Grade: 2	**Content Area: Science**

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Introduction

Students in second grade science will explore five units including engineering, matter, environments, Earth's surface, and changes to Earth's surface. Students will integrate a range of practices and cross cutting concepts to construct evidence-based explanations of compelling and challenging phenomena. A system of assessments will be utilized to demonstrate proficiency of core ideas.

Recommended Pacing Guide	
Unit 1: Engineering	20 days
Unit 2: Matter	25 Days
Unit 3: Environments for Living Things	25 Days
Unit 4: Earth's Surface	25 Days
Unit 5: Changes to Earth's Surface	25 days

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Unit 1: Engineering	**Duration:** 20 days

Standards/Learning Targets

New Jersey Student Learning Standards:

- **ETS1.A:** Defining and Delimiting Engineering Problems
- **ETS1.B:** Developing Possible Solutions
- **ETS1.C:** Optimizing the Design Solution

Performance Expectation

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	**Disciplinary Core Ideas**
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.	**ETS1.A: Defining and Delimiting Engineering Problems-** ● A situation that people want to change or create can be approached as a problem to be solved through engineering. ● Asking questions, making observations, and gathering information are helpful in thinking about problems. ● Before beginning to design a solution, it is important to clearly understand the problem.
Crosscutting Concepts	**Learning Objectives**
Structure and Function The shape and stability of structures of natural and designed objects are related to their function(s).	● Students ask questions and make observations to gather information about a situation that people want to change. Students' questions,

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	observations, and information gathering are focused on: ○ A given situation that people wish to change. ○ Why people want the situation to change. ○ The desired outcome of changing the situation. ● Students' questions are based on observations and information gathered about scientific phenomena that are important to the situation. ● Students use the information they have gathered, including the answers to their questions, observations they have made, and scientific information, to describe the situation people want to change in terms of a simple problem that can be solved with the development of a new or improved object or tool. ● With guidance, students describe the desired features of the tool or object that would solve the problem, based on scientific information, materials available, and potential related benefits to people and other living things.

Performance Expectation	
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.	
Science and Engineering Practices	**Disciplinary Core Ideas**

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Developing and Using Models- ● Define a simple problem that can be solved through the development of a new or improved object or tool. ● Develop a simple model based on evidence to represent a proposed object or tool.	**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
Crosscutting Concepts	**Learning Objectives**
Structure and Function- ● The shape and stability of structures of natural and designed objects are related to their function(s).	● Students develop a representation of an object and the problem it is intended to solve. In their representation, students include the following components: ○ The object ○ The relevant shape(s) of the object. ○ The function of the object. ● Students use sketches, drawings, or physical models to convey their representations. ● Students identify relationships between the components in their representation, including: ○ The shape(s) of the object and the object's function. ○ The object and the problem is it designed to solve. ● Students use their representation (simple sketch, drawing, or physical model) to communicate the connections between the shape(s) of an object, and how the object could solve the problem.

Performance Expectation	
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.	
Science and Engineering Practices	**Disciplinary Core Ideas**

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Analyzing and Interpreting Data- ● Analyze data from tests of an object or tool to determine if it works as intended.	**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.
Crosscutting Concepts	**Learning Objectives**
Structure and Function The shape and stability of structures of natural and designed objects are related to their function(s).	● With guidance, students use graphical displays (e.g., tables, pictographs, line plots) to organize given data from tests of two objects, including data about the features and relative performance of each solution. ● Students use their organization of the data to find patterns in the data, including: ○ How each of the objects performed, relative to: ■ The other object. ■ The intended performance ○ How various features of the objects relate to their performance ● Students use the patterns they found in object performance to describe: ○ The way each object will solve the problem ○ The strengths and weaknesses of each design. ○ Which object is better suited to the desired function, if both solve the problem.

Primary Interdisciplinary Connections:
ELA: RI.2.1, W.2.6, W.2.8, SL.2.5
Math: MP.2, MP.4
2.MD.D.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 problems12 using information presented in a bar graph. Science example: Make a bar graph

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with single-unit scale showing the number of seeds dispersed by two or three different design solutions for seed dispersal.

Technology Standards:
8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

- A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations
- B. Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
- E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
- F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

21st Century Career Ready Practices:

- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP11. Use technology to enhance productivity.
- CRP12. Work productively in teams while using cultural global competence.

Evidence of Student Learning

Formative Tasks:	Alternative Assessments:
● Graphic Organizers & Guided Note Taking ● Directed Reading ● Cooperative Group Learning ● Lesson quizzes, lesson reviews ● Evidence notebook entries ● *Language SmArts* writing activities	● Group Work/Class Discussion Rubric ● Guided Observations ● Question Starters ● Participation Rubric ● Modified Tests/Quizzes/Classwork ● Mystery Science Activities ● Performance Tasks
Summative Assessments: ● Performance Assessment ● Unit Project ● Associated Unit tests ● Labs and engineering based projects	**Benchmark Assessments:** ● Pre-Unit Assessments ● Beginning of the year, mid-year, and end of the year SGO

Knowledge & Skills

Enduring Understandings:	Essential Questions:

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• Engineers test their designs to find out whether they meet their design goals. • The shape and stability of structures of natural and designed objects are related to their function(s). • A situation that people want to change or create can be approached as a problem to be solved through engineering. • Asking questions, making observations, and gathering information are helpful in thinking about problems. • Before beginning to design a solution, it is important to clearly understand the problem. • 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. • Because there is always more than one possible solution to a problem, it is useful to compare and test designs.	• How are asking questions, gathering information, and making observation helpful when thinking about problems? • How does sketching or creating a model to illustrate its shape help solve a given problem? • How does testing a model determine its strengths and weaknesses in solving a given problem?

