Ocean Academy Charter School
Curriculum Guide
Grade 2 - Science

Original Adoption:	August 2025
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OCEAN ACADEMY CHARTER SCHOOL **Science Curriculum**	
Content Area: Science	
Course Title: Science	
Grade Level: Grade 2	
Unit Title	**Pacing Guide in Days**
Unit Plan 1: Matter and Its Interactions	30 Days
Unit Plan 2: Ecosystems: Interactions, Energy, and Dynamics **Climate Change**	30 Days
Unit Plan 3: Earth's Place in the Universe **Climate Change**	30 Days
Unit Plan 4: Engineering Design	On Going

OCEAN ACADEMY CHARTER SCHOOL **Unit 1 Overview**	
Content Area: Science	
Unit Title: Matter and Its Interactions	**Duration:** 30 Days
Target Course/Grade Level: Grade 2	

Introduction/Unit Focus-

The performance expectations in second grade help students formulate answers to questions such as: How are materials similar and different from one another, and how do the properties of the materials relate to their use? How can materials be assembled or disassembled to change their purpose? Students will be able to construct an argument with

evidence some change caused by heating and cooking can be reversed and some cannot. An understanding of observable properties of materials is developed by students at this level through analysis and classification of different materials. The crosscutting concepts of patterns; cause and effect; energy and matter; structure and function; stability and change; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the second grade performance expectations, students are expected to demonstrate grade appropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

Disciplinary Concepts for the Unit

Standard 9.1 Personal Financial Literacy

This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

Standard 9.2 Career Awareness, Exploration, Preparation and Training

This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Standard 9.4 Life Literacies and Key Skills

This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science

Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking

Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

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Diversity and Inclusion: C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

The instruction shall:

(1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;

(2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and

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Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLS) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

"Twenty-first century themes and skills" means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy."

Focus Standards (Major Standards) https://www.nj.gov/education/cccs

Content Standards: New Jersey Student Learning Standards for Science

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 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. 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.]		
Science and Engineering Practices	**Discipline Core Ideas/Unit Enduring Understandings**	**Crosscutting Concepts**
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) 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)	**Patterns** **Patterns in the natural and human designed world can be observed. (2-PS1-1)**
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. (2-PS1-2)	**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)	**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)

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)		**Energy and Matter** Objects may break into smaller pieces and be put together into larger pieces, or change shapes. (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)		***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)
New Jersey Student Learning Standards: Interdisciplinary Connections https://www.nj.gov/education/cccs		

ELA/Writing

- 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. (2-PS1-4)
- RI.IT.2.3. Describe the connection between a series of historical events, scientific ideas or concepts, or steps in a sequence within a text. (2-PS1-4)
- RI.AA.2.7. Describe and identify the logical connections of how reasons support specific points the author makes in a text.(2-PS1-2),(2-PS1-4)
- W.AW.2.1. With prompts and support, write opinion pieces to present an idea with reasons or information. (2-PS1-4)
- W.WR.2.5. Generate questions about a topic and locate related information from a reference source to obtain information on that topic through shared and independent research. (2-PS1-1),(2-PS1-2),(2-PS1-3)
- 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. (2-PS1-1),(2-PS1-2),(2-PS1-3)

Mathematics

- MP.2 Reason abstractly and quantitatively. (2-PS1-2)
- MP.4 Model with mathematics. (2-PS1-1),(2-PS1-2).
- MP.5 Use appropriate tools strategically. (2-PS1-2) 2.
- 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. (2-PS1-1),(2-PS1-2)

New Jersey Student Learning Standards: Career Readiness, Life Literacies, and Key Skills

Core Ideas	Performance Expectations (Identified with Standard Number and statement)
Creativity and Innovation: Brainstorming can create new, innovative ideas.	9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2). 9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
Critical Thinking and Problem-solving: Critical thinkers must first identify a problem then develop a plan to address it in order to effectively solve a problem.	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).
Information and Media Literacy: Digital tools and media resources provide access to	9.4.2.IML.1: Identify a simple search term to find information in a search engine or digital resource.

vast stores of information that can be searched.	
Information and Media Literacy: A variety of diverse sources, contexts, disciplines and cultures provide valuable and necessary information that can be used for different purposes.	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).
New Jersey Student Learning Standards: Computer Science and Design Thinking	
Core Ideas	**Performance Expectations (Identified with Standard Number and Statement)**
Data & Analysis: Individuals collect, use, and display data about individuals and the world around them.	8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats.
Data & Analysis: Data can be used to make predictions about the world.	8.1.2.DA.3: Identify and describe patterns in data visualizations. 8.1.2.DA.4: Make predictions based on data using charts or graphs.
Algorithms & Programming: Individuals develop and follow directions as part of daily life. A sequence of steps can be expressed as an algorithm that a computer can process.	8.1.2.AP.1: Model daily processes by creating and following algorithms to complete tasks.
Algorithms & Programming: People work together to develop programs for a purpose, such as expressing ideas or addressing problems. The development of a program involves identifying a sequence of events, goals, and expected outcomes, and addressing errors (when necessary).	8.1.2.AP.5: Describe a program's sequence of events, goals, and expected outcomes. 8.1.2.AP.6: Debug errors in an algorithm or program that includes sequences and simple loops.

New Jersey Student Learning Standards: Climate Change Mandate	
Core Ideas	**Performance Expectations (Identified with Standard Number and Statement)**
Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a	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.

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.	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.

