Second Grade Science Curriculum

This curricula and accompanying instructional materials have been developed to align with the NJSLS and in accordance with the NJ Department of Education's guidelines to include: Curriculum designed to meet grade level expectations, integrated accommodations and modifications for students with IEPs, 504s, ELLs, and gifted and talented students, assessments including benchmarks, formative, summative, and alternative assessments, a list of core instructional and supplemental materials, pacing guide, interdisciplinary connections, integration of 21st century skills, integration of technology, and integration of 21st Century Life and Career standards.

About the Standards

In 1996, the New Jersey State Board of Education adopted the state's first set of academic standards called the Core Curriculum Content Standards. The standards described what students should know and be able to do upon completion of a thirteen-year public school education. Over the last twenty years, New Jersey's academic standards have laid the foundation for local district curricula that are used by teachers in their daily lesson plans.

Revised every five years, the standards provide local school districts with clear and specific benchmarks for student achievement in nine content areas. Developed and reviewed by panels of teachers, administrators, parents, students, and representatives from higher education, business, and the community, the standards are influenced by national standards, research-based practice, and student needs. The standards define a "Thorough and Efficient Education" as guaranteed in 1875 by the New Jersey Constitution. Currently the standards are designed to prepare our students for college and careers by emphasizing high-level skills needed for tomorrow's world.

The New Jersey Student Learning Standards include Preschool Teaching and Learning Standards, as well as nine K-12 standards for the following content areas: **21st Century Life and Careers, Comprehensive Health and Physical Education, English Language Arts, Mathematics, Science, Social Studies, Technology, Visual and Performing Arts, World Languages**

The 2020 NJSLS in Science were adopted by the State Board of Education on June 3, 2020. Districts are required to implement it by September 2022. The 2020 New Jersey Student Learning Standards webpage provides links to the 2020 NJSLS and information regarding curriculum implementation dates.

Cape May City Elementary School District Science Curriculum
Second Grade Science Pacing Guide

Content Area: Science

Our elementary science program is founded upon the New Jersey Student Learning Standards for Science, which emphasizes three dimensions to promote scientific literacy for all student scientists. The core three dimensions of science learning, which are integrated into all science learning activities, are: **Science and Engineering Practices, Disciplinary Core Ideas, and Cross Cutting Concepts.** These three dimensions can also be thought of as, **"what scientists do," "what scientists need to know," and "common themes found throughout all science disciplines."**

To implement these standards and corresponding dimensions, our district utilizes highly interactive and engaging activities. These dynamic activities are categorized into three main units of study. and present hands-on, real-world science experiences matched to the developmental level of students.

Three Main Units of Study:

1. Physical Science,
2. Earth & Space Science, and
3. Life Science

Course Title: Science	**Grade Level: Second**
Unit I: 2-PS1 Matter and its Interactions **Instructional Days: 20** In this unit of study, students continue to develop an understanding of observable properties of materials through analysis and classification of different materials. The crosscutting concepts of cause and effect and energy and matter are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in constructing explanations, designing solutions, and engaging in argument from evidence. Students are also expected to use these practices to demonstrate understanding of and engaging in argument from evidence. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on 2-PS1-3 and 2-PS1-4	**Dates for Unit: September to November** **<u>Pacing Guide: 20 days</u>** Week 1: Describe Matter Week 2: Solids / Liquids / Gasses Week 3: Design a Solution to a Problem/ Build a paper bridge to determine the best material to use for a project. Week 4: Use small Lego pieces to make something new. See video link below. Week 5: Make slime or Oobleck and discuss the properties of matter.

Unit II: 2-LS2 Ecosystems, Interactions, Energy, and Dynamics **Instructional Days: 15** In this unit of study, students develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination. Students also compare the diversity of life in different habitats. The crosscutting concepts of cause and effect and structure and function are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in planning and carrying out investigations and developing and using models. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on 2-LS4-1, 2-LS2-1, 2-LS2-2, and K-2-ETS1-1	**Dates for Unit: November to February** **<u>Pacing Guide: 15</u>** Week 1: Habits Week 2: Forests and Grasslands Week 3: Water Habits Week 4: Deserts Hot and Cold Week 5: Review / Assessment
Unit III: 2-ESS1 Earth's Place in the Universe **Instructional Days: 20 days** In this unit of study, students apply their understanding of the idea that wind and water can change the shape of land to compare design solutions to slow or prevent such change. The crosscutting concepts of stability and change; structure and function; and the influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in asking questions and defining problems, developing and using models, and constructing explanations and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on 2-ESS1-1, 2-ESS2-1, K-2-ETS1-1, and K-2-ETS1-2.	**Dates for Unit: February to March** **<u>Pacing Guide: 20 days</u>** Week 1: Describe Earth's Surface/Landforms Week 2: Oceans / Fresh Water Week 3: Tectonic Plates/Volcanic Eruptions Week 4: Quick / Slow Changes to Earth's Surface Week 5: Research Poster/Model Presentations