Core Instructional & Supplemental Materials

Suggested Activities/Resources:
• Houghton Mifflin Harcourt *Science DImensions*:
  ○ Lesson explorations
  ○ Hands-on activities
  ○ You Solve It activities
  ○ Virtual Labs
  ○ Video based projects
  ○ Extensions
  ○ Career explorations
• http://betterlesson.com/common_core/browse/2105/ngss-k-2-ets1-1-ask-questions-make-observations-and-gather-information-about-a-situation-people-want-to-change-to-define-a-simpl (lesson on Erosion)
	Varied Levels of Text:
	• Houghton Mifflin Harcourt *Science Dimensions* leveled readers
	• *Rosie Revere Engineer* by A. Beaty
	• *The Most Magnificent Thing* by A. Spires
	• *Marvelous Mattie: How Margaret E. Knight Became an Inventor* by E. McCully
	• *Coppernickel The Invention* by W. van Reek
	• *Hello Ruby: Adventures in Coding* by L. Liukas
	• *If I Built a Car* by C. Van Dusen
	• *Papa's Mechanical Fish* by C. Fleming
	• *What Do You Do With an Idea?* by K. Yamada

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- http://betterlesson.com/next_gen_science/browse/2107/ngss-k-2-ets1-3-analyze-data-from-tests-of-two-objects-designed-to-solve-the-same-problem-to-compare-the-strengths-and-weaknesse (engineering challenge in which students prevent ice cube from melting)
- http://www.asee.org/documents/conferences/k12/2011/07/17-Ready-for-Primary-Time.pdf (engineering curriculum lesson ideas)
- http://teachers.egfi-k12.org/ (engineering lesson plans)
- http://www.maryville-schools.org/site/Default.aspx?PageID=4713 (STEM class lessons)
- https://www.teachengineering.org/ (engineering curriculum)
- http://app15c.aws.livebinders.com/play/play?id=137603 (engineering lesson ideas)
- http://www.hookedonscience.org/nextgenerationsciencestandards.html (science experiments)
- http://www.resa.net/curriculum/curriculum/science/professionaldevelopment/ngss-pd/lesson-plans-exploring-ngss/ (Science and Engineering lessons)
- https://www.brainpop.com/science/
- https://betterlesson.com/browse/next_gen_science
- https://ngss.nsta.org/Classroom-Resources.aspx
- mysteryscience.com
- https://betterlesson.com/lesson/640745/finding-erosion-at-our-school

- *Building a House* by Byron Barton
- *Engineering the ABC's: How Engineers Shape Our World* by Patty O'Brien Novak
- *Janice VanCleave's Engineering for Every Kid: Easy Activities That Make Learning Science Fun* by Janice VanCleave
- *Three Billy Goats Gruff* by Peter Christen Asbjørnsen
- *How Things Work: 100 Ways Parents and Kids Can Share the Secrets of Technology* by Neil Ardley

Modifications/Accommodations

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English Language Learners:
- Use word wall
- Provide pictures and well labeled models
- Speak slowly and gesture when necessary
- Pre-teach vocabulary words
- Extended time on assessments
- Small group for assessment
- Review Vocabulary
- Allow for alternate responses during activities and assessments

Special Education/504 Plans/Students with Disabilities:
- Follow specific IEP/504 accommodations and modifications
- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Allow alternate assignments and assessments

Students at Risk of Failure:
- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Incorporate social/emotional discussions
- Encourage and monitor positive peer collaboration
- Provide academic resources for both home and school use
- Provide incentives to increase motivation and collaboration

Economically Disadvantaged:
- Provide clear, achievable expectations, do not lower academic requirements for them.
- Build a safe and nurturing atmosphere
- Be flexible with assignments
- Offer several alternatives from which all students can choose.
- Allow students to finish assignments independently, or give them the opportunity to complete tasks at their own pace.
- Use real-world examples and create mental models for abstract idea
- Provide increased knowledge base and vocabulary use about real world experiences.
- Share the decision making in class.
- Maintain expectations while offering choice and soliciting input

Culturally Diverse:
- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions
- Build in more group work to encourage interaction with peers
- Show photos, videos, and definitions when possible for culturally unique vocabulary
- Teach study skills

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- Provided students with necessary academic resources and materials
- Allow for alternative assignments
- Provide visuals
- Assign peer tutor
- Support verbal explanations with non verbal cues: Gestures/ facial expressions Props, realia, manipulatives, concrete materials Visuals, graphs, pictures, maps
- Provide positive praise to increase motivation
- Provide real world connections and emphasize the value of education
- Communicate high expectations for the success of all students

Unit 2: Matter	**Duration:** 25 days

Standards/Learning Targets

New Jersey Student Learning Standards:

- **PS1.A:** Structure and Properties of Matter
- **PS1.B:** Chemical Reaction

Performance Expectation

2-PS1-1- Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]

Science and Engineering Practices	**Disciplinary Core Ideas**
Planning and Carrying Out Investigations ● Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. ● Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.(2-PS1-1)	**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. (2-PS1-1)

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Crosscutting Concepts	Learning Objectives
Patterns ● Patterns in the natural and human designed world can be observed. (2-PS1-1)	● Students identify and describe the phenomenon under investigation, which includes the following idea: different kinds of matter have different properties, and sometimes the same kind of matter has different properties depending on temperature. ● Students identify and describe the purpose of the investigation, which includes answering a question about the phenomenon under investigation by describing and classifying different kinds of materials by their observable properties. ● Students collaboratively develop an investigation plan and describe the evidence that will be collected, including the properties of matter of the materials that would allow for classification, and the temperature at which those properties are observed. ● Students individually describe that: ○ The observations of the materials provide evidence about the properties of different kinds of materials. ○ Observable patterns in the properties of materials provide evidence to classify the different kinds of

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	materials. ● In the collaboratively developed investigation plan, students include: ○ Which materials will be described and classified. ○ Which materials will be observed at different temperatures, and how those temperatures will be determined and measured. ○ How the properties of the materials will be determined. ○ How the materials will be classified by the pattern of the properties. ● Students individually describe how the properties of materials, and the method for classifying them, are relevant to answering the question. ● According to the developed investigation plan, students collaboratively collect and record data on the properties of the materials.

Performance Expectation	
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.* [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]	
Science and Engineering Practices	**Disciplinary Core Ideas**

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Analyzing and Interpreting Data ● Analyze data from tests of an object or tool to determine if it works as intended.	**PS1.A: Structure and Properties of Matter** ● Different properties are suited to different purposes.
Crosscutting Concepts	**Learning Objectives**
Cause and Effect ● Simple tests can be designed to gather evidence to support or refute student ideas about causes.	● Using graphical displays, students use the given data from tests of different materials to organize those materials by their properties ● Students describe relationships between materials and their properties ● Students identify and describe relationships between properties of materials and some potential uses purpose ● Students describe which properties allow a material to be well suited for a given intended use. ● Students use their organized data to support or refute their ideas about which properties of materials allow the object or tool to be best suited for the given intended purpose relative to the other given objects/tools. ● Students describe how the given data from the test provided evidence of the suitability of different materials for the intended purpose.

