD Connections: Writing Skills**
   - **ELA/ELD Connections: Speaking and Listening Toolkit**
   - **ELA/ELD Connections: Vocabulary Skills**

   Suggestions for how to use these pages are provided at point-of-use throughout the Lesson Guides.

2. **Differentiating Instruction**

   Lesson Guides include step-by-step suggestions for meeting the needs of English Learners, students below grade level in reading and writing, special education (plus G&T) students, and advanced learners within the context of whole class instruction and with minimal modifications needed on the teacher's part. For more support, see **Best Practices for Differentiating Instruction.**

3. **Reading Support**

   The Student Text and Interactive Student Notebook has built-in support for emerging to advanced readers. Learn more about **Literacy in Science.**

   - **Reading Support Buttons** allow students to change the text reading level, highlight main ideas, or use text-to-speech audio.
   - **Considerate Text** has a single-column layout, section titles, and subheads that divide content into meaningful and manageable chunks, carefully structured paragraphs with topic sentences and supporting details, images that are carefully
   - chosen to support the text, and captions that incorporate main ideas. Learn more about **Considerate Text features.**
   - **Vocabulary** is introduced in the Introduction and then defined in-line to support reading fluency. A glossary assists students with essential terms.
   - **Lesson Summaries** succinctly review main concepts.
   - **The graphically organized notebook** helps students record and remember what they read.

   Informational and literary texts are balanced with at least 50% of reading time devoted to expository texts.

4. **Graphic Organizer Toolkit**

   Use the graphic organizers in this **toolkit** when students need support processing information. These organizers are flexible visual aids that help students map concepts, organize thoughts, and identify relationships between abstract ideas.

   This toolkit includes:

   - Venn diagrams

- Sequence chains
- Prediction/inference diagrams
- Decision trees
- Webs, timelines, and more

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Subject Area: Science
Grade Level: 2

Unit 3- Earth's Surface

Dates: May - June	**Time Frame:** 7-8 weeks

Overview

Students are introduced to the unit's anchoring phenomenon of how Earth's land takes on many different shapes. In this unit, students discover the features of the Earth's surface, including its many different forms of land and water. Students understand how maps are used to represent land and water. Students go on a video tour of some national parks in America to examine rapid and slow changes including how natural events such as earthquakes, volcanoes, and erosion from wind and water shape Earth's surface. Students find out how problems caused by wind and water are solved. Using what they know, can students develop a design to protect a shoreline from erosion?

Essential Questions	**Enduring Understandings**
• What is on Earth's surface? • What kind of land and water are	• Learn that water and landforms are parts of Earth.

found on earth? • How do maps show land and water? • How does Earth's surface change? • How do earthquakes and volcanoes change the land? • How do wind and water change the land? • How can problems caused by wind and water be solved?	• Identify land and water patterns on a globe. • Compare models to identify land and water on Earth. • Develop a model of Earth's land and water areas. • Obtain information from models to explain patterns in the natural world. • Explain that water is found in various places on Earth in solid or liquid form. • Observe images of the different kinds of land and water found on Earth's surface. • Observe and identify water found in the ocean, rivers, lakes, and ponds that exists in solid and liquid form. • Identify the land or water form in the image and explain their choices to a partner, listening actively to arguments and agreeing or disagreeing based on evidence. • Practice observing a map to see where things are located. • Make observations firsthand to describe rocks, sand, and soil. • Use information from images and audio transcripts to provide evidence that Earth events can happen quickly or slowly. • Observe photos and look for evidence that land is changing to construct an explanation. • Observe the effects of the shape of land changing from wind and water. • Observe the effects of a landslide on a road.