Knowledge and Skills

Unit Learning Targets (Objectives):
Students will be able to…

- ➢ Separate objects based on observable properties.
- ➢ Explain a classification system for organizing objects.
- ➢ Brainstorm a list of possible structures that could be built with different materials.
  - ○ Students can build bridges or houses. Select one structure from the list and determine the intended purpose of that structure. Select two or three different materials that can be used to build the structure.
  - ○ Investigate the physical properties of the materials, including shape, strength, flexibility, hardness, texture, or absorbency.
  - ○ Collect and analyze data to determine whether or not the given materials have properties that are suited for the intended purpose of the selected structure. In groups, students will use one of the materials to build the structure. (Teachers should have different groups use different types of materials)
  - ○ Test and compare how each structure performs. It is useful to compare the strengths and weaknesses of each structure and material used.
- ➢ Discuss and/or demonstrate how matter changes from liquid to gas.
- ➢ Make predictions and observe a solid become a liquid. Discuss whether the liquid can become a solid again.
- ➢ Observe liquid over long periods of time. Predict what will happen. Identify changes that occured that caused it to become a gas.

Unit Enduring Understandings:
Students will know…

- ➢ Matter exists as different substances that have various observable properties.
- ➢ Properties such as strength, flexibility, hardness, texture, and absorbency determine the purpose of matter.
- ➢ Objects may break into smaller pieces and be put together into larger pieces, or change shapes.
- ➢ Some materials experience permanent changes when heated or cooled, while others have changes that are reversible.

Unit Essential Questions:

- How can you describe and classify different kinds of materials?
- Which properties of different materials make them suitable for select functions?
- How can an object made of a small set of pieces be disassembled and made into a new object?
- How does heating and cooling change matter?

Instructional Plan

Students will engage in a science framework that enables them to investigate phenomena, design solutions to problems, make sense of evidence to construct arguments, and critique and discuss those arguments. This is a model to support students through mastery of the Next Generation Science Standards.
Science Resources

5 E Instructional Model provides opportunities for students to engage, explore, explain, elaborate and evaluate science content.

The Science block will consist of the following components:

Activities:
Engage: Raise a question and use compelling storytelling and visuals to introduce students to a scientific phenomenon and get them excited to investigate. Activate prior knowledge and prepare students for the day's learning. This is also known as an advance organizer, hook, or set induction.

- **Resources:**
  - Mystery Science- Anchor Phenomenon (Materials & Properties: Melting Metal)
    - Beat the Heat
    - See, Think, Wonder Chart
    - Activity and Discussion
  - PebbleGo
    - What is Matter?
    - Materials
    - Properties of Materials
  - NearPod

Explore: Students experience key concepts through a collaborative hands-on, inquiry activity. They test predictions, share ideas and record observations. Teachers act as a facilitator, supporting students in establishing relationships and communicating their experience and

ideas. This could be done through read alouds, videos, experiments, STEM/STEAM challenges and projects.

- ➢ **Resources:**
  - Mystery Science- Material Magic
    - Lesson 1: Materials, Properties, & Engineering (Activity:Mad Hatter)
    - Lesson 2: Classify Materials, Insulators, Properties (Activity: Feel the Heat)
    - Lesson 3: Heating, Cooling, & Phases of Matter (Activity: Candy Melt)
    - Lesson 4: Inventions & Engineering (Activity: Bouncy Glass Inventions)
    - Lesson 5: Materials, Properties, & Engineering (Activity: Paper Towers)
  - PebbleGo
    - NearPod

Explain: Students have frequent opportunities to connect their prior knowledge to new concepts. They share their thinking and build explanations. Post-activity questions encourage students to engage in sense-making, linking their findings to the Mystery question. Video exploration can build upon the student discussion and provide scientific explanation

- ➢ **Resources:**
  - Mystery Science:
    - Performance Task: Materials & Properties
  - PebbleGo
  - NearPod

Elaborate: Opportunity for students to apply their learning to a similar or new situation. Project ideas and readings can help extend the learning

- ➢ **Resources:**
  - Mystery Science:
    - Performance Task: Materials & Properties: Unit Review and Activity
    - Reading Extensions:
      - Lesson 1: T-Shirts and Shorts, The Silk Mystery, A Playground Problem
      - Lesson 2: Heat Stoppers
      - Lesson 3: Colorful Crayons, Breakfast Time, A Camping Trip
      - Lesson 4: Ideas that Pop, A Brush with History, Inventions: Then and Now
  - PebbleGo

- NearPod

Evaluate: Assess student understanding of learning objective

➢ **Resources:**

- Mystery Science- Material Magic
  - Lesson 1: Materials, Properties, & Engineering Assessment
  - Lesson 2: Classify Materials, Insulators, Properties Assessment
  - Lesson 3: Heating, Cooling, & Phases of Matter Assessment
  - Lesson 4: Inventions & Engineering Assessment
  - Lesson 5: Materials, Properties, & Engineering Assessment
  - Material Magic Unit Assessment
- PebbleGo
- NearPod

Evidence of Student Learning

Formative Assessments:

➢ Graphic Organizers & Guided Note Taking
➢ Directed Reading
➢ Cooperative Group Learning
➢ Homework
➢ Journal Entries

Summative Assessments:

➢ Mystery Science Unit Assessments
➢ Projects

Benchmark Assessments:

➢ RST- Research Simulation Task
➢ Associated Unit tests, quizzes
➢ Labs and engineering based projects

Alternative Assessments:

➢ Projects

Performance Tasks:

➢ Changing States of Matter hands on assignment

Suggested Options for Differentiation and Modifications

Special Education

- Follow all IEP modifications.
- Use visuals, manipulatives, and hands-on models.
- Pre-teach and review key vocabulary.
- Provide picture word banks and visual glossaries.
- Use small-group or one-on-one instruction.
- Assign peer tutoring or a "buddy" for lab activities.
- Read aloud directions; model steps for experiments.
- Use chants, songs, or gestures to reinforce science terms.
- Provide preferential seating near teacher or materials.
- Allow extra time for labs, projects, or assessments.
- Accept oral or dictated responses in place of written work.
- Shorten or modify assignments when needed.
- Use large-print materials, Braille, or digital/audio text.
- Provide scribes or augmentative communication devices if needed.