Performance Expectation	
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. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]	
Science and Engineering Practices	**Disciplinary Core Ideas**

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Constructing Explanations and Designing Solutions -. ● Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.	**PS1.A: Structure and Properties of Matter** ● Different properties are suited to different purposes. ● A great variety of objects can be built up from a small set of pieces.
Crosscutting Concepts	**Learning Objectives**
Energy and Matter ● Objects may break into smaller pieces and be put together into larger pieces, or change shapes. ● Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world.	● Students articulate a statement that relates the given phenomenon to a scientific idea, including that an object made of a small set of pieces can be disassembled and made into a new object. ● Students use evidence and reasoning to construct an evidence-based account of the phenomenon. ● Students describe evidence from observations (firsthand or from media), including: ○ The characteristics ○ That the original object was disassembled into pieces. ○ That the pieces were reassembled into a new object or objects. ○ The characteristics ● Students use reasoning to connect the evidence to support an explanation. Students describe* a chain of reasoning that includes: ○ The original object was disassembled into its pieces and is reassembled into a new object or objects. ○ Many different objects can be built from the same set of pieces. ○ Compared to the original object, the new object or objects can have different characteristics, even though

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	they were made of the same set of pieces.

Performance Expectation	
2-PS1-4- Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]	
Science and Engineering Practices	**Disciplinary Core Ideas**
Engaging in Argument from Evidence ● Construct an argument with evidence to support a claim ● Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.	**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.
Crosscutting Concepts	**Learning Objectives**
Cause and Effect ● Events have causes that generate observable patterns. ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. ● People depend on various technologies in their lives; human life would be very different without technology. ● Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world.	● Students make a claim to be supported about a phenomenon. In their claim, students include the idea that some changes caused by heating or cooling can be reversed and some cannot. ● Students describe the given evidence, including: ○ The characteristics of the material before heating or cooling. ○ The characteristics of the material after heating or cooling. ○ The characteristics of the material when the heating or cooling is reversed. ● Students evaluate the evidence to determine:

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	○ The change in the material after heating. ○ Whether the change in the material after heating is reversible. ○ The change in the material after cooling. ○ Whether the change in the material after cooling is reversible. ● Students describe whether the given evidence supports the claim and whether additional evidence is needed. ● Students use reasoning to connect the evidence to the claim. Students describe the following chain of reasoning: ○ Some changes caused by heating or cooling can be reversed by cooling or heating.

Primary Interdisciplinary Connections:

- **ELA/Literacy-**
  - **RI.2.1-** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
  - **RI.2.3-** Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
  - **RI.2.4-** Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.
  - **RI.2.5-** Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.
  - **RI.2.6-** Identify the main purpose of a text, including what the author wants to answer, explain, or describe.
  - **RI.2.7-** Explain how specific illustrations and images (e.g., a diagram showing how a machine works) contribute to and clarify a text.
  - **RI.2.10-** Read and comprehend informational texts, including history/social studies, science, and technical texts, at grade level text complexity proficiently with scaffolding as needed.

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- **L.2.4-** Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 2 reading and content, choosing flexibly from an array of strategies
- **L.2.6-** Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using adjectives and adverbs to describe (e.g., When other kids are happy that makes me happy).
- **W.2.1-** 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 conclusion.
- **W.2.7-** 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).
- **W.2.8-** Recall information from experiences or gather information from provided sources to answer a question.
- **SL.2.1-** Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
- **SL.2.1.A-** Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).
- **SL.2.1.B-** Build on others' talk in conversations by linking their explicit comments to the remarks of others.
- **SL.2.2-** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

- **Mathematics-**
  - **MP.1-** Make sense of problems and persevere in solving them.
  - **MP.2-** Reason abstractly and quantitatively.
  - **MP.3-** Construct viable arguments and critique the reasoning of others.
  - **MP.4-** Model with mathematics.
  - **MP.5-** Use appropriate tools strategically.
  - **MP.6-** Attend to precision.
  - **MP.7-** Look for and make use of structure.
  - **2.OA.1-** Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
  - **2.MD.4-** Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
  - 2.MD.D.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. Science examples: (1) Make a bar graph with a single unit scale showing how many samples in a mineral collection are red, green, purple, or various other colors. Based on the graph, how many samples are represented in all? (2) As

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part of an investigation of which materials are best for different intended uses, make a picture graph with a single-unit scale showing how many tools in a toolbox are made of metal, wood, rubber/plastic, or a combination. Based on the graph, how many tools are represented in all?

Technology Standards:

- **8.1 Educational Technology-** All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
- **A. Technology Operations and Concept-** Students demonstrate a sound understanding of technology concepts, systems and operations
- **B. Creativity and Innovation-** Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
- **C. Communication and Collaboration-** Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
- **E: Research and Information Fluency-** Students apply digital tools to gather, evaluate, and use information.
- **F: Critical thinking, problem solving, and decision making-** Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

21st Century Themes/Career Readiness:

- CRP4. Communicate clearly and effectively and with reason.
- CRP6. Demonstrate creativity and innovation.
- CRP7. Employ valid and reliable research strategies.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

Evidence of Student Learning

Formative Tasks:	Alternative Assessments:
● Cooperative group learning ● Exit slips ● Analysis of student work ● Teacher observations ● Self-reflection ● Science evidence notebooks ● Lesson quizzes ● Lesson reviews ● Instructionally embedded tasks ● Short performance assessments ● *Language SmArts* writing activities	● Performance Tasks ● Student created models ● Written/verbal explanations ● Peer assessment
Summative Assessments:	**Benchmark Assessments:**