Skill and Knowledge Objectives

SWBAT:

- **Discover the features of the Earth's surface, including its many different forms of land and water.**
- **Understand how maps are used to represent land and water.**
- **Go on a video tour of some national parks in America to examine rapid and slow changes including how natural events such as earthquakes, volcanoes, and erosion from wind and water shape Earth's surface.**
- **Find out how problems that are caused by wind and water are solved.**
- **Use what they know to develop a design to protect a shoreline from erosion**

Assessments

Unit 3 Lesson 1
Unit 3 Lesson 2
Unit 3 Lesson 3
Unit 3 Lesson 4
Unit 3 Lesson 5
Unit 3 Lesson 6

Unit 3 Lesson 7

Formative Assessments

Investigation

- The **discussion questions** in each section provide ample opportunities for formative assessment. Throughout the investigation, use student answers to the built-in discussion questions to gauge their three-dimensional learning. Typically, you can assess as a class, but you may wish to have individual students record their answers to certain questions. Use the +/- buttons to compare student answers to suggested answers. (Note that you shouldn't use suggested answers as a "script," but rather as a way to gauge student progress.) In the same way, use the Hint and Sample Answer buttons in the slideshows to drive the investigations forward and assess student understanding.
- **Interactive slides** provide opportunities for formative assessment before or after an investigation. These slides are often "drag and drop" or "graphing" slides that allow students to interact with the presentation and share what they have learned or hypothesize. You may wish to have individual students or groups of students come to the computer, interact with the slide, and then ask someone else if they agree or have a different hypothesis. These assessments can prompt rich classroom discussion and identify any holes in the learning.
- The **Wrap Up** at the end of the investigation should always be used for formative assessment. The questions are purposefully written to assess the three-dimensional objectives that have been taught throughout the investigation. Have students answer the questions in their notebooks, as exit tickets, or using your strategy of choice. You may wish to have students first brainstorm answers with a partner for some questions—reflecting on the investigation together—before writing their answers. If students struggle to answer the questions three-dimensionally, have them review their investigation prompts in their Interactive Student Notebooks and/or read the sections of Student Text connected to the investigation (as noted in the Suggested Reading buttons).

Student Journal

- As students complete the **investigation notes** in print or online, circulate the room, looking for evidence of a three-dimensional understanding of the lesson objectives and NGSS elements used during the investigation. Use the Answer Key (that has suggested answers and rubrics when applicable) to support the analysis of student answers. If students struggle with SEP elements, use the handouts in the SEP Toolkit buttons or the Science and Engineering Practices pages for more practice.
- As students complete the **reading section prompts** in their Interactive Student Notebooks, use the Answer Key to assess their answers and adjust instruction to address misconceptions or inaccuracies. If you notice students are struggling with the reading, allow them to use the text-to-speech feature online so they can follow along as the text is read, along with the Main Ideas feature to highlight the key concepts in the text (you can turn off these features for students who don't need them). Then have students retry the section prompts or select a few questions from the Question Bank to reassess their progress. (Note that the Question Bank includes the Notebook and Lesson Game questions so that you can easily give them as an assessment or modify them.)

Check for Understanding

Students can self-assess by using the Check for Understanding in their account. You should gather qualitative data by asking questions as students use the tutorials or project the tutorials and have

students share their thinking.

Vocabulary Cards

Using the vocabulary flip cards in their subscriptions, you can assess students' grasp of key vocabulary terms in the lesson. You can have students self-assess by testing themselves or each other, or you can use the flip cards as part of a whole-class review game. For terms that students are struggling with, use one of the Vocabulary Development pages found in the Literacy Support info bar at the top of the Table of Contents.

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Summative Assessments

Lesson Assessments

Use the TCI Test for each lesson to assess the lesson objectives summatively. But also use these three-dimensional tests to formatively assess student progress toward the unit's targeted performance expectation(s) that will be assessed in the unit Performance Assessment. Use the quantitative data provided in your Gradebook to evaluate the progress of individual students or "view trends" to see whole-class data to know what to reteach.

Unit Progress (KWL Chart and Developing a Model to Explain a Phenomenon)

Finally, after the lesson, make sure students have added new three-dimensional knowledge to their unit KWL charts, noting topics they have a firm grasp on and others that you may need to return to or expand upon. Students should have been connecting their learning throughout the lesson's investigations to the unit's anchoring phenomenon, but give them time to reflect with a group about how their three-dimensional learning is helping them make sense of the anchoring phenomenon, revise their models, and ask questions of what else they need to know to more fully make sense of the anchoring phenomenon.