Unit IV: 2-ESS2: Earth's Systems **Instructional Days: 20** In this unit of study, students use information and models to identify and represent the shapes and kinds of land and bodies of water in an area and where water is found on Earth. The crosscutting concept of patterns is called out as an organizing concept for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in developing and using models and obtaining, evaluating, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on 2-ESS2-3 and 2-ESS2-2.	**Dates for Unit: March to May** **Pacing Guide: 20 days** Week 1: Where is the water? Week 2: What is the role of water? Week 3: Study of the wind Week 4: Why does it flood? Week 5: Erosion project
Unit V: K-2-ETSI: Engineering Design **Instructional Days: 10** In this unit of study, students will ask questions, make observations, and gather information about a situation people want to change. They will define a simple problem that can be solved through the development of a new or improved object or tool. They will 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. Students will analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. This unit is based on K-2-ETS1-1, K-2-ETS1-2, K-2-ETS1-3	**Dates for Unit: May to June** **Pacing Guide: 10 days** Week 1: Information and Research Skills Week 2: Define a Simple Problem Week 3: Develop a New Way to Solve the Simple Problem Week 4: Marshmallow Catapults and Simple Machines

Date Created: 04/07/2022	**Board Approved On: 8/18/22**

Note: The number of instructional days is an estimate based on the information available at this time. 1 day equals approximately 42 minutes of seat time. Teachers are strongly encouraged to review the entire unit of study carefully and collaboratively to determine whether adjustments to this estimate need to be made.

Cape May City Elementary School District Second Grade Science Curriculum

Unit I Overview

Content Area: Science

Unit Title: Unit I

2-PS1 Matter and its Interactions

Target Course/Grade Level: Second

Unit Summary: Learning Goal

Students will develop the idea that by taking advantage of the properties of materials, we can solve many problems in our lives.

- Students will develop an appreciation for the manmade materials and learn to recognize their properties.
- Students will explore the material properties involved in meeting basic needs.
- They will consider the solid and liquid states of matter and brainstorm futuristic inventions possible through new materials.
- Analyze data from tests of materials designed to solve the same problem to compare the strengths and weaknesses of how each material performs.

Interdisciplinary Connections:

- Science, Technology, English / Language Arts, Health, Social Emotional Learning, Mathematics, Social Studies

Career Readiness: Life Literacies and Key Skills Standards:

- Career Readiness, Life Literacies and Key Skills
  - These include critical thinking, problem solving, creativity, innovation, collaboration, teamwork and leadership, cross-cultural understanding, and interpersonal communication and science.
  - Incorporation of relevant technologies as tools as part of instruction (i.e. Chromebooks, Touch screen devices, manipulatives, certified assistive technologies for students with special needs, etc.)
  - Developing effective communication
  - Developing Independent Learning Strategies
- Incorporating Science, Technology, Engineering, and Mathematical themes into daily lessons

Learning Targets:

- 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.]
- 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.]
- 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.]
- 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.]

Unit Activity	Suggested Learning Activities
I.	**Planning and Carrying Out Investigations:** 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) Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. Connections to Nature of Science Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena Scientists search for cause and effect relationships to explain natural events. (2-PS1-4) Analyze data from tests of an object or tool to determine if it works as intended. (2-PS1-2) 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 (firsthand or from media) to construct an evidence-based account for natural phenomena. (2-PS1-3) Engaging in Argument from Evidence Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s). Construct an argument with evidence to support a claim. (2- PS1-4) **Disciplinary Core Ideas PS1.A:** 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) Different properties are suited to different purposes. (2-PS1-2), (2- PS1-3) A great variety of objects can be built up from a small set of pieces. (2-PS1-3) 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. (2-PS1-4) **Crosscutting Concepts Patterns:** Patterns Patterns in the natural and human designed world can be observed. (2-PS1-1) Cause and Effect Events have causes that generate observable patterns. (2-PS1-4) Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2) Energy and Matter Objects may break into smaller pieces and be put together into larger pieces or change shapes. (2- PS1-3) 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 using materials derived from the natural world. (2-PS1-2) Connections to Nature of Science Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena Scientists search for cause and effect relationships to explain natural events. (2-PS1-4)  **Lesson Activity-Paper Bridge Materials Challenge** **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. **Overview:** Steel, concrete, wood—real bridges are built from many different materials. How do engineers decide which materials to use? In this activity, your students will expand on a basic paper bridge lesson plan by building and testing bridges made from different materials. Objective:

	• Understand that different materials have different properties. • Interpret the results of an experiment to determine which material is best suited for a certain purpose. **Materials:** Sheets of printer or construction paper (2), Sheets of aluminum foil (2), Sheets of wax paper (2), Sheets of cardstock or manila folder (2), Stack of books, or small boxes (2), Pennies (about 30, more may be required for stronger designs), Tape, Ruler **Activity:** In this project, first your students will explore the mechanical properties of some different materials. They will use their observations to predict which material will make the strongest bridge. Then they will design an experiment to test bridges made from different materials and see which one is the strongest. First discuss types of bridges. Then ask students to guess which type of material they have collected from the supplies might make the strongest bridge for this penny experiment. Students will record final results in a journal, and draw pictures. The groups or individuals can take turns sharing their findings with the class. **Remember to follow these rules when testing the bridges:** • Set up two stacks of books 10 inches apart. When testing, place the bridge so one end rests on each stack of books. • You can use up to two pieces of tape for each bridge to prevent it from unfolding/unrolling. You cannot tape the bridge to the books. • Add pennies to the bridge one at a time, starting at one end and working your way to the other side. If you reach the other side, go back to the beginning and stack the pennies on top of each other. • Keep adding pennies until the bridge collapses (falls down and touches the table) or the pennies start to slide/fall off the bridge. Record your observations in a journal. **Background for Teachers:** In this project, your students will build bridges out of single sheets of paper that will potentially hold dozens of pennies. You might wonder: how can a single piece of paper hold up dozens of pennies when it cannot even support its own weight. The answer lies in folding the paper to change its cross section (the shape you see when you look at the paper edge-on). Think about bending a ruler. A ruler has a (roughly) rectangular cross section that is very thin in one direction and thicker in the other direction. It is very easy to bend the ruler in the thin dimension, but *much* more difficult to bend it in the thick dimension. Different materials have different properties. In this project, we are specifically concerned with the material's mechanical properties (as opposed to other types of properties, like chemical or optical properties). How easy is the material to stretch, squeeze, tear, or bend? If you bend the material slightly, does it bounce back to its original shape, or stay bent? How far can you stretch or bend the material before it breaks? Does it break slowly (like stretching out a ball of clay) or suddenly (like snapping a wooden pencil)? All of these factors determine what materials engineers use to build bridges. For example, if a bridge flexes a little bit under a large amount of weight (like a train), you want it to return to its original shape.

Gifted and Talented: Enrichment Links and Writing Prompts
Links:

Lego Exhibit at The Carnegie Science Center (Use small objects to make something new!)
Reversible and Irreversible Changes
Matter Compilation: Crash Course Kids
Milk and Soap
Reaction in a bag
Precious Plastics
Why are so many toys made out of plastic?
Can you fry an egg on a sidewalk?

Writing Prompts:

Draw or write sentences to finish the prompts.

"Create a solid, liquid, or gas for the future, and tell how you would use it!"

"Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot." (Hint: eggs, water, butter, burning wood, etc.)

At-Risk, Including ELL: Resources to Enhance Understanding

Books: What's the Matter in Mr. Whiskers' Room? by Michael Elsohn Ross, Change It! Solids, liquids, gasses and you by Adrienne Mason, What is the World Make Of? All about solids, liquids, and gasses by Kathleen Weidner Zoehfeld, Solids, Liquids, and Gases by The Ontario Science Centre

Reading A to Z: Most Books are in English and Spanish

Bubbles, Level D
The Icy Tent, Level Q
The Science of Cooking, Level V

Video Links:

Unilab-Bridge Video
Bill Nye Properties of Matter
Magic School Bus Water
States of Matter
Is Oobleck a Solid or a Liquid?
Objects and Materials
More Objects and Materials

Content Area: Science

Unit Title: Unit II

2-LS2: Ecosystems, Interactions, Energy, and Dynamics

Target Course/Grade Level: Second

Unit Summary: Learning Goal

Students will be able to observe, investigate, and develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants. 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.

- Students will observe and investigate the needs of plants in different habitats.

Interdisciplinary Connections:

- Science, Technology, English / Language Arts, Health, Social Emotional Learning, Mathematics, Social Studies

Career Readiness: Life Literacies and Key Skills Standards:

- Career Readiness, Life Literacies and Key Skills
  - These include critical thinking, problem solving, creativity, innovation, collaboration, teamwork and leadership, cross-cultural understanding, and interpersonal communication and science.
  - Incorporation of relevant technologies as tools as part of instruction (i.e. Chromebooks, Touch screen devices, manipulatives, certified assistive technologies for students with special needs, etc.)
  - Developing effective communication
  - Developing Independent Learning Strategies
  - Incorporating Science, Technology, Engineering, and Mathematical themes into daily lessons

Learning Targets:

- 2-LS2-1 Plan and conduct an investigation to determine if plants need sunlight and water to grow.
- 2-LS2-2 Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants
- 2-LS4-1 Make observations of plants and animals to compare the diversity of life in different habitats.

Unit Activity	Suggested Learning Activities
II.	**Science and Engineering Practices:** 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 that can be used to make comparisons. (2-LS4-1)

DCI: 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. (2-LS4-1)

Crosscutting Concepts: Connections to Nature of Science Scientific Knowledge is Based on Empirical Evidence Scientists look for patterns and order when making observations about the world. (2-LS4-1)

Busy Bee Pollination Lesson

Preview Videos: Busy Bee Lesson with Cheetos

Real Science-Cheese Puff Pollination (Alternate activity)

Materials: Flower print outs, a bowl, some Cheetos or other cheesy snacks, and a science journal.

- Print out or have students draw four flowers.
- Place a handful of Cheetos or other orange cheesy snacks on each of the four flowers that you have placed around a small bowl.
- Students should work individually since they will be allowed to eat the snacks at the end.
- Students will be instructed to pretend to be a bee, moving around their desk to take one cheesy snack from each flower and move it to the bowl, until they have returned to their original flower. Once they are back at flower 1, ask them to rub their fingers on flower 1. They should leave cheesy prints all over flower 1.
- Let them know this is what the bees do with pollen on the flowers. Bees will go from flower to flower collecting pollen, which is represented in this lesson by the cheesy powder. When the bee lands it brings pollen to a new flower, which will eventually cause it to make new seeds, for new flowers.
- Students can either make a mini-pollination book, or write the following sentences in their journal.
    a. The wind or animals move pollen from one plant to another. Draw 3 flowers

	and a bee leaving pollen on the flowers. b. Using adjectives describe and draw what pollen looks like, using the sentence starter.. "Pollen looks like… c. Write 3 or more sentences about the word, "pollen". For example: Pollen is a powder.