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● Associated unit tests ● Unit Projects ● Performance Assessments ● Labs and engineering based projects ● Student created models ● Written student explanations of phenomenon	● Pre-Unit Assessments ● Beginning of the year, mid-year, and end of the year SGO
Knowledge & Skills	
Enduring Understandings: ● Properties include how materials smell, look, taste, feel sound. ● Different materials have different properties. ● You can tell if materials and substances are different by observing their properties or by testing them. ● Properties of mixtures can change when other ingredients are added. ● Properties of substances are the same whether you have a small amount or a large amount. ● When a substance is heated or cooled, its properties can change. ● Some substances change back to the way they were before they were heated or cooled. ● If a substance doesn't change back to the way it was, it has become a different substance. ● Mixtures may have a combination of the properties of their ingredients. ● Mixtures may have some of the properties of their ingredients. ● Mixtures can be designed for certain purposes by using ingredients with certain properties.	**Essential Questions:** ● What can be noticed about different materials? ● How can you tell if substances are different? ● How can the properties of a mixture change? ● What can happen after a substance has been heated or cooled and returns to its original temperature? ● How can mixtures be designed to have certain properties?
Core Instructional & Supplemental Materials	
Suggested Activities/Resources: ● Houghton Mifflin Harcourt *Science Dimensions:*	**Varied Levels of Text:** ● Houghton Mifflin Harcourt *Science Dimensions* leveled readers

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○ Lesson explorations ○ Hands-on activities ○ You Solve It activities ○ Video-based projects ○ Extensions ○ Career explorations ● https://www.brainpop.com/science/ ● https://betterlesson.com/browse/next_gen_science ● https://ngss.nsta.org/Classroom-Resources.aspx	● *What if Rain Boots Were Made of Paper?* ● *Can You Change it Back?* ● *Jess Makes Hair Gel* ● *Jelly Bean Engineer* ● *The Handbook of Interesting Ingredients*

Modifications/Accommodations
English Language Learners: ● Provide pictures and well labeled models ● Speak slowly and gesture when necessary ● Pre-teach vocabulary words ● Extended time on assessments ● Small group for assessment ● Review Vocabulary ● Allow for alternate responses during activities and assessments **Special Education/504 Plans/Students with Disabilities:** ● Follow specific IEP/504 accommodations and modifications ● Strategic grouping ● Pre-teach concepts ● Small group for assessments ● Check in's during experiments to help refocus ● Allow alternate assignments and assessments **Students at Risk of Failure:** ● Strategic grouping ● Pre-teach concepts ● Small group for assessments ● Check in's during experiments to help refocus ● Incorporate social/emotional discussions ● Encourage and monitor positive peer collaboration ● Provide academic resources for both home and school use ● Provide incentives to increase motivation and collaboration **Economically Disadvantaged:** ● Provide clear, achievable expectations, do not lower academic requirements for them. ● Build a safe and nurturing atmosphere

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- Be flexible with assignments
- Offer several alternatives from which all students can choose.
- Allow students to finish assignments independently, or give them the opportunity to complete tasks at their own pace.
- Use real-world examples and create mental models for abstract idea
- Provide increased knowledge base and vocabulary use about real world experiences.
- Share the decision making in class.
- Maintain expectations while offering choice and soliciting input

Culturally Diverse:

- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions
- Build in more group work to encourage interaction with peers
- Show photos, videos, and definitions when possible for culturally unique vocabulary
- Teach study skills
- Provided students with necessary academic resources and materials
- Allow for alternative assignments
- Provide visuals
- Assign peer tutor
- Support verbal explanations with non verbal cues: Gestures/ facial expressions, props, realia, manipulatives, concrete materials, visuals, graphs, pictures, maps
- Provide positive praise to increase motivation
- Provide real world connections and emphasize the value of education
- Communicate high expectations for the success of all students

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Unit 3: Environments for Living Things	**Duration:** 25 days

Standards/Learning Targets

New Jersey Student Learning Standards:

- **2-LS2-1** Ecosystems: Interactions, Energy, and Dynamics
- **2-LS2-2**
- **2-LS4-1** Biological Evolution: Unity and Diversity
- **2-ESS2-2** Earth's Systems

Performance Expectation	
2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]	
Science and Engineering Practices	**Disciplinary Core Ideas**
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. ● 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) to collect data that can be used to make comparisons. ● Scientists look for patterns and order when making observations about the world.	**LS2.A: Interdependent Relationships in Ecosystems** ● Plants depend on water and light to grow.
Crosscutting Concepts	**Learning Objectives**
Cause and Effect ● Events have causes that generate observable patterns. ● Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.	● With guidance, students use graphical displays (e.g., tables, pictographs, line plots) to organize given data from tests of two objects, including data about the features and

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	relative performance of each solution. ● Students describe the evidence to be collected, including: ○ Plant growth with both light and water. ○ Plant growth without light but with water. ○ Plant growth without water but with light ○ Plant growth without water and without light. ● Students describe how the evidence will allow them to determine whether plants need light and water to grow. ● Students collaboratively develop an investigation plan. In the investigation plan, students describe the features to be part of the investigation, including: ○ The plants to be used ○ The source of light ○ How plants will be kept with/without light in both the light/dark test and the water/no water test. ○ The amount of water plants will be given in both the light/dark test and the water/no water test ○ How plant growth will be determined (e.g., observations of plant height, number and size of leaves, thickness of the stem, number of branches).

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	● Students individually describe how this plan allows them to answer the question. ● According to the investigation plan developed, students collaboratively collect and record data on the effects on plant growth by: ○ Providing both light and water ○ Withholding light but providing water ○ Withholding water but providing light ○ Withholding both water and light.

Performance Expectation	
2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.	
Science and Engineering Practices	**Disciplinary Core Ideas**
Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ● Develop a simple model based on evidence to represent a proposed object or tool.	**LS2.A: Interdependent Relationships in Ecosystems** ● Plants depend on animals for pollination or to move their seeds around. **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.(secondary)
Crosscutting Concepts	**Learning Objectives**
Structure and Function ● The shape and stability of structures of natural and designed objects are related to their function(s).	● Students develop a simple model that mimics the function of an animal in seed dispersal or pollination of plants. Students identify the relevant

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	components of their model, including those components that mimic the natural structure of an animal that helps it disperse seeds or that mimic the natural structure of an animal that helps it pollinate plants. The relevant components of the model include: ○ Relevant structures of the animal. ○ Relevant structures of the plant. ○ Pollen or seeds from plants. ● In the model, students describe relationships between components, including evidence that the developed model mimics how plant and animal structures interact to move pollen or disperse seeds. ○ Students describe the relationships between components that allow for movement of pollen or seeds ○ Students describe the relationships between the parts of the model they are developing and the parts of the animal they are mimicking. ● Students use the model to describe: ○ How the structure of the model gives rise to its function ○ Structure-function relationships in the natural world that allow some animals to disperse seeds or pollinate plants.