Resources

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- Biographies
- Career Profiles

- Pacing Guide

Standards

Next Generation Science Standards

Performance Expectation

2-ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly. **2-ESS2-2** Develop a model to represent the shapes and kinds of land and bodies of water in an area.

2-ESS2-3 Obtain information to identify where water is found on Earth and that it can be solid or liquid.

K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

2-ESS2-1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

Science and Engineering Practices

Constructing Explanations and Designing Solutions

- Make observations (firsthand or from media) to construct an evidence-based account of natural phenomena.
- Generate and/or compare multiple solutions to a problem.

Obtaining, Evaluating, and Communicating Information

- Communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about scientific ideas, practices, and/or design ideas.
- Describe how specific images (e.g., a diagram showing how a machine works) support a scientific or engineering idea.
- Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question and/or supporting a scientific claim.

Analyzing and Interpreting Data

- Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems.
- Analyze data from tests of an object or tool to determine if it works as intended.

Developing and Using Models

- Distinguish between a model and the actual object, process, and/or events the model represents.

- Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s).
- Compare models to identify common features and differences.

Engaging in Argument from Evidence

- Construct an argument with evidence to support a claim.
- Make a claim about the effectiveness of an object, tool, or solution that is supported by relevant evidence.
- Listen actively to arguments to indicate agreement or disagreement based on evidence, and/or to retell the main points of the argument.

Planning and Carrying Out Investigations

- Make observations (firsthand or from media) and/or measurements of a proposed object or tool or solution to determine if it solves a problem or meets a goal.

Asking Questions and Defining Problems

- Define a simple problem that can be solved through the development of a new or improved object or tool.

Crosscutting Concepts

Stability and Change

- Things may change slowly or rapidly.

Energy and Matter

- Objects may break into smaller pieces, be put together into larger pieces, or change shapes.

Cause and Effect

- Events have causes that generate observable patterns.

Patterns

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

Systems and System Models

Objects and organisms can be described in terms of their parts.

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth

- Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe.

ESS2.A: Earth's Materials and Systems

- Wind and water can change the shape of the land.

ESS2.C: The Roles of Water in Earth's Surface Processes

- Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form.

ESS2.B: Plate Tectonics and Large-Scale System Interactions

- Maps show where things are located. One can map the shapes and kinds of land and water in any area.

ETS1.C: Optimizing the Design Solution

- Because there is always more than one possible solution to a problem, it is useful to compare and test designs.

Connections to Nature of Science

Science Addresses Questions About the Natural and Material World

- Scientists study the natural and material world.

Complete NGSS Correlations

ELA Standards and 9.4 Life Literacy and Key Skills 21st Century Learning Standards

Reading

Key Ideas and Details

- CC.2.R.I.3 Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
- CC.2.R.I.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate an understanding of key details in a text.

Writing

Research to Build and Present Knowledge

- CC.2.W.8 Recall information from experiences or gather information from provided sources to answer a question.

Text Types and Purposes

- CC.2.W.1 Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section.

Speaking and Listening

Comprehension and Collaboration

- CC.2.SL.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
- CC.2.SL.3 Ask and answer questions about what a speaker says to clarify

comprehension, gather additional information, or deepen understanding of a topic or issue.

NJSLS Standard 9: 9.1, 9.2, 9.4 Financial Literacy, Career Readiness, Life Literacies, and Key Skills

- 9.1.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job.
- 9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2)
- 9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).
- 9.4.2.CT.2: Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
- 9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive)

8.1 Computer Science and Design Thinking

- 8.1.2.CS.1: Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences.

Unit 3: Earth's Surface				
Lesson 1: What Is On Earth's Surface? **Materials**: • Ball, styrene, 3" • Clay, modeling, 4 colors • Pencils, assorted colors Print • Reading Notes	**Lesson 2**: What Kinds of Land and Water Are Found On Earth? **Materials**: • Chip, counting • Glue **(SDS)** • Paper, construction, assorted colors • Pencils, assorted colors • Scissors	**Lesson 3**: How Do Maps Show Land and Water? **Materials**: • Paper, blank **Print** • Picture Card A • Reading Notes Answer Key • Science Journal • Spanish: Picture Card	**Lesson 4**: How Does Earth's Surface Change? **Materials**: • Apron, Vinyl • Bin, plastic, shoe box size • Bottle, spray • Gloves, safety • Goggles, safety • Gravel • Petri dish • Rock	**Lesson 5**: How Do Earthquakes and Volcanoes Change the Land? **Materials**: • Markers, assorted colors • Paper, construction, black • Scissors **Print** • Audio Transcripts