Gifted and Talented: Enrichment Links and Writing Prompts

Links:
The Death of Bees
Seed Dispersal and Pollination-Teacher Worksheet
Seed Dispersal and Pollination- Student Worksheet
Pollination worksheets
Build a Bee House
Busy Bees
Writing Prompts:
Draw or write sentences to finish the prompts.
If a bee loses its wings, how would this affect the bee? How would this affect the pollination process?

At-Risk, Including ELL: Resources to Enhance Understanding

Books: From Seed to Plant, Gail Gibbons, Adios Oscar, Peter Elwell, The Honey Makers, Gail Gibbons,The Life and Times of the Honeybee, Charles Maccuci, Amazing Bees, Sue Unstead
Reading A to Z: Most Books are in English and Spanish
Bees Feed Me, Level D
These Bees, Level D
Fuzzy Buzzy Bee, not leveled
What Comes From Plants, Level J
The Plant, Level E
Video Links:
Real Science-Cheese Puff Pollination
Plant Needs
Pollination
Plant and Animal Interactions
Plants and Animals Depend on Each Other

Content Area: Science

Unit Title: Unit III

2-ESS1 Earth's Place in the Universe/Landforms and Water

Target Course/Grade Level: Science/Second Grade

Unit Summary: Learning Goal

Students will use information from several sources to provide evidence that Earth events can occur quickly or slowly.

Interdisciplinary Connections:

- Science, Technology, English / Language Arts, Health, Social Emotional Learning, Mathematics, Social Studies

Career Readiness: Life Literacies and Key Skills Standards:

- Career Readiness, Life Literacies and Key Skills
  - These include critical thinking, problem solving, creativity, innovation, collaboration, teamwork and leadership, cross-cultural understanding, and interpersonal communication and science.
  - Incorporation of relevant technologies as tools as part of instruction (i.e. Chromebooks, Touch screen devices, manipulatives, certified assistive technologies for students with special needs, etc.)
  - Developing effective communication
  - Developing Independent Learning Strategies
  - Incorporating Science, Technology, Engineering, and Mathematical themes into daily lessons

Learning Targets:

- 2-ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly.
- 2-ESS2-1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.
- 2-ESS2-2 Develop a model to represent the shapes and kinds of land and bodies of water in an area
- 2ESS2-3 Obtain information to identify where water is found on Earth and that it can be solid or liquid
- 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.
- 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-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Unit Activity	Suggested Learning Activities
III.	**Science and Engineering Practices:** 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. (2-ESS1-1) **DCI**: 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. (2-ESS1-1)

Crosscutting Concepts: Stability and Change Things may change slowly or rapidly. (2-ESS1-1)

Lesson Plan Activity: Earth Research Presentation Projects

Students can work individually or in groups to make a research poster or 3D model with words, labels, and pictures, for a chosen topic. Then students will present their discoveries.

Choose one of the following Performance Tasks for

Module Earth's Surface:

Make a Model of a Landform

Labeling Earth's Oceans on a Poster

Make a Model of Fresh Water Movement

Polar Ice Cap Research Performance Project

Choose one of the following Performance Tasks for

Module Earth's Surface Changes

Earth's Slow Changes

Earth's Quick Changes

Compare Solutions to Earth's Quick and Slow Changes, Make a be a Scientist Notebook

Tell how Tectonic Plates change the Earth

Extra Activities:

1. **Lesson Plan Activity: Make a Topographic Map**

Follow this link to make your own 3D map!

Topographic Map from Nasa

2. **Lesson Plan Activity: Clay Craft Landforms**

Follow this Link:

Clay Landforms

Gifted and Talented: Enrichment Links and Writing Prompts

Links:

Maps and Landforms Song
Volcanic Eruptions
How was the Grand Canyon Formed?
Augmented Reality Sandbox
Why Do Rivers Curve?
Climate Change and the Earth
Epic Mudslide Caught on Camera
Glacier National Park is Melting Away
Tectonic Forces

Writing Prompts:

Draw or write sentences to finish the prompts.

"What effect does a volcano have on the Earth?"
"Does Earth have more saltwater or freshwater?
"Draw and explain the "Water Cycle".
"Pick two or more landforms to illustrate: mountain, volcano, bluff, valley, plain, island."
"What are Tectonic Plates?"
"Why is Rwanda the "Land of a Thousand Hills?"

At-Risk, Including ELL: Resources to Enhance Understanding

Books: Earth's Landforms and Bodies of Water by Natalie Hyde, Earth's Landforms and Bodies of Water by Natalie Hyde, V is for Volcano by Library Adventure, Eruption the Story of Volcanos by Anita Ganeri, Everything Volcanoes and Earthquakes, by Katy Furgang,

Reading A to Z: Most Books are in English and Spanish
Landforms Adventure, Level N
Rocks Factual Description, Level C
Sinkhole Science, Level Q

Video Links:
Types of Landforms
How much water is on the Earth?
All About the Earth
The Oceans
Earth Vocabulary
Formation of the Continents
The Seven Continents Made Easy

Content Area: Science

Unit Title: Unit IV

2-ESS2: Earth's Systems/Changes Made by Water and Wind

Target Course/Grade Level: Second Grade

Unit Summary: Learning Goals:
Students will be able to understand that wind and water can change the shape of the land.