Students with 504 Plans

- Follow the 504 plan.
- Provide extra time for assignments, labs, or tests.
- Offer small-group or quiet settings for work.
- Allow oral or dictated responses.
- Provide large-print, Braille, or digital text with audio support.
- Use scribes or communication devices when required.

Students at Risk of School Failure

- Use visuals, real objects, and simple demonstrations.
- Pre-teach and revisit key science vocabulary.
- Provide step-by-step directions and check for understanding.
- Offer small-group instruction and guided practice.
- Use peer support during activities.
- Provide preferential seating.
- Break down experiments or projects into smaller, manageable steps.

Gifted and Talented

- Ask open-ended, higher-level science questions ("Why do you think…?", "What would happen if…?").
- Encourage discovery learning and independent investigations.
- Offer interest-based extension projects.
- Provide advanced science texts, videos, or enrichment tasks.

- Use flexible grouping for inquiry activities.
- Provide options and choice in how to show learning.
- Include enrichment centers, experiments, or STEM challenges.
- Encourage reflection and sharing of findings.

Multilingual Learners

- Collaborate with ESL/MLL teachers.
- Provide small-group or partner science activities.
- Pre-teach vocabulary using pictures, labels, and real objects.
- Use gestures, visuals, and graphic organizers to explain concepts.
- Provide bilingual or picture glossaries when possible.
- Offer sentence frames for lab discussions (e.g., "I observed ___").
- Allow oral responses and extended time.
- Use audio or recorded directions to support comprehension.

Diversity and Inclusion

- Respect and integrate cultural traditions in science examples.
- Involve families in projects and activities.
- Provide alternative assignments when appropriate.
- Use visuals and clear, simple language.
- Collaborate with support staff and language professionals.
- Create a structured, inclusive classroom environment.
- Provide wait time before calling on students to ensure participation.
- Build positive connections with families and caregivers.

Supplemental Resources

Instructional Materials:

- Read Alouds:
  - *What is the World Made Of* by Kathleen Weidner Zoehfeld
  - *All About Matter* by Mari Schuh
  - *Matter: Physical Science for Kids* by Andi Diehn
- Mystery Science: Material Magic
  - Lesson 1: Materials, Properties, and Engineering
  - Lesson 2: Classify Materials, Insulators, Properties
  - Lesson 3: Heating, Cooling, and Phases of Matter
  - Lesson 4: Inventions and Engineering
  - Lesson 5: Materials, Properties, and Engineering

Supplemental Materials:

- BrainPOP Jr. Videos:

- Changing States of Matter
- Physical and Chemical Changes
- Solids, Liquids, and Gases

➢ Mentor Text:

- Ice and Snow (Level D)
- Look How It Changes (Level E)
- Old Cans and Cars (Level F)
- Solids, Liquids, and Gases (Level F)
- The Land Around Us (Level G)
- Milk to Ice Cream (Level G)
- Wax To Crayons (Level G)
- Oranges to Orange Juice (Level G)
- What is a Solid (Level K)
- What is a Liquid (Level K)
- A Drop of Water
- Odd Boy Out: Young Albert Einstein
- What is the World Made Of?
- What's the Matter in Mr. Whisker's Room?
- Matter of Survival: Properties of Matter
- What Are Atoms? (Level H)
- What is Volume ? (Level I)
- Matter: See it, Touch it, Taste it, Smell it (Level K)
- Matter (Level L)
- What is a Gas? (Level J)
- States of Matter: How Water Changes (Level M)
- Solids, Liquids and Gases (Level N)
- Floating and Sinking (Level O)
- States of Matter (Level P)

Intervention Materials:

➢ www.readinga-z.com
➢ Vocabulary List
➢ Anchor Charts
➢ Think Pair Share
➢ Stations
➢ Choice Board

Teacher Notes

OCEAN ACADEMY CHARTER SCHOOL Unit 2 Overview

Content Area: Science	
Unit Title: Ecosystems: Interactions, Energy, and Dynamics	**Duration:** 30 Days
Target Course/Grade Level: Grade 2	

Introduction/Unit Focus

What do plants need to grow? How many types of living things live in a place? Students are expected to develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination. Students are also expected to compare the diversity of life in different habitats. The crosscutting concepts of patterns; cause and effect; energy and matter; structure and function; stability and change; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the second grade performance expectations, students are expected to demonstrate grade appropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

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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.]