Performance Expectation

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2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats. [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

Science and Engineering Practices	**Disciplinary Core Ideas**
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. ● Make observations (firsthand or from media) to collect data which can be used to make comparisons.	**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.
Crosscutting Concepts	**Learning Objectives**
Patterns can be found in nature	● Students identify and describe the phenomenon and purpose of the investigation, which includes comparisons of plant and animal diversity of life in different habitats ● Based on the given plan for the investigation, students describe the following evidence to be collected: ○ Descriptions* based on observations of habitats, including land habitats and water habitats. ○ Descriptions based on observations of different types of living things in each habitat. ○ Comparisons of the different types of living things that can be found in different habitats. ● Students describe how these observations provide evidence for patterns of plant and animal diversity across habitats. ● Based on the given investigation

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	plan, students describe how the different plants and animals in the habitats will be observed, recorded, and organized. ● Students collect, record, and organize data on different types of plants and animals in the habitats.

Performance Expectation	
2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.]	
Science and Engineering Practices	**Disciplinary Core Ideas**
Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ● Develop a model to represent patterns in the natural world.	**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.
Crosscutting Concepts	**Learning Objectives**
Patterns ● Patterns in the natural world can be observed.	● Students develop a model that identifies the relevant components, including components that represent both land and bodies of water in an area. ● In the model, students identify and describe relationships between components using a representation of the specific shapes and kinds of land and specific bodies of water within a given area. ● Students use the model to describe the patterns of water and land in a given area.

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	● Students describe that because they can map the shapes and kinds of land and water in any area, maps can be used to represent many different types of areas.

Primary Interdisciplinary Connections:

- **ELA/Literacy-**
  - **RI.2.1-** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
  - **RI.2.3-** Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
  - **RI.2.4-** Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.
  - **RI.2.5-** Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.
  - **RI.2.10-** Read and comprehend informational texts, including history/social studies, science, and technical texts, at grade level text complexity proficiently with scaffolding as needed.
  - **SL.2.1-** Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
  - **SL.2.2-** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
  - **L.2.4-** Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 2 reading and content, choosing flexibly from an array of strategies
  - **L.2.6-** Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using adjectives and adverbs to describe (e.g., When other kids are happy that makes me happy).
  - **W.2.2-**.Write informative/explanatory texts in which they introduce a topic, use evidence-based facts and definitions to develop points, and provide a conclusion.
  - **W.2.7-** 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).
  - **W.2.8-** Recall information from experiences or gather information from provided sources to answer a question.
- **Mathematics-**
  - **MP.1-** Make sense of problems and persevere in solving them.
  - **MP.2-** Reason abstractly and quantitatively.
  - **MP.5-** Use appropriate tools strategically.

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- **MP.6-** Attend to precision
- **2.NBT.2-** Count within 1000; skip-count by 5s, 10s, and 100s.
- **2.NBT.3-** Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
- **2.NBT.5-** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- **2.MD.3-** Estimate lengths using units of inches, feet, centimeters, and meters.
- **2.NBT.7**- Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
- **2.MD.1-** Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
- **2.MD.2-** Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
- **2.MD.4-** Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
- **2.MD.9-** Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.
- **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.
- 2.MD.D.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 problems10 using information presented in a bar graph. Science example: Make a picture graph with single-unit scale showing the number of plant, vertebrate-animal, and invertebrate-animal species observed during a field trip or in a nature photograph; how many more plant species were observed than animal species?
- 2.MD.D.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 problems9 using information presented in a bar graph. Science example: Make a bar graph with single-unit scale showing the number of seedlings that sprout with and without watering.

Technology Standards:
8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to

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create and communicate knowledge.

- E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
- F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

21st Century Themes/Career Readiness:

- CRP6. Demonstrate creativity and innovation.
- CRP7. Employ valid and reliable research strategies.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP11. Use technology to enhance productivity.

Evidence of Student Learning

Formative Tasks:

- Cooperative group learning
- Exit slips
- Lesson quizzes, lesson reviews
- Analysis of student work
- Teacher observations
- Self-reflection
- Science evidence notebooks/journals
- *Language SmArts* evidence notebooks

Alternative Assessments:

- Performance Tasks
- Student created models
- Written/verbal explanations
- Peer assessment

Summative Assessments:

- Associated unit tests
- Unit Projects
- Performance Assessments
- Labs and engineering based projects
- Student created models
- Written student explanations of phenomenon

Benchmark Assessments:

- Pre-Unit Assessments
- Beginning of the year, mid-year, and end of the year SGO

Knowledge & Skills

Enduring Understandings:

- One way scientists study habitats is by observing the plants in them over time.

Essential Questions:

- How do scientists study habitats?
- How do new plants grow?
- How do plants get the sunlight and water they need to grow?

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• There are many types of habitats. Each habitat has many different types of plants and animals. • Plants make seeds that can grow into new plants. • Only seeds that get enough sunlight and water sprout and grow into full-grown plants. • Plants have leaves that get sunlight. Plants have roots that get water from the soil. • Without enough space, plants can't get the sunlight and water they need to grow. • Leaves need space to get sunlight. Roots need space in the soil to get water. • Animals sometimes disperse seeds by eating fruit, moving to another place, and leaving droppings with the seeds inside. • Before they investigate, scientists decide how they will measure the thing they want to learn about. • Some plants depend on animals to disperse their seeds. These animals depend on the plants for food.	• Why can't plants get the sunlight and water they need to grow? • How can seeds get to new places in their habitats? • How are other seeds in the reserve able to get to places where they can grow?
Core Instructional & Supplemental Materials	

Suggested Activities/Resources:
• Houghton Mifflin Harcourt *Science Dimensions:*
  ○ Lesson explorations
  ○ Hands-on activities
  ○ Virtual labs
  ○ Video-based projects
  ○ You Solve it activities
  ○ Extensions
  ○ Career explorations
• https://www.brainpop.com/science/
• https://betterlesson.com/browse/next_gen_science
	Varied Levels of Text:
	• Houghton Mifflin Harcourt *Science Dimensions leveled readers*
	• *My Nature Notebook*
	• *A Plant is a System*
	• *Habitat Scientist*
	• *Investigating Seeds*
	• *Handbook of Habitats*