Interdisciplinary Connections:

- Science, Technology, English / Language Arts, Health, Social Emotional Learning, Mathematics, Social Studies

Career Readiness: Life Literacies and Key Skills Standards:

- Career Readiness, Life Literacies and Key Skills
  - These include critical thinking, problem solving, creativity, innovation, collaboration, teamwork and leadership, cross-cultural understanding, and interpersonal communication and science.
  - Incorporation of relevant technologies as tools as part of instruction (i.e. Chromebooks, Touch screen devices, manipulatives, certified assistive technologies for students with special needs, etc.)
  - Developing effective communication
  - Developing Independent Learning Strategies
  - Incorporating Science, Technology, Engineering, and Mathematical themes into daily lessons

Learning Targets:

- ESS2.A: Earth Materials and Systems
- • Wind and water can change the shape of the land. (2-ESS2-1)
- 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. (2-ESS2-2)
- 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. (2-ESS2-3)

Unit Activity	Suggested Learning Activities
IV.	**Science and Engineering Practices:** 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. (2- ESS2-2) 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. (2-ESS2-1) 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, electronic menus, icons), and other media that will be useful in answering a scientific question. (2- ESS2-3)

DCI: ESS2.A: Earth Materials and Systems Wind and water can change the shape of the land. (2-ESS2-1) ESS2.B: Plate Tectonics and LargeScale System Interactions Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2) 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. (2- ESS2-3) 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. (secondary to 2-ESS2-1)

Crosscutting Concepts: Patterns in the natural world can be observed. (2-ESS2-2), (2-ESS2-3) Stability and Change Things may change slowly or rapidly. (2-ESS2-1) Connections to Engineering, Technology, and Applications of Science Influence of Engineering, Technology, and Science on Society and the Natural World Developing and using technology has impacts on the natural world. (2-ESS2-1) Connections to Nature of Science Addresses Questions About the Natural and Material World Scientists study the natural and material world. (2-ESS2-1)

Lesson Plan Activity: Weathering and Erosion

Make a model of weathering, erosion, and deposition using a stream.

Material List:

- 1 Bag of sand
- 1 Pen or pencil
- 1 Cup of small rocks
- 1 Large bottle of water
- 1 Baking tray (or similar sized container)

Instructions:

- In one half of the tray make a landmass with the sand (must be sloped downward).
- Lightly drag a pen or pencil through the sand in an "S" shape to create a riverbed.
- Place stones along the riverbed.
- Slowly pour water where the riverbed starts.

How It Works: When weathering breaks down the Earth's surface it forms small pieces of dirt, sand, and small rocks. All of this material can get moved through erosion - this happened in the model when flowing water in the riverbed moved some of the material down the hill. Eventually, these pieces ended up somewhere else. The process of the material being deposited at the bottom of the hill is called deposition. Weathering and Erosion Video

Gifted and Talented: Enrichment Links and Writing Prompts

Links:

Writing Prompts:

Draw or write sentences to finish the prompts.

"What are some places that have been affected by wind and water erosion that you know about?"

"What does a hurricane or tornado do to the Earth and the oceans?"

"Write about the effects of erosion."

"Does erosion change the Earth slowly or quickly?"

"Write about the effect that storms can have on beaches."\

"Identify where water can be found on Earth. Tell why it is a solid or a liquid."

"Can water be as powerful as an excavator? Why or Why not?"

At-Risk, Including ELL: Resources to Enhance Understanding

Books: Cracking Up - A Story About Erosion by Jacqui Bailey, How Do Wind and Water Change the Earth, by Apple Books, How Do Wind and Water Change Rock?, by Ellen Lawrence, Tornado, Nat Geo Kids

Reading A to Z: Most Books are in English and Spanish

The Force of Water, Level N

Land and Water, Level I

The Grand Canyon, Level H

Video Links:

Bill Nye-Erosion

Magic School Bus Rocks and Rolls

Make Your Own Erosion

How Does it Flood?

Tornados

Unit V Overview
Content Area: Science
Unit Title: Unit V **K-2-ETS1: Engineering Design**
Target Course/Grade Level: Second
Unit Summary: Learning Goal Students will ask questions, make observations, and gather information about a situation people want to change. ● They will define a simple problem that can be solved through the development of a new or improved object or tool.
Interdisciplinary Connections: ● Science, Technology, English / Language Arts, Health, Social Emotional Learning, Mathematics, Social Studies
Career Readiness: Life Literacies and Key Skills Standards: ● Career Readiness, Life Literacies and Key Skills ● These include critical thinking, problem solving, creativity, innovation, collaboration, teamwork and leadership, cross-cultural understanding, and interpersonal communication and science. ● Incorporation of relevant technologies as tools as part of instruction (i.e. Chromebooks, Touch screen devices, manipulatives, certified assistive technologies for students with special needs, etc.) ● Developing effective communication ● Developing Independent Learning Strategies ● Incorporating Science, Technology, Engineering, and Mathematical themes into daily lessons
Learning Targets: K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool. 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-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Unit Activity	Suggested Learning Activities
V.	**Science and Engineering Practices:** Asking Questions and Defining Problems Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions. Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2- ETS1-1) Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1) 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.