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. [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	Discipline Core Ideas/Unit Enduring Understandings	Crosscutting Concepts
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. (2-LS2-2)	**LS2.A: Interdependent Relationships in Ecosystems** Plants depend on water and light to grow. (2-LS2-1) Plants depend on animals for pollination or to move their seeds around. (2-LS2-2)	**Cause and Effect** Events have causes that generate observable patterns. (2-LS2-1)
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-LS2-1)	**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. (secondary to 2-LS2-2)	**Structure and Function** The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)

	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. (2-LS4-1)	**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)

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ELA/Writing

- 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. (2-PS1-4)
- RI.IT.2.3. Describe the connection between a series of historical events, scientific ideas or concepts, or steps in a sequence within a text. (2-PS1-4)
- 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. (2-PS1-1),(2-PS1-2),(2-PS1-3)

Mathematics

- MP.2 Reason abstractly and quantitatively. (2-LS2-1),(2-LS4-1)
- MP.4 Model with mathematics. (2-LS2-1),(2-LS2-2),(2-LS4-1)
- MP.5 Use appropriate tools strategically. (2-LS2-1)
- 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. (2-LS2-2),(2-LS4-1)

New Jersey Student Learning Standards: Career Readiness, Life Literacies, and Key Skills

Core Ideas	**Performance Expectations (Identified with Standard Number and statement)**
Creativity and Innovation: Brainstorming can create new, innovative ideas	9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2). 9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
Critical Thinking and Problem-solving: Critical thinkers must first identify a problem then develop a plan to address it in order to effectively solve a problem.	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).
Information and Media Literacy: A variety of diverse sources, contexts, disciplines and cultures provide valuable and necessary information that can be used for different purposes.	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).
Technology Literacy: Collaboration can simplify the work an individual has to do and sometimes produce a better product.	9.4.2.TL.7: Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts (e.g., W.2.6., 8.2.2.ED.2).
New Jersey Student Learning Standards: Computer Science and Design Thinking	
Core Ideas	**Performance Expectations (Identified with Standard Number and Statement)**
Algorithms & Programming: Complex tasks can be broken down into simpler instructions, some of which can be broken down even further.	8.1.2.AP.4: Break down a task into a sequence of steps.
Algorithms & Programming: People work together to develop programs for a purpose, such as expressing ideas or addressing problems.	8.1.2.AP.5: Describe a program's sequence of events, goals, and expected outcomes. 8.1.2.AP.6: Debug errors in an algorithm or program that includes sequences and simple loops.
Interaction of Technology and Humans: Technology has changed the way people live and work. Various tools can improve daily tasks and quality of life.	8.2.2.ITH.3: Identify how technology impacts or improves life. 8.2.2.ITH.4: Identify how various tools reduce work and improve daily tasks. 8.2.2.ITH.5: Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution.
Effects of Technology on the Natural World: Reusing and recycling materials can save money while preserving natural resources and avoiding damage to the environment.	8.2.2.ETW.1: Classify products as resulting from nature or produced as a result of technology. 8.2.2.ETW.2: Identify the natural resources needed to create a product. 8.2.2.ETW.3: Describe or model the system used for recycling technology.

	8.2.2.ETW.4: Explain how the disposal of or reusing a product affects the local and global environment.

New Jersey Student Learning Standards: Climate Change Mandate	
Core Ideas	**Performance Expectations (Identified with Standard Number and Statement)**
All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.	K-LS1-1: Use observations to describe patterns of what plants and animals (including humans) need to survive.
Sunlight warms Earth's surface.	K-PS3-1: Make observations to determine the effect of sunlight on Earth's surface
Plants and animals can change their environment. Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.	K-ESS2-2: Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.
Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.	K-ESS3-1: Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.
Plants depend on water and light to grow.	2-LS2-1: Plan and conduct an investigation to determine if plants need sunlight and water to grow.

Knowledge and Skills
Unit Learning Targets (Objectives): *Students will be able to…*

- Conduct an investigation to identify why plants need sunlight and water to grow.
- Demonstrate how animals disperse seeds and pollinate plants.
- Observe and compare the diversity between different animal habitats.

Unit Enduring Understandings:
Students will know…

- Plants need water and light.
- Seed dispersal and pollination of plants occur when animals eat and travel to various areas.
- Diversity is dependent on availability of life sustaining resources

Unit Essential Questions:

- Do plants and animals need sunlight and water to grow?
- What are the steps that occur when animals help disperse seeds or aid in pollinating plants?
- What are observations that can be made about the diversity of living things in different habitats?

Instructional Plan

Activities:
Students will engage in a science framework that enables them to investigate phenomena, design solutions to problems, make sense of evidence to construct arguments, and critique and discuss those arguments. This is a model to support students through mastery of the Next Generation Science Standards.
Science Resources

5 E Instructional Model provides opportunities for students to engage, explore, explain, elaborate and evaluate science content.

The Science block will consist of the following components:

Engage: Raise a question and use compelling storytelling and visuals to introduce students to a scientific phenomenon and get them excited to investigate. Activate prior knowledge and prepare students for the day's learning. This is also known as an advance organizer, hook, or set induction.

- **Resources:**
  - Mystery Science- Animal Adventures: Anchor Phenomenon (Life Underground)
    - Bat Rest Stop Printout
    - Activity and Discussion
  - Mystery Science- Plant Adventures: Anchor Phenomenon (Superbloom)
    - See-Think-Wonder

- Activity and Discussion

Explore: Students experience key concepts through a collaborative hands-on, inquiry activity. They test predictions, share ideas and record observations. Teachers act as a facilitator, supporting students in establishing relationships and communicating their experience and ideas. This could be done through read alouds, videos, experiments, STEM/STEAM challenges and projects.