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• https://ngss.nsta.org/Classroom-Resources.aspx • https://ngl.cengage.com/assets/html/ngss/	

Modifications/Accommodations
English Language Learners: • Provide pictures and well labeled models • Speak slowly and gesture when necessary • Pre-teach vocabulary words • Extended time on assessments • Small group for assessment • Review Vocabulary • Allow for alternate responses during activities and assessments **Special Education/504 Plans/Students with Disabilities:** • Follow specific IEP/504 accommodations and modifications • Strategic grouping • Pre-teach concepts • Small group for assessments • Check in's during experiments to help refocus • Allow alternate assignments and assessments **Students at Risk of Failure:** • Strategic grouping • Pre-teach concepts • Small group for assessments • Check in's during experiments to help refocus • Incorporate social/emotional discussions • Encourage and monitor positive peer collaboration • Provide academic resources for both home and school use • Provide incentives to increase motivation and collaboration **Economically Disadvantaged:** • Provide clear, achievable expectation, do not lower academic requirements for them. • Build a safe and nurturing atmosphere • Be flexible with assignments • Offer several alternatives from which all students can choose. • Allow students to finish assignments independently, or give them the opportunity to complete tasks at their own pace.

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- Use real-world examples and create mental models for abstract idea
- Provide increased knowledge base and vocabulary use about real world experiences.
- Share the decision making in class.
- Maintain expectations while offering choice and soliciting input

Culturally Diverse:

- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions
- Build in more group work to encourage interaction with peers
- Show photos, videos, and definitions when possible for culturally unique vocabulary
- Teach study skills
- Provided students with necessary academic resources and materials
- Allow for alternative assignments
- Provide visuals
- Assign peer tutor
- Support verbal explanations with non verbal cues: Gestures/ facial expressions, props, realia, manipulatives, concrete materials, visuals, graphs, pictures, maps
- Provide positive praise to increase motivation
- Provide real world connections and emphasize the value of education
- Communicate high expectations for the success of all students

Unit 4: Earth's Surface	**Duration:** 25 days

Standards/Learning Targets

New Jersey Student Learning Standards:

- **2-ESS2-2** Earth's Systems
- **2-ESS2-3** Earth's Systems

Performance Expectation	
2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.]	
Science and Engineering Practices	**Disciplinary Core Ideas**

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Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ● Develop a model to represent patterns in the natural world.	**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.
Crosscutting Concepts	**Learning Objectives**
Patterns ● Patterns in the natural world can be observed.	● Students develop a model to identify and describe relationships between components using a representation of the specific shapes and kinds of land within a given area. ● Students use the model to describe the patterns of water and land in a given area ● Students explain that because they can map the shapes and kinds of land and water in any area, maps can be used to represent many different types of areas.

Performance Expectation	
2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.	
Science and Engineering Practices	**Disciplinary Core Ideas**
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information. ● Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries,	**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.

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electronic menus, icons), and other media that will be useful in answering a scientific question.	
Crosscutting Concepts	**Learning Objectives**
Patterns ● Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.	● Students use books and other reliable media as sources for scientific information to answer scientific questions about: ○ Where water is found on Earth, including in oceans, rivers, lakes, and ponds. ○ The idea that water can be found on Earth as liquid water or solid ice ○ Patterns of where water is found, and what form it is in. ● Students identify which sources of information are likely to provide scientific information

Primary Interdisciplinary Connections:

- **ELA/Literacy-**
  - **RI.2.1-** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
  - **RI.2.2-** Identify the main topic of a multiparagraph text as well as the focus of specific paragraphs within the text.
  - **RI.2.4-** Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.
  - **RI.2.5-** Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.
  - **RI.2.7-** Explain how specific illustrations and images (e.g., a diagram showing how a machine works) contribute to and clarify a text.
  - **RI.2.10-** Read and comprehend informational texts, including history/social studies, science, and technical texts, at grade level text complexity proficiently with scaffolding as needed.
  - **SL.2.1-** Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
  - **SL.2.2-** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

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- **SL.2.3-** 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.
- **L.2.4-** Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 2 reading and content, choosing flexibly from an array of strategies
- **L.2.6-** Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using adjectives and adverbs to describe (e.g., When other kids are happy that makes me happy).
- **W.2.2-**.Write informative/explanatory texts in which they introduce a topic, use evidence-based facts and definitions to develop points, and provide a conclusion.
- **W.2.5-** With guidance and support from adults and peers, focus on a topic and strengthen writing as needed through self-reflection, revising and editing.
- **W.2.8-** Recall information from experiences or gather information from provided sources to answer a question.

- **Mathematics-**
  - **MP.1-** Make sense of problems and persevere in solving them.
  - **MP.2-** Reason abstractly and quantitatively.
  - **MP.4-** Model with mathematics.
  - **MP.5-** Use appropriate tools strategically.
  - **2.OA.1-** Represent and solve problems involving addition and subtraction.
  - **2.OA.2-** Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.
  - **2.NBT.5-** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
  - **2.MD.3-** Estimate lengths using units of inches, feet, centimeters, and meters.
  - **2.MD.4-** Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
  - **2.MD.5-** Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations
  - **2.MD.9-** Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.
  - **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.
  - 2.NBT.A.3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. Science example: Students write about a lake that is 550 feet deep, a river that is 687 miles long, a forest that began growing about 200 years ago, and so on. 2.MD.B.5. Use addition and subtraction within

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100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. Science example: A gulley is 17 inches deep before a rainstorm and 42 inches deep after a rainstorm. How much deeper did it get during the rainstorm?