	(K-2-ETS1-2) Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3) **DCI:** 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. (K-2- ETS1-1) Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool. (K-2- ETS1-1) Before beginning to design a solution, it is important to clearly understand the problem. (K-2- ETS1-1) 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. (K-2-ETS1-2) 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. (K-2-ETS1-3) **Crosscutting Concepts:** Structure and Function The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2) **Marshmallow Catapult Lesson Activity** Marshmallow Catapults**-See this link for details.** **Fun Video to Begin: Jack Hartman-Simple Machines** Tell the students you want to make a simple machine that will launch marshmallows to a bowl or target. Have them brainstorm some ideas before you give them directions. Then pass out the supplies, and work with them as a group to build the catapults. Have fun learning about simple machines that solve problems. **Materials:** You only need a couple of supplies to make a marshmallow catapult: ● Four large marshmallows for each student ● Seven bamboo/wood skewers for each student ● One thin rubber band for each student ● One plastic spoon for each student ● Masking tape **Directions:** Using 3 marshmallows and 3 skewers, form a triangle. Use 3 more skewers and 1 more marshmallow to form a pyramid. Loop a thin rubber band over the topmost marshmallow. Tape a plastic spoon securely onto the end of another skewer. Insert spoon skewer through rubber band and into one of the base marshmallows to complete the catapult.

	When launching, be sure to hold the front marshmallow with one hand, and pull back the spoon with the other hand. **Tips For Success:** Be sure to let the marshmallows get stale before you make the catapults. If you use fresh marshmallows, they will tear quite easily as the kids play with the catapults. If you remember, open the bag of marshmallows the night before you want to use them, but if not, leave the marshmallows out for about an hour before construction. Have mini marshmallows or cheerios on hand to launch. You can also launch the larger size marshmallows; they just won't go quite as far. Try launching multiple small candies at once. Extend the play time by creating targets on the table or the wall for kids to launch into. You can use masking tape to create targets, or even set out hula hoops or baskets. Be aware that the skewers do have a pointy end which is sharp, so if you are making these with younger kids you might want to snip the point off with kitchen shears.

Gifted and Talented: Enrichment Links and Writing Prompts

Links:
What is an engineer?
Make a Straw Rocket
Marshmallow Catapults
Simple Machines for Kids
What is the Perfect Road for a Square Wheel?

Writing Prompts:
Draw or write sentences to finish the prompts.
"Write about two or more tools you have used."
"Write about a problem you solved."
"How do you learn new things?"
"What is research?"
"How do shapes help us solve problems?"

At-Risk, Including ELL: Resources to Enhance Understanding

Books: The Kids Book of Simple Machines, Simple Machines the Way They Work, Simple Machines, Wheels, Levers, Pulleys by Adler, Simple Machines, Let's Read,

Reading A to Z: Most Books are in English and Spanish
The Steam Engine, Level P
Simple Machines, Level K
Tools, Level C

Video Links:
Engineer Song
Solving Problems with Simple Tools
Simple Machines Song
Work Smarter, Not Harder

Cape May City Elementary School District Science Curriculum
Evidence of Learning

Specific Formative Assessments Utilized in Daily Lessons:

- Suggested Formative Assessment
- Daily independent practice
- Peer Discussions
- Student Portfolio
- Reading/Writing Conferences
- Self-Evaluations
- Anecdotal Notes
- Open-Ended Responses
- Journal Entries
- Reading Logs
- Exit Tickets

Summative Assessment Utilized throughout Units:

- Performance Tasks
- Technology Tasks

Benchmarks:

- Quarterly Benchmarks Generated by the Teacher / Curriculum Committee

Modifications for English Language Learner's [ELL]

- Teacher tutoring
- Peer tutoring
- Online Resources
- Cooperative Learning Groups
- Modified Assignments
- Differentiated Instruction
- Response to Intervention (www.help4teachers.com)
- Provide additional examples and opportunities for additional problems for repetition with visuals and manipulatives
- Picture vocabulary
- Picture books
- Simplified language for understanding
- Reader's Theater
- Modify Homework, Assignments and Assessment (can be oral if necessary)

- Cooperative learning
- Retell stories using props
- Additional Center work focusing on alphabet and HFW
- Additional Phonemic Awareness teaching and practice
- Re-teach alphabet and alphabet sounds
- Sentence frames with word bank and pictures
- Songs
- Total Physical Response
- Picture word wall

Modifications for Special Education Students [IEPs]:

- Follow all IEP accommodations for each student as to meet each student's individual need
- For extra strategies please review list above in the ELL category for students who have IEPs
- Provide instructional breaks / practice chunking
- Circling back to original topic
- Lexile score modifications

Modifications for students with 504s:

- Adhere to the modifications of the 504
- For extra strategies please review list above in the ELL category for students who have IEPs
- Provide instructional breaks / practice chunking
- Circling back to original topic
- Lexile score modifications

Modifications Gifted and Talented Students:

- Advanced Lexile Resources
- Independent Study
- Advanced Assignments
- Project Based Learning

Modifications At-Risk/Basic Skills:

- Teacher tutoring
- Supplemental / Pull Out Teaching
- Peer tutoring
- Cooperative Learning Groups / Centers
- Modified Assignments
- Differentiated Instruction
- Response to Intervention (www.help4teachers.com)
- Provide additional examples and opportunities for additional problems for repetition with visuals and manipulatives
- Picture vocabulary
- Picture books
- Simplified language for understanding
- Reader's Theater
- Modify Homework, Assignments and Assessment (can be oral if necessary)
- Cooperative learning
- Retell stories using props
- Additional Center work focusing on alphabet and HFW
- Additional Phonemic Awareness teaching and practice
- Sentence frames with word bank and pictures
- Songs
- Total Physical Response
- Picture word wall

Teacher Notes:

- **Career Readiness, Life Literacies, and Key Skills:** Rapid advancements in technology and subsequent changes in the economy have created opportunities for individuals to compete and connect on a global scale. In this increasingly diverse and complex world, the successful entrepreneur or employee must not only possess the requisite education for specific industry pathways but also employability skills necessary to collaborate with others and manage resources effectively in order to establish and maintain stability and independence. This document outlines concepts and skills necessary for New Jersey's students to thrive in an ever-changing world. Intended for integration throughout all K–12 academic and technical content areas, the New Jersey Student Learning Standards- Career Readiness, Life Literacies, and Key Skills (NJSLS-CLKS) provides the framework for students to learn the concepts, skills, and practices essential to the successful navigation of career exploration and preparation, personal finances and digital literacy that rewards innovation, creativity, and adaptation to change.

Project-based Learning Tasks:

- Ongoing student portfolio assessments [created by faculty] to monitor student progress.

Vocabulary:

- In-text vocabulary should be incorporated into every unit. Word journals, vocabulary walls, and/or various other activities should be utilized by the instructor to teach vocabulary.
- Story, key details, retell, describe, main topic, rhyming words, syllables, story elements, character, setting, question,

question words, front cover, back cover, title page, narrative, favorite, informational text, rules, connection, discuss, conversation, information, illustrator, author, illustrate, picture

The Research Process:

- The research process must be integrated within each course curriculum. Students will be provided with opportunities to investigate issues from thematic units of study. As the NJSLS indicate, students will develop proficiency with MLA or APA format as applicable.
- https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/general_format.html
- https://owl.purdue.edu/owl/research_and_citation/mla_style/mla_formatting_and_style_guide/mla_formatting_and_style_guide.html

Technology:

- Students must engage in technology applications integrated throughout the curriculum, though technology provided by us in their individual classroom, and in our technology centered classrooms.
- BrainPop
- Time for Kids Magazine online
- Scholastic Magazine online
- Google Earth
- Nationalgeographic.com
- StemScopes

Resources:

- Ancillary resources and materials used to deliver instruction are included below:
- Stemscopes
- Learning New Jersey Model Curriculum
- Reading A-Z.com
- Abcmouse .com
- EnchantedLearning,Com
- Sing Along Songs
- Scholastic.com
- Bilingualplanet.com
- Frog street
- Press.com
- 122 teachme.com
- www.starfall.com
- www.teacherspayteachers.com
- www.teachingchannel.org
- www.udl.org
- http://www.state.nj.us/education/aps/cccs/ss/
- www.macmillanmh.com –downloadable graphic organizer

Career Education & Resources:

- **NJDOE CTE (https://www.nj.gov/education/cte/)**
- Careers are Everywhere Workbook (https://lmci.state.tx.us/shared/careersareeverywhere.asp)
- Career Bingo (http://www.breitlinks.com/careers/career_pdfs/careerbingo.pdf)
- Vocational Information Center / Career Exploration Guides and Resources for Younger Students (http://www.khake.com/page64.html)
- CTE NJDOE Career Explore (https://www.nj.gov/education/cte/resources/tools/exploration.htm)

Differentiation Strategies

Differentiation strategies can require varied amounts of preparation time. High-prep strategies often require a teacher to both create multiple pathways to process information/demonstrate learning and to assign students to those pathways. Hence, more ongoing monitoring and assessment is often required. In contrast, low-prep strategies might require a teacher to strategically create process and product choices for students, but students are allowed to choose which option to pursue given their learning profile or readiness level. Also, a low-prep strategy might be focused on a discrete skill (such as vocabulary words), so there are fewer details to consider. Most teachers find that integration of one to two new low-prep strategies and one high-prep strategy each quarter is a reasonable goal.

Low Prep Strategies	
Varied journal prompts, spelling or vocabulary lists	Students are given a choice of different journal prompts, spelling lists or vocabulary lists depending on level of proficiency/assessment results.
Anchor activities	Anchor activities provide meaningful options for students when they are not actively engaged in classroom activities (e.g., when they finish early, are waiting for further directions, are stumped, first enter class, or when the teacher is working with other students). Anchors should be directly related to the current learning goals.
Choices of books	Different textbooks or novels (often at different levels) that students are allowed to choose from for content study or for literature circles.
Choices of review activities	Different review or extension activities are made available to students during a specific section of the class (such as at the beginning or end of the period).
Homework options	Students are provided with choices about the assignments they complete as homework. Or, students are directed to specific homework based on student needs.
Student-teacher goal setting	The teacher and student work together to develop individual learning goals for the student.
Flexible grouping	Students might be instructed as a whole group, in small groups of various permutations (homogeneous or heterogeneous by skill or interest), in pairs or individuals. Any small groups or pairs change over time based on assessment data.
Varied computer programs	The computer is used as an additional center in the classroom, and students are directed to specific websites or software that allows them to work on skills at their