- **Resources:**
  - Mystery Science- Animal Adventures
    - Lesson 1: Biodiversity & Classification (Activity: Animal Sorting Games)
    - Lesson 2: Biodiversity, Habitats, & Species (Activity: Who's Calling?)
    - Lesson 3: Biodiversity & Engineering (Activity: Design a Bird Feeder)
  - Mystery Science- Plant Adventures
    - Lesson 1: Seed Dispersal (Activity: Fly Your Own Seed)
    - Lesson 2: Water, Sunlight, & Plant Growth (Activity: Seeds - Light and Dark)
    - Lesson 3: Light, Leaves, & Competition (Activity: Grass Head)
    - Lesson 4: Adaptations & Habitat (Activity: Grass Head Revisited)
    - Lesson 5: Adaptations & Habitat (Activity: Plant Survivor)

Explain: Students have frequent opportunities to connect their prior knowledge to new concepts. They share their thinking and build explanations. Post-activity questions encourage students to engage in sense-making, linking their findings to the Mystery question. Video exploration can build upon the student discussion and provide scientific explanation

- **Resources:**
  - Mystery Science: Animal Adventures
    - Performance Task: Biodiversity, Habitats, & Species

Elaborate: Opportunity for students to apply their learning to a similar or new situation. Project ideas and readings can help extend the learning

- **Resources:**
  - Mystery Science:
    - Performance Task: Biodiversity, Habitats, & Species: Unit Review and Activity
    - Reading Extensions:
      - Animal Adventures
        - Lesson 1: Mammals (Like us!)
        - Lesson 2: Newsela articles
        - Lesson 3: Martin's Birdhouse
      - Plant Adventures

- Lesson 1: The Koa Tree Mystery
- Lesson 2: "What Do Plants Need?"
- Lesson 3: "When a Tree Falls"
- Lesson 4: The Giant Saguaro
- Lesson 5: "Goats Clean Up a Famous Cemetery"

Evaluate: Assess student understanding of learning objective

➢ **Resources:**
- Mystery Science:
  - Animal Adventures
    - Lesson 1: Biodiversity & Classification Assessment
    - Lesson 2: Biodiversity, Habitats, & Species Assessment
    - Lesson 3: Biodiversity & Engineering Assessment
    - Animal Adventures Unit Assessment
  - Plant Adventures
    - Lesson 1: Seed Dispersal Assessment
    - Lesson 2: Water, Sunlight, & Plant Growth Assessment
    - Lesson 3: Light, Leaves, & Competition Assessment
    - Lesson 4: Adaptations & Habitat Assessment
    - Lesson 5: Adaptations & Habitat Assessment
    - Plant Adventures Unit Assessment

Evidence of Student Learning

Formative Assessments:
- ➢ Graphic Organizers & Guided Note Taking
- ➢ Directed Reading
- ➢ Cooperative Group Learning
- ➢ Homework
- ➢ Journal Entries

Summative Assessments:
- ➢ Mystery Science Unit Assessments
- ➢ Projects
- ➢ Science A-Z Unit Assessments

Benchmark Assessments:
- ➢ RST- Research Simulation Task
- ➢ Associated Unit tests, quizzes
- ➢ Labs and engineering based projects

Alternative Assessments:
- ➢ Projects

Performance Tasks:

- ➢ Plant seeds to identify life cycle. Track in a plant journal.
- ➢ Create a habitat for an animal.
- ➢ Watch the animal life cycle of an insect and track.

Options for Differentiation and Modifications

Special Education

- ➢ Follow all IEP modifications.
- ➢ Use visuals, manipulatives, and hands-on models.
- ➢ Pre-teach and review key vocabulary.
- ➢ Provide picture word banks and visual glossaries.
- ➢ Use small-group or one-on-one instruction.
- ➢ Assign peer tutoring or a "buddy" for lab activities.
- ➢ Read aloud directions; model steps for experiments.
- ➢ Use chants, songs, or gestures to reinforce science terms.
- ➢ Provide preferential seating near teacher or materials.
- ➢ Allow extra time for labs, projects, or assessments.
- ➢ Accept oral or dictated responses in place of written work.
- ➢ Shorten or modify assignments when needed.
- ➢ Use large-print materials, Braille, or digital/audio text.
- ➢ Provide scribes or augmentative communication devices if needed.

Students with 504 Plans

- ➢ Follow the 504 plan.
- ➢ Provide extra time for assignments, labs, or tests.
- ➢ Offer small-group or quiet settings for work.
- ➢ Allow oral or dictated responses.
- ➢ Provide large-print, Braille, or digital text with audio support.
- ➢ Use scribes or communication devices when required.

Students at Risk of School Failure

- ➢ Use visuals, real objects, and simple demonstrations.
- ➢ Pre-teach and revisit key science vocabulary.
- ➢ Provide step-by-step directions and check for understanding.
- ➢ Offer small-group instruction and guided practice.
- ➢ Use peer support during activities.
- ➢ Provide preferential seating.

- Break down experiments or projects into smaller, manageable steps.

Gifted and Talented

- Ask open-ended, higher-level science questions ("Why do you think…?", "What would happen if…?").
- Encourage discovery learning and independent investigations.
- Offer interest-based extension projects.
- Provide advanced science texts, videos, or enrichment tasks.
- Use flexible grouping for inquiry activities.
- Provide options and choice in how to show learning.
- Include enrichment centers, experiments, or STEM challenges.
- Encourage reflection and sharing of findings.