Technology Standards:
8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

- A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations
- E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
- F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

21st Century Themes/Career Readiness:

- CRP2. Apply appropriate academic and technical skills.
- CRP5. Consider the environmental, social and economic impacts of decisions.
- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

Evidence of Student Learning

Formative Tasks:	Alternative Assessments:
● Lesson quizzes ● Cooperative group learning ● Exit slips ● Analysis of student work ● Teacher observations ● Self-reflection ● Science evidence notebooks ● Investigation summaries ● Language Smarts writing assignments ● Claims, Evidence and Reasoning ● Short performance task ● Instructionally embedded assessments	● Performance Tasks ● Student created models ● Written/verbal explanations ● Peer assessment
Summative Assessments: ● Associated unit tests ● Unit Projects	**Benchmark Assessments:** ● Pre-Unit Assessments

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● Performance Assessments ● Labs and engineering based projects ● Student created models ● Written student explanations of phenomenon	● Beginning of the year, mid-year and end of the year SGO
Knowledge & Skills	
Enduring Understandings: ● Landforms are made of rock. ● Even if geologists can't see a change happening, they can use models to visualize how it may have happened. ● Even though rock is hard, it can change shape. ● The shape of a landform changes when water causes pieces of a rock to break off. ● Water hitting a landform causes tiny pieces of the landform to break off. ● Scientists make diagrams to show their ideas about how the world works, based on evidence from investigations, models, and books. ● Maps show where water and land are and where different landforms are. ● Many small changes that are hard to notice can add up to a bigger change that is easy to notice. ● When many small changes happen over a long time, the whole landform changes. ● Wind and water can erode a landform quickly if the landform is made of loose materials.	**Essential Questions:** ● What are landforms made of? ● How do geologists figure out how something changed when they can't observe it changing? ● What can make landforms change? ● How could water change a landform even though landforms are made of hard rock? ● If erosion moves small pieces of rock, how can it cause a big change? ● How can landforms erode quickly?
Core Instructional & Supplemental Materials	
Suggested Activities/Resources: ● Houghton Mifflin Harcourt Science Dimensions: ○ Lesson explorations ○ Hands-on activities ○ Performance tasks	**Varied Levels of Text:** ● *Landform Postcards* ● *Gary's Sand Journal* ● *Making Models of Streams* ● *What's Stronger? How Water Causes Erosion*

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○ Virtual labs ○ You Solve It activities ○ Video Based activities ● Use stream tables to model erosion using different sediment types ● https://www.brainpop.com/science/ ● https://betterlesson.com/browse/next_gen_science ● https://ngss.nsta.org/Classroom-Resources.aspx ● https://ngl.cengage.com/assets/html/ngss/	● *Handbook of Land and Water*

Modifications/Accommodations
English Language Learners: ● Provide pictures and well labeled models ● Speak slowly and gesture when necessary ● Pre-teach vocabulary words ● Extended time on assessments ● Small group for assessment ● Review Vocabulary ● Allow for alternate responses during activities and assessments **Special Education/504 Plans/Students with Disabilities:** ● Follow specific IEP/504 accommodations and modifications ● Strategic grouping ● Pre-teach concepts ● Small group for assessments ● Check in's during experiments to help refocus ● Allow alternate assignments and assessments **Students at Risk of Failure:** ● Strategic grouping ● Pre-teach concepts ● Small group for assessments ● Check in's during experiments to help refocus ● Incorporate social/emotional discussions ● Encourage and monitor positive peer collaboration ● Provide academic resources for both home and school use ● Provide incentives to increase motivation and collaboration **Economically Disadvantaged:** ● Provide clear, achievable expectation, do not lower academic requirements for them.

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- Build a safe and nurturing atmosphere
- Be flexible with assignments
- Offer several alternatives from which all students can choose.
- Allow students to finish assignments independently, or give them the opportunity to complete tasks at their own pace.
- Use real-world examples and create mental models for abstract idea
- Provide increased knowledge base and vocabulary use about real world experiences.
- Share the decision making in class.
- Maintain expectations while offering choice and soliciting input

Culturally Diverse:

- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions
- Build in more group work to encourage interaction with peers
- Show photos, videos, and definitions when possible for culturally unique vocabulary
- Teach study skills
- Provided students with necessary academic resources and materials
- Allow for alternative assignments
- Provide visuals
- Assign peer tutor
- Support verbal explanations with non verbal cues: Gestures/ facial expressions Props, realia, manipulatives, concrete materials Visuals, graphs, pictures, maps
- Provide positive praise to increase motivation
- Provide real world connections and emphasize the value of education
- Communicate high expectations for the success of all students

Grade: 2	**Content Area: Science**

Unit 5: Changes to Earth's Surface	**Duration:** 25 days

Standards/Learning Targets

New Jersey Student Learning Standards:

- **2-ESS1-1** Earth's Place in the Universe
- **2-ESS2-1** Earth's Systems

Performance Expectation

2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly. [Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.] [Assessment Boundary: Assessment does not include quantitative measurements of timescales.]

Science and Engineering Practices	**Disciplinary Core Ideas**
Constructing Explanations and Designing Solutions -Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. ● Make observations from several sources to construct an evidence based account for natural phenomena	**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.
Crosscutting Concepts	**Learning Objectives**
Stability and Change ● Things may change slowly or rapidly.	● Students articulate a statement that relates the given phenomenon to a scientific idea, including that Earth events can occur very quickly or very slowly. ● Students use evidence and reasoning to construct an evidence-based account of the phenomenon. ● Students describe the evidence from observations,

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	including: ○ That some Earth events occur quickly ○ That some Earth events occur slowly ○ Some results of Earth events that occur quickly ○ Some results of Earth events that occur very slowly ○ The relative amount of time it takes for the given Earth events to occur ● Students make observations using at least three sources ● Students use reasoning to logically connect the evidence to construct an evidence-based account. Students describe their reasoning, including: ○ In some cases, Earth events and the resulting changes can be directly observed; therefore those events must occur rapidly. ○ In other cases, the resulting changes of Earth events can be observed only after long periods of time; therefore these Earth events occur slowly, and change happens over a time period that is much longer than one can observe.

Performance Expectation

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2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.*[Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.]

Science and Engineering Practices	Disciplinary Core Ideas
Constructing Explanations and Designing Solutions- Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. ● Compare multiple solutions to a problem.	**ESS2.A: Earth Materials and Systems** ● Wind and water can change the shape of the land. **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.
Crosscutting Concepts	**Learning Objectives**
Stability and Change ● Things may change slowly or rapidly.	● Students describe the given problem, which includes the idea that wind or water can change the shape of the land by washing away soil or sand. ● Students describe at least two given solutions in terms of how they slow or prevent wind or water from changing the shape of the land. ● Students describe the specific expected or required features for the solutions that would solve the given problem, including: ○ Slowing or preventing wind or water from washing away soil or sand. ○ Addressing problems created by both slow and rapid changes in the environment ● Students evaluate each given solution against the desired features to determine and describe whether and how well the features are met by each solution. ● Using their evaluation, students compare the given solutions to each

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	other.