	level.
Multiple Intelligence or Learning Style options	Students select activities or are assigned an activity that is designed for learning a specific area of content through their strong intelligence (verbal-linguistic, interpersonal, musical, etc.)
Varying scaffolding of same organizer	Provide graphic organizers that require students to complete various amounts of information. Some will be more filled out (by the teacher) than others.
Think-Pair-Share by readiness, interest, and/or learning profile	Students are placed in predetermined pairs, asked to think about a question for a specific amount of time, then are asked to share their answers first with their partner and then with the whole group.
Mini workshops to re-teach or extend skills	A short, specific lesson with a student or group of students that focuses on one area of interest or reinforcement of a specific skill.
Orbitals	Students conduct independent investigations generally lasting 3-6 weeks. The investigations "orbit" or revolve around some facet of the curriculum.
Games to practice mastery of information and skill	Use games as a way to review and reinforce concepts. Include questions and tasks that are on a variety of cognitive levels.
Multiple levels of questions	Teachers vary the sorts of questions posed to different students based on their ability to handle them. Varying questions is an excellent way to build the confidence (and motivation) of students who are reluctant to contribute to class discourse. Note: Most teachers would probably admit that without even thinking about it they tend to address particular types of questions to particular students. In some cases, such tendencies may need to be corrected. (For example, a teacher may be unknowingly addressing all of the more challenging questions to one student, thereby inhibiting other students' learning and fostering class resentment of that student.)
High Prep Strategies	
Cubing	Designed to help students think about a topic or idea from many different angles or perspectives. The tasks are placed on the six sides of a cube and use commands that help support thinking (justify, describe, evaluate, connect, etc.). The students complete the task on the side that ends face up, either independently or in homogenous groups.
Tiered assignment/ product	The content and objective are the same, but the process and/or the products that students must create to demonstrate mastery are varied according to the students' readiness level.
Independent studies	Students choose a topic of interest that they are curious about and want to discover new information on. Research is done from questions developed by the student and/or teacher. The researcher produces a product to share learning with

	classmates.
4MAT	Teachers plan instruction for each of four learning preferences over the course of several days on a given topic. Some lessons focus on mastery, some on understanding, some on personal involvement, and some on synthesis. Each learner has a chance to approach the topic through preferred modes and to strengthen weaker areas
Jigsaw	Students are grouped based on their reading proficiency and each group is given an appropriate text on a specific aspect of a topic (the economic, political and social impact of the Civil War, for example). Students later get into heterogeneous groups to share their findings with their peers, who have read about different areas of study from source texts on their own reading levels. The jigsaw technique allows you to tackle the same subject with all of your students while discreetly providing them the different tools they need to get there.
Multiple texts	The teacher obtains or creates a variety of texts at different reading levels to assign strategically to students.
Alternative assessments	After completing a learning experience via the same content or process, the student may have a choice of products to show what has been learned. This differentiation creates possibilities for students who excel in different modalities over others (verbal versus visual).
Modified Assessments	Assessments can be modified in a variety of ways – for example by formatting the document differently (e.g. more space between questions) or by using different types of questions (matching vs. open ended) or by asking only the truly essential questions.
Learning contracts or Personal Agendas	A contract is a negotiated agreement between teacher and student that may have a mix of requirements and choice based on skills and understandings considered important by the teacher. A personal agenda could be quite similar, as it would list the tasks the teacher wants each student to accomplish in a given day/lesson/unit. Both Learning contracts and personal agendas will likely vary between students within a classroom.
Compacting	This strategy begins with a student assessment to determine level of knowledge or skill already attained (i.e. pretest). Students who demonstrate proficiency before the unit even begins are given the opportunity to work at a higher level (either independently or in a group).
Literature circles	Flexible grouping of students who engage in different studies of a piece of literature. Groups can be heterogeneous and homogeneous.
Learning Centers	A station (or simply a collection of materials) that students might use independently to explore topics or practice skills. Centers allow individuals or groups of students to work at their own pace. Students are constantly reassessed to determine which centers are appropriate for students at a particular time, and to plan activities at those centers to build the most pressing skills.

Tic-Tac-Toe Choice Board (sometimes called "Think-Tac-Toe"	The tic-tac-toe choice board is a strategy that enables students to choose multiple tasks to practice a skill, or demonstrate and extend understanding of a process or concept. From the board, students choose (or the teacher assigns) three adjacent or diagonal. To design a tic-tac-toe board: - Identify the outcomes and instructional focus - Design 9 different tasks - Use assessment data to determine student levels - Arrange the tasks on a tic-tac-toe board either randomly, in rows according to level of difficulty, or you may want to select one critical task to place in the center of the board for all students to complete.

Curriculum Development Resources/Instructional Materials:

List or Link Ancillary Resources and Curriculum Materials Here:

- New Jersey Student Learning Standards (https://www.nj.gov/education/cccs/)
- NJSLS Science (https://www.nj.gov/education/modelcurriculum/sci/)

Board of Education Approved Text(s)

Scholastic Magazines

National Geographic for Kids

Time Magazine for Kids

StemScopes

Newsela