Multilingual Learners

- Collaborate with ESL/MLL teachers.
- Provide small-group or partner science activities.
- Pre-teach vocabulary using pictures, labels, and real objects.
- Use gestures, visuals, and graphic organizers to explain concepts.
- Provide bilingual or picture glossaries when possible.
- Offer sentence frames for lab discussions (e.g., "I observed ___").
- Allow oral responses and extended time.
- Use audio or recorded directions to support comprehension.

Diversity and Inclusion

- Respect and integrate cultural traditions in science examples.
- Involve families in projects and activities.
- Provide alternative assignments when appropriate.
- Use visuals and clear, simple language.
- Collaborate with support staff and language professionals.
- Create a structured, inclusive classroom environment.
- Provide wait time before calling on students to ensure participation.
- Build positive connections with families and caregivers.

Supplemental Resources

Instructional:

- Read Alouds:

- *From Seed to Plant* by Gail Gibbons
- *The Tiny Seed* by Eric Carle
- *The Magic School Bus: Plants Seeds*
- *National Geographic's From Seed to Plant*
- *Oh Say Can You Seed? All About About Flowering Plants* by Bonnie Worth

➢ Mystery Science: Plant Adventures
- Lesson 1: Seed Dispersal
- Lesson 2: Water, Sunlight, and Plant Growth
- Lesson 3: Light, Leaves, and Competition
- Lesson 4: Adaptations & Habitat
- Lesson 5: Adaptations & Habitat

➢ Mystery Science: Animal Adventures
- Lesson 1: Biodiversity & Classification
- Lesson 2: Biodiversity, Habitats, & Species
- Lesson 3: Biodiversity & Engineering

Supplemental:

➢ BrainPOP Jr. Video: Animals
- Food Chain
- Migration
- Classifying Animals
- Fish
- Mammals

➢ BrainPOP Jr. Video: Plants
- Parts of a Plant
- Plant Adaptations
- Plant Life Cycle

Intervention:

➢ Mentor Texts available in book rooms
- Exploding Ants: Amazing Facts About How Animals Adapt
- Extreme Animals: The Toughest Creatures on Earth
- Plants in Different Habitats
- Rainforest Grew All Around
- What Do You Do with a Tail Like This?
- Animals in Hiding (Level H)
- What Do You Do When Something Wants to Eat You? (Level K)
- What Color is Camouflage? (Level L)
- Animals and the Environment (Level I)
- Hurray for Plants (Level J)
- Hungry Plants (Level N)
- Animal Def: How Animals Protect Themselves
- I Wonder Why Trees Have Leaves (Level O)
- How Do Animals Adapt? (Level P)
- Giant Plant Eating Dinosaurs (Level M)

➢ PebbleGo
- Coral Reefs
- Deserts
- Grasslands

- Temperate Forests
- Tropical Rainforest
- Tundra
- Wetlands
- What are Plants?
- Plant Parts
- Plant Classification
- Plant Habitats
- Pollination
- Photosynthesis

Teacher Notes

OCEAN ACADEMY CHARTER SCHOOL Unit 3 Overview	
Content Area: Science	**Duration: 30 Days**
Unit Title: Earth's Place in the Universe	
Target Course/Grade Level: Grade 2	

Introduction/Unit Focus

The performance expectations in second grade help students formulate answers to questions such as: "How does land change and what are some things that cause it to change? What are the different kinds of land and bodies of water? Students are able to apply their understanding of the idea that wind and water can change the shape of the land to compare design solutions to slow or prevent such change. Students are able to 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 concepts of patterns; cause and effect; energy and matter; structure and function; stability and change; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the second grade performance expectations, students are expected to demonstrate grade appropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

Disciplinary Concepts for the Unit

Standard 9.1 Personal Financial Literacy

This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

Standard 9.2 Career Awareness, Exploration, Preparation and Training

This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Standard 9.4 Life Literacies and Key Skills

This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science

Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking

Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

Amistad Law: N.J.S.A. 18A 52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocide in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

Diversity and Inclusion: C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

The instruction shall:

(1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;

(2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and

(3) encourage safe, welcoming, and inclusive environments for all students regardless of

race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLS) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

"Twenty-first century themes and skills" means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy."

Focus Standards (Major Standards) https://www.nj.gov/education/cccs

Content Standards: New Jersey Student Learning Standards for Science

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.]

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.]

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.]

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	Discipline Core Ideas/Unit Enduring Understandings	Crosscutting Concepts
Constructing Explanations and Designing Solutions	**ESS1.C: The History of Planet Earth**	**Stability and Change**

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) Compare multiple solutions to a problem. (2-ESS2-1)	Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1)	Things may change slowly or rapidly. (2-ESS1-1)
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 model to represent patterns in the natural world. (2- ESS2-2)	**ESS2.A: Earth Materials and Systems** Wind and water can change the shape of the land. (2-ESS2-1)	**Patterns** Patterns in the natural world can be observed. (2-ESS2-2), (2-ESS2-3)
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	**ESS2.A: Earth Materials and Systems** Wind and water can change the shape of the land. (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)

(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)		
	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)	**Connections to Nature of Science** **Science Addresses Questions About the Natural and Material World** Scientists study the natural and material world. (2-ESS2-1)
	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)	

New Jersey Student Learning Standards: Interdisciplinary Connections
https://www.nj.gov/education/cccs

ELA/Writing —

- 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. (2-PS1-4)
- RI.IT.2.3. Describe the connection between a series of historical events, scientific ideas or concepts, or steps in a sequence within a text. (2-PS1-4)
- 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. (2-PS1-1),(2-PS1-2),(2-PS1-3)
- RI.CT.2.8. Compare and contrast two informational versions of the same idea or topic by different authors or authors from different cultures.