Answer Key • Science Journal • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities**: **Investigation** Students learn to identify land and water shapes. Then they use a map to make a clay model of Earth's surface. **Observing Phenomena** Students consider where they can find water on Earth. **Making Sense of Phenomena** Students complete a Claim, Evidence, and Reasoning chart to answer the question: *Does Earth's surface have more land or water?* **Video Lesson Extension: Super Simple Science-** Find Africa and South America on a globe. Do they look like they could fit together like pieces of a giant puzzle?	• Stapler **Print** • Handout A: Lotto Board • Handout B: Land and Water Pictures • Handout C: Land and Water Book • Reading Notes Answer Key • Science Journal • Spanish Handout A: Lotto Board • Spanish Handout B: Land and Water Pictures • Spanish Handout C: Land and Water Book • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities**: **Investigation** Students play a game to learn about types of landforms and	A • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities**: **Investigation** Students draw a map of the schoolyard and mark an X on the map to show where they hid a "treasure." Then they use a map to find a classmate's treasure. **Observing Phenomena** Students discuss how maps show land and water. **Making Sense of Phenomena** As a class, discuss how students can use what they have learned to explain the Lesson Phenomenon: *Maps can show the types of land and water in a place.* • What does the blue on the map represent? What does the green represent? • How can you tell which direction we are looking?	collection • Sand, medium **(SDS)** • Soil • Straw **Print** • Extension Handout • Reading Notes Answer Key • Science Journal • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities**: **Investigation** Students explore how wind and water affect gravel, sand, and soil. **Observing Phenomena** Students consider how water can cause changes **Making Sense of Phenomena** As a class, discuss how students can use what they have learned to explain the Lesson Phenomenon: *The water in this river is sometimes clear and sometimes muddy.* • What can make a river "muddy"?	• Extension Handout • Handout A: Role Cards • Handout B: Volcano Book • Reading Notes Answer Key • Science Journal • Spanish Handout A: Role Cards • Spanish Handout B: Volcano Book • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities**: **Investigation** Students look at how a new volcano changed the land and act out how nearby villagers may have experienced the volcano. **Observing Phenomena** Students think about how volcanoes and earthquakes change the land. **Making Sense of Phenomena** As a class, discuss how students can use what they have learned to explain

	water bodies. **Observing Phenomena** Students consider the different forms that water can take. **Making Sense of Phenomena** As a class, discuss how students can use what they have learned to explain the Lesson Phenomenon: *There are many different kinds of land and water on Earth.* • What are some types of land on Earth? There are mountains, valleys, and islands. • What forms can water take on Earth's surface? It can be in a stream or river. It can be frozen in a glacier. **Video Lesson Extension: Super Simple Science-** Salmon swim thousands of miles through saltwater and freshwater. Their journey takes them through just a few of Earth's many landforms and	**Video Lesson Extension: Super Simple Science-** Orienteers use a map and a compass to find places. How can you use a compass to find places?	• What are some slow and fast ways that rivers can change? **Video Lesson Extension: Super Simple Science-** Glaciers change over time. The changes happen little by little and are hard to notice. How does a glacier make a valley?	the Lesson Phenomenon: *Volcanoes can change the land.* • What happens during a volcanic eruption? • Does the land change quickly or slowly? **Video Lesson Extension: Super Simple Science-** Mount St. Helens erupted, and lava poured from the top. How can you show what flowing lava looks like?

