2nd Grade Unit 3 - Mapping Our Changing Earth

Content Area: **Science**
Course(s): **Science Grade 2**
Time Period: **MP3**
Length: **29 days**
Status: **Published**

NJSLS - Science

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.
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.
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

Constructing Explanations and Designing Solutions
Make observations from several sources to construct an evidence-based account for natural phenomena. (2-ESS1-1)

Compare multiple solutions to a problem. (2-ESS2-1)

Developing and Using Models
Develop a model to represent patterns in the natural world. (2-ESS2-2)

Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS-1-2)

Obtaining, Evaluating, and Communicating 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)

Asking Questions and Defining Problems
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)

Analyzing and Interpreting Data
Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth

Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1)

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)

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)

Asking questions, making observations, and gathering information are helpful in thinking about problems. (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

Stability and Change

Things may change slowly or rapidly. (2-ESS1-1, 2-ESS2-1)

Patterns

Patterns in the natural world can be observed. (2-ESS2-2, 2-ESS2-3)

Structure and Function

The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS-1-2)

Rationale and Transfer Goals

In this unit, students will discover the dynamic systems that shape our planet. Students will investigate how Earth's landscapes are constantly in motion, comparing changes that happen rapidly, such as volcanic eruptions and earthquakes, with those that occur imperceptibly slowly over long periods, like the erosion of a canyon.

Through hands-on modeling and engineering design, students will collaborate to propose and test solutions to slow down or prevent wind and water from reshaping the land. Moving from the ground to the globe, students will develop spatial awareness by creating and interpreting maps to reveal the shapes and kinds of land and water in an area. Finally, students will identify where water exists on Earth, distinguishing between solid ice and liquid water, and mapping its locations across the globe. By the conclusion of this unit, students will view Earth not as a static rock, but as an interconnected, ever-changing system of land and water.

Enduring Understandings

Earth's surface is constantly changing. Some of these changes happen in the blink of an eye, while others take longer than a human lifetime to occur.

While wind and water naturally reshape the land, humans can design, test, and use specific structures to slow down or prevent this erosion to protect our communities.

Maps and 3D models are essential tools that use shapes, lines, and colors to represent the actual features, boundaries, and scale of land and water in an area.

Water is found all over Earth in many different forms (both liquid and solid ice), and its location is closely tied to the shapes of the landforms around it.

Essential Questions

How does the shape of the land change, and how can we protect it?

How do maps help us understand the features of our planet?

Where is water found on Earth, and what forms does it take?

Content - What will students know?

- Earth events like earthquakes, tsunamis, landslides, and volcanic eruptions can change the shape of the land rapidly (in minutes or hours).
- Earth events like weathering and erosion (caused by wind, water, and ice) change the shape of the land extremely slowly (over hundreds, thousands, or millions of years).
- Scientists look at rock layers, fossils, and landforms to find clues about how the Earth used to look.
- Moving water (rivers, waves) and blowing wind physically move soil, sand, and rock from one place to another.
- Humans can design and build structures to slow down or prevent this movement.
- The characteristics of major landforms, including mountains, hills, valleys, plains, plateaus, and canyons.
- Maps use shapes, colors, and symbols to represent real-world land and water features from an aerial (birds-eye) perspective.
- Maps can show where land is flat and where it is tall or steep.
- Water is found in oceans, rivers, lakes, ponds, streams, and glaciers.
- Oceans contain saltwater and cover most of the Earth, while rivers and lakes are typically freshwater.
- Water exists on Earth as both a liquid (in oceans and rivers) and a solid (as ice in glaciers and polar ice caps).

Skills - What will students be able to do?

- Compare and contrast Earth events that happen quickly (e.g., volcanoes, landslides) versus those that happen slowly (e.g., weathering, erosion) using evidence from text and media.
- Observe and describe how wind and water change the shape of land using classroom models (e.g., stream tables, sand trays).
- Identify patterns in nature that show evidence of past Earth changes (e.g., the shape of a canyon, a carved-out riverbank).
- Brainstorm and sketch multiple design solutions to prevent or slow down wind/water erosion (e.g., planting vegetation, building retaining walls, creating windbreaks).
- Construct and test a physical prototype of an erosion-control structure using classroom materials.
- Compare the effectiveness of different solutions based on data gathered during testing to determine which design worked best.
- Create a 2D or 3D model (such as a clay model, drawing, or digital map) representing local or global

landforms and bodies of water.

- Read and interpret a simple map by using shapes, colors, and symbols to identify specific physical features (e.g., recognizing that a blue wavy line represents a river, or a brown triangle represents a mountain).
- Describe spatial relationships on a map (e.g., explaining that a river flows from a mountain down into an ocean).
- Obtain and sort information from books or digital resources to identify the locations of fresh water versus salt water on Earth.
- Classify water found in different Earth features as either a liquid (rivers, lakes, oceans) or a solid (glaciers, ice caps).
- Communicate findings about Earth's water features using a combination of drawings, writing, and oral presentations.

Activities - How will we teach the content and skills?

- Mystery Science Work of Water Anchor Phenomenon
- Mystery Science Work of Water Lesson 1
- Mystery Science Work of Water Lesson 2
- Mystery Science Work of Water Lesson 3
- Mystery Science Work of Water Lesson 4
- Mystery Science Work of Water Lesson 5
- Mystery Science Work of Water Lesson 6
- Whole group instruction and discussion.
- Read Alouds
- Group and Individual Projects
- Hands-on discovery when possible; creating models
- Webquests/Internet “field trips”

Formative Assessments

- Mystery Science Work of Water Lesson 1 Assessment
- Mystery Science Work of Water Lesson 2 Assessment
- Mystery Science Work of Water Lesson 3 Assessment
- Mystery Science Work of Water Lesson 4 Assessment
- Mystery Science Work of Water Lesson 5 Assessment
- Mystery Science Work of Water Lesson 6 Assessment
- Teacher Observation
- Student projects/models
- Exit Tickets

Summative Assessments

- Tests/Quizzes
- Mystery Science Work of Water Unit Assessment
- Grade 2 Science Benchmark #3

Spiraling for Mastery

Content or Skill for this Unit	Spiral Focus from Previous Unit	Instructional Activity
N/A	Kindergarten: A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions.	K-PS2-1 Activities

Career Readiness, Life Literacies, & Key Skills

9.1.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.
9.1.2.CR.1	Recognize ways to volunteer in the classroom, school and community.

9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
9.1.2.CR.2	List ways to give back, including making donations, volunteering, and starting a business.
9.4.2.CI.2	Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
9.4.2.CT.1	Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).
9.4.2.CT.2	Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
9.4.2.IML.3	Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).

Interdisciplinary Connections

2.NBT.A.3	Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
2.DL.B.4	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.
RI.CR.2.1	Ask and answer questions to demonstrate understanding of key details in an informational text, referring explicitly to the text as the basis for the answers.
W.SE.2.6	Prioritize information provided by different sources on the same topic while gathering ideas and planning to write about a topic.
SL.UM.2.5	Use multimedia; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.