Mathematics —

- MP.2 Reason abstractly and quantitatively. (2-ESS1-1),(2-ESS2-1),(2- ESS2-2)

- MP.4 Model with mathematics. (2-ESS1-1),(2-ESS2-1),(2-ESS2-2)
- MP.5 Use appropriate tools strategically. (2-ESS2-1) 2.NBT.A Understand place value. (2-ESS1-1)
- 2.NBT.A Understand place value. (2-ESS1-1)
- 2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. (2- ESS2-2)
- 2.M.B.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 with a symbol for the unknown number to represent the problem. (2-ESS2-1)

New Jersey Student Learning Standards: Career Readiness, Life Literacies, and Key Skills	
Core Ideas	**Performance Expectations (Identified with Standard Number and statement)**
Creativity and Innovation: Brainstorming can create new, innovative ideas.	9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2). 9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
Critical Thinking and Problem-solving: Critical thinkers must first identify a problem then develop a plan to address it in order to effectively solve a problem.	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).
Information and Media Literacy: Digital tools and media resources provide access to vast stores of information that can be searched.	9.4.2.IML.1: Identify a simple search term to find information in a search engine or digital resource.
Information and Media Literacy: A variety of diverse sources, contexts, disciplines and cultures provide valuable and necessary information that can be used for different purposes.	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).
New Jersey Student Learning Standards: Computer Science and Design Thinking	
Core Ideas	**Performance Expectations (Identified with Standard Number and Statement)**
Data & Analysis: Individuals collect, use, and display data	8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats.

about individuals and the world around them.	
Data & Analysis: Data can be used to make predictions about the world.	8.1.2.DA.3: Identify and describe patterns in data visualizations. • 8.1.2.DA.4: Make predictions based on data using charts or graphs.
Algorithms & Programming: Individuals develop and follow directions as part of daily life.	8.1.2.AP.1: Model daily processes by creating and following algorithms to complete tasks.
Algorithms & Programming: The development of a program involves identifying a sequence of events, goals, and expected outcomes, and addressing errors (when necessary).	8.1.2.AP.5: Describe a program's sequence of events, goals, and expected outcomes. 8.1.2.AP.6: Debug errors in an algorithm or program that includes sequences and simple loops.
Effects of Technology on the Natural World: The use of technology developed for the human designed world can affect the environment, including land, water, air, plants, and animals. Reusing and recycling materials can save money while preserving natural resources and avoiding damage to the environment.	8.2.2.ETW.1: Classify products as resulting from nature or produced as a result of technology. 8.2.2.ETW.2: Identify the natural resources needed to create a product. 8.2.2.ETW.3: Describe or model the system used for recycling technology. 8.2.2.ETW.4: Explain how the disposal of or reusing a product affects the local and global environment.

New Jersey Student Learning Standards: Climate Change Mandate	
Core Ideas	**Performance Expectations (Identified with Standard Number and Statement)**
Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. 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-ESS3-3: Communicate solutions that will reduce the impact of climate change and humans on the land, water, air, and/or other living things in the local environment.

Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.	K-ESS2-1: Use and share observations of local weather conditions to describe patterns over time.

Knowledge and Skills

Unit Learning Targets (Objectives):
Students will be able to…

- Provide evidence that Earth events can occur quickly or slowly.
- Experiment with different factors to demonstrate that wind or water can change the shape of the land.
- Develop a model to represent the shapes and kinds of land and bodies of water in an area.
- Identify where water is found on Earth and that it can be solid or liquid.

Unit Enduring Understandings:
Students will know…

- Patterns in the natural world can be observed.
- Things may change slowly or rapidly such as erosion of rocks, glaciers melting, volcanic explosions, and earthquakes.
- Developing and using technology has impacts on the natural world.
- Humans have designed multiple solutions to slow or prevent wind or water from changing the shape of the land, such as windbreaks, shrubs, grass and trees.

Unit Essential Questions:

- Why do some Earth events happen very slowly or quickly?
- What are different solutions designed to prevent wind or water changing the shape of land?
- How can a map represent the shape of land and kind of water in a specified area?
- Where and why is water on Earth found in both solid and liquid form?

Instructional Plan

Activities:
Students will engage in a science framework that enables them to investigate phenomena, design solutions to problems, make sense of evidence to construct arguments, and critique and discuss those arguments. This is a model to support students through mastery of the Next Generation Science Standards.

Science Resources

5 E Instructional Model provides opportunities for students to engage, explore, explain, elaborate and evaluate science content.

The Science block will consist of the following components:

Engage: Raise a question and use compelling storytelling and visuals to introduce students to a scientific phenomenon and get them excited to investigate. Activate prior knowledge and prepare students for the day's learning. This is also known as an advance organizer, hook, or set induction.

- **Resources:**
  - Mystery Science- Anchor Phenomenon (Strange River)
    - See, Think, Wonder Chart
    - Activity and Discussion

Explore: Students experience key concepts through a collaborative hands-on, inquiry activity. They test predictions, share ideas and record observations. Teachers act as a facilitator, supporting students in establishing relationships and communicating their experience and ideas. This could be done through read alouds, videos, experiments, STEM/STEAM challenges and projects.