	water bodies.			
Lesson 6:How Do Wind and Water Change the Land? **Materials**: Print • Extension Handout • Reading Notes Answer Key • Science Journal • Spanish: Science Journal • Super Simple Science • Teacher's Guide **Activities**: **Investigation** Students go on a virtual trip to the beach, during which they analyze videos of the effects of wind and water on the beach. **Observing Phenomena** Students consider the effect of wind on their surroundings. **Making Sense of Phenomena** As a class, discuss how students can use what they have learned to explain the Lesson Phenomenon: *The wind is changing this beach.* • *How can*	**Lesson 7**: How Can Problems Caused by Wind and Water Be Solved? **Materials**: • Apron, Vinyl • Bin, plastic, shoe box size • Bottle, spray • Bucket • Clay, modeling, 4 colors • Craft stick • Gloves, safety • Gravel • Newspaper • Paper towels • Paper, construction, black • Pipe cleaner • Soil • Sponge • Spoon, plastic • Steel wool pad • Sticky notes, 3" x 3" • Stir Stick • Tape, transparent • Water, tap Print • Reading Notes Answer Key • Science Journal • Spanish: Science Journal • Super Simple Science			

you tell the wind is blowing? You can see sand blowing on the beach. • *How might the wind change this beach quickly or slowly?* **Video Lesson Extension: Super Simple Science-** Hoodoos are formed by water and ice. People enjoy naming hoodoos. What names would you give hoodoos?	• Teacher's Guide **Activities**: **Investigation** Students design ways to protect a road from a landslide and evaluate the designs. **Observing Phenomena** Students consider how wind and water may change land and cause problems for people over time. **Making Sense of Phenomena** As a class, discuss how students can use what they have learned to explain the Lesson Phenomenon: *Landslides can block roads and cause other damage.* • What might have caused the landslide? • How might it have been prevented? **Video Lesson Extension: Super Simple Science-** Trees can protect soil from wind. How can you find where land needs to be protected from wind or water?			

Differentiate Instruction by:
ELA/ELD Support for IEPs, at-risk, MLL (ELL/ESL), Enriched G&T

TCI's commitment to universal access—and our fundamental belief that all children can learn—is shown in these support features.

1. **ELA/ELD Connections**

Support students who need additional guidance and structure with reading, writing, or vocabulary development with ELA/ELD Connections. Make these toolkits available to your students as an independent tutorial, for class instruction, or use with peer tutoring. Learn more about **Strategies for Integrating Language Arts.**

- **ELA/ELD Connections: Reading Skills**
- **ELA/ELD Connections: Writing Skills**
- **ELA/ELD Connections: Speaking and Listening Toolkit**
- **ELA/ELD Connections: Vocabulary Skills**

Suggestions for how to use these pages are provided at point-of-use throughout the Lesson Guides.

2. **Differentiating Instruction**

Lesson Guides include step-by-step suggestions for meeting the needs of English Learners, students below grade level in reading and writing, special education (plus G&T) students, and advanced learners within the context of whole class instruction and with minimal modifications needed on the teacher's part. For more support, see **Best Practices for Differentiating Instruction.**

3. **Reading Support**

The Student Text and Interactive Student Notebook has built-in support for emerging to advanced readers. Learn more about **Literacy in Science.**

- **Reading Support Buttons** allow students to change the text reading level, highlight main ideas, or use text-to-speech audio.
- **Considerate Text** has a single-column layout, section titles, and subheads that divide content into meaningful and manageable chunks, carefully structured paragraphs with topic sentences and supporting details, images that are carefully
- chosen to support the text, and captions that incorporate main ideas. Learn more about **Considerate Text features.**
- **Vocabulary** is introduced in the Introduction and then defined in-line to support reading fluency. A glossary assists students with essential terms.
- **Lesson Summaries** succinctly review main concepts.
- **The graphically organized notebook** helps students record and remember what they read.

Informational and literary texts are balanced with at least 50% of reading time devoted to expository texts.

4. **Graphic Organizer Toolkit**

Use the graphic organizers in this **toolkit** when students need support processing information. These organizers are flexible visual aids that help students map concepts, organize thoughts, and identify relationships between abstract ideas.

This toolkit includes:

- Venn diagrams
- Sequence chains
- Prediction/inference diagrams
- Decision trees
- Webs, timelines, and more

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   - **ELA/ELD Connections: Vocabulary Skills**

   Suggestions for how to use these pages are provided at point-of-use throughout the Lesson Guides.

   - Webs, timelines, and more