Primary Interdisciplinary Connections:

- **ELA/Literacy-**
  - **RI.2.1-** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
  - **RI.2.2-** Identify the main topic of a multiparagraph text as well as the focus of specific paragraphs within the text.
  - **RI.2.4-** Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.
  - **RI.2.5-** Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.
  - **RI.2.7-** Explain how specific illustrations and images (e.g., a diagram showing how a machine works) contribute to and clarify a text.
  - **RI.2.10-** Read and comprehend informational texts, including history/social studies, science, and technical texts, at grade level text complexity proficiently with scaffolding as needed.
  - **SL.2.1-** Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
  - **SL.2.2-** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
  - **SL.2.3-** 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.
  - **L.2.4-** Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 2 reading and content, choosing flexibly from an array of strategies
  - **L.2.6-** Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using adjectives and adverbs to describe (e.g., When other kids are happy that makes me happy).
  - **W.2.2-**.Write informative/explanatory texts in which they introduce a topic, use evidence-based facts and definitions to develop points, and provide a conclusion.
  - **W.2.5-** With guidance and support from adults and peers, focus on a topic and strengthen writing as needed through self-reflection, revising and editing.
  - **W.2.8-** Recall information from experiences or gather information from provided sources to answer a question.
- **Mathematics-**
  - **MP.1-** Make sense of problems and persevere in solving them.
  - **MP.2-** Reason abstractly and quantitatively.

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- **MP.4-** Model with mathematics.
- **MP.5-** Use appropriate tools strategically.
- **2.OA.1-** Represent and solve problems involving addition and subtraction.
- **2.OA.2-** Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.
- **2.NBT.5-** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- **2.MD.3-** Estimate lengths using units of inches, feet, centimeters, and meters.
- **2.MD.4-** Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
- **2.MD.5-** Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations
- **2.MD.9-** Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.
- **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.

Technology Standards:
8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

- A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations
- E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
- F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

21st Century Themes/Career Readiness:

- CRP2. Apply appropriate academic and technical skills.
- CRP5. Consider the environmental, social and economic impacts of decisions.
- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

Evidence of Student Learning

Formative Tasks:	Alternative Assessments:
● Lesson quizzes	● Performance Tasks

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● Cooperative group learning ● Exit slips ● Analysis of student work ● Teacher observations ● Self-reflection ● Science evidence notebooks ● Investigation summaries ● *Language SmArts* writing assignments ● Claims, Evidence and Reasoning ● Short performance task ● Instructionally embedded assessments	● Student created models ● Written/verbal explanations ● Peer assessment
Summative Assessments: ● Associated unit tests ● Unit Projects ● Performance Assessments ● Labs and engineering based projects ● Student created models ● Written student explanations of phenomenon	**Benchmark Assessments:** ● Pre-Unit Assessments ● Beginning of the year, mid-year and end of the year SGO
Knowledge & Skills	
Enduring Understandings: ● Landforms are made of rock. ● Even if geologists can't see a change happening, they can use models to visualize how it may have happened. ● Even though rock is hard, it can change shape. ● The shape of a landform changes when water causes pieces of a rock to break off. ● Water hitting a landform causes tiny pieces of the landform to break off. ● Scientists make diagrams to show their ideas about how the world works, based on evidence from investigations, models, and books. ● Maps show where water and land are and where different landforms are.	**Essential Questions:** ● What are landforms made of? ● How do geologists figure out how something changed when they can't observe it changing? ● What can make landforms change? ● How could water change a landform even though landforms are made of hard rock? ● If erosion moves small pieces of rock, how can it cause a big change? ● How can landforms erode quickly?

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- Many small changes that are hard to notice can add up to a bigger change that is easy to notice.
- When many small changes happen over a long time, the whole landform changes.
- Wind and water can erode a landform quickly if the landform is made of loose materials.

Core Instructional & Supplemental Materials

Suggested Activities/Resources:

- Houghton Mifflin Harcourt Science Dimensions:
  - Lesson explorations
  - Hands-on activities
  - Performance tasks
  - Virtual labs
  - You Solve It activities
  - Video Based activities
- Use stream tables to model erosion using different sediment types
- https://www.brainpop.com/science/
- https://betterlesson.com/browse/next_gen_science
- https://ngss.nsta.org/Classroom-Resources.aspx
- https://ngl.cengage.com/assets/html/ngss/

Varied Levels of Text:

- *Landform Postcards*
- *Gary's Sand Journal*
- *Making Models of Streams*
- *What's Stronger? How Water Causes Erosion*
- *Handbook of Land and Water*

Modifications/Accommodations

English Language Learners:

- Provide pictures and well labeled models
- Speak slowly and gesture when necessary
- Pre-teach vocabulary words
- Extended time on assessments
- Small group for assessment
- Review Vocabulary
- Allow for alternate responses during activities and assessments

Special Education/504 Plans/Students with Disabilities:

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- Follow specific IEP/504 accommodations and modifications
- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Allow alternate assignments and assessments

Students at Risk of Failure:

- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Incorporate social/emotional discussions
- Encourage and monitor positive peer collaboration
- Provide academic resources for both home and school use
- Provide incentives to increase motivation and collaboration

Economically Disadvantaged:

- Provide clear, achievable expectations, do not lower academic requirements for them.
- Build a safe and nurturing atmosphere
- Be flexible with assignments
- Offer several alternatives from which all students can choose.
- Allow students to finish assignments independently, or give them the opportunity to complete tasks at their own pace.
- Use real-world examples and create mental models for abstract idea
- Provide increased knowledge base and vocabulary use about real world experiences.
- Share the decision making in class.
- Maintain expectations while offering choice and soliciting input

Culturally Diverse:

- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions
- Build in more group work to encourage interaction with peers
- Show photos, videos, and definitions when possible for culturally unique vocabulary
- Teach study skills
- Provided students with necessary academic resources and materials
- Allow for alternative assignments
- Provide visuals
- Assign peer tutor
- Support verbal explanations with non verbal cues: Gestures/ facial expressions Props, realia, manipulatives, concrete materials Visuals, graphs, pictures, maps
- Provide positive praise to increase motivation
- Provide real world connections and emphasize the value of education
- Communicate high expectations for the success of all students

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