- **Resources:**
  - Mystery Science- Work of Water Unit
    - Lesson 1: Mapping & Earth's Surface Features (Activity: Paper Mountains)
    - Lesson 2: Rocks, Sand, & Erosion (Activity: Rocking the River)
    - Lesson 3: Erosion, Earth's Surface, & Landforms (Activity: Cornmeal Canyons)
    - Lesson 4: Erosion & Engineering (Activity: Erosion Engineering)

Explain: Students have frequent opportunities to connect their prior knowledge to new concepts. They share their thinking and build explanations. Post-activity questions encourage students to engage in sense-making, linking their findings to the Mystery question. Video exploration can build upon the student discussion and provide scientific explanation

- **Resources:**
  - Mystery Science:
    - Performance Task: Mapping & Earth's Surface Features (How long is the shortest river?) Unit Review and Activity

Elaborate: Opportunity for students to apply their learning to a similar or new situation. Project ideas and readings can help extend the learning

- **Resources:**
  - Mystery Science:
    - Performance Task: Mapping & Earth's Surface Features (How long is the shortest river?) Unit Review and Activity
    - Reading Extensions:
      - Lesson 1: Oceans, Rivers, and Lakes, The Mighty Mississippi, All Kinds of Maps, Birth of a Mighty River
      - Lesson 2: How Not to Save a Sand Castle, Explore the Seashore, The Perfect Sandcastle, What Is a Rock?
      - Lesson 3: Erosion, A Grand Old Canyon
      - Lesson 4: *How Do Water and Wind Change Rock?* by Ellen Lawrence, *Soil Erosion and How to Prevent It*, by Natalie Hyde, *Examining Erosion* by Joelle Riley:

Evaluate: Assess student understanding of learning objective

- **Resources:**
  - Mystery Science: Work of Water Unit
    - Lesson 1: Mapping & Earth's Surface Features Assessment
    - Lesson 2: Rocks, Sand, & Erosion Assessment
    - Lesson 3: Erosion, Earth's Surface, & Landforms Assessment
    - Lesson 4: Erosion & Engineering Assessment
    - Work of Water Unit Assessment

Evidence of Student Learning

Formative Assessments:

- Graphic Organizers & Guided Note Taking
- Directed Reading
- Cooperative Group Learning
- Homework
- Journal Entries

Summative Assessments:

- Mystery Science Unit Assessments
- Projects
- Science A-Z Unit Assessments

Benchmark Assessments:

- RST- Research Simulation Task
- Associated Unit tests, quizzes
- Labs and engineering based projects

Alternative Assessments:

- Projects

Performance Tasks:

- Mystery Science Erosion Lesson
- Create a structure of blocks to prevent the wind from hitting a structure.

Suggested Options for Differentiation and Modifications

Special Education

- Follow all IEP modifications.
- Use visuals, manipulatives, and hands-on models.
- Pre-teach and review key vocabulary.
- Provide picture word banks and visual glossaries.
- Use small-group or one-on-one instruction.
- Assign peer tutoring or a "buddy" for lab activities.
- Read aloud directions; model steps for experiments.
- Use chants, songs, or gestures to reinforce science terms.
- Provide preferential seating near teacher or materials.
- Allow extra time for labs, projects, or assessments.
- Accept oral or dictated responses in place of written work.
- Shorten or modify assignments when needed.
- Use large-print materials, Braille, or digital/audio text.
- Provide scribes or augmentative communication devices if needed.

Students with 504 Plans

- Follow the 504 plan.
- Provide extra time for assignments, labs, or tests.
- Offer small-group or quiet settings for work.
- Allow oral or dictated responses.
- Provide large-print, Braille, or digital text with audio support.
- Use scribes or communication devices when required.

Students at Risk of School Failure

- Use visuals, real objects, and simple demonstrations.
- Pre-teach and revisit key science vocabulary.
- Provide step-by-step directions and check for understanding.
- Offer small-group instruction and guided practice.
- Use peer support during activities.
- Provide preferential seating.

- Break down experiments or projects into smaller, manageable steps.

Gifted and Talented

- Ask open-ended, higher-level science questions ("Why do you think…?", "What would happen if…?").
- Encourage discovery learning and independent investigations.
- Offer interest-based extension projects.
- Provide advanced science texts, videos, or enrichment tasks.
- Use flexible grouping for inquiry activities.
- Provide options and choice in how to show learning.
- Include enrichment centers, experiments, or STEM challenges.
- Encourage reflection and sharing of findings.

Multilingual Learners

- Collaborate with ESL/MLL teachers.
- Provide small-group or partner science activities.
- Pre-teach vocabulary using pictures, labels, and real objects.
- Use gestures, visuals, and graphic organizers to explain concepts.
- Provide bilingual or picture glossaries when possible.
- Offer sentence frames for lab discussions (e.g., "I observed ___").
- Allow oral responses and extended time.
- Use audio or recorded directions to support comprehension.

Diversity and Inclusion

- Respect and integrate cultural traditions in science examples.
- Involve families in projects and activities.
- Provide alternative assignments when appropriate.
- Use visuals and clear, simple language.
- Collaborate with support staff and language professionals.
- Create a structured, inclusive classroom environment.
- Provide wait time before calling on students to ensure participation.
- Build positive connections with families and caregivers.

Supplemental Resources

Instructional:

- Read Alouds:

- *The Magic and Mystery of Trees* by Jen Green
- *Erosion: Changing Earth's System* by Robin Koontz
- *How do Wind and Water Change Earth?* by Natalie Hyde
- *Grand Canyon* by Jason Chin
- *Cracking Up: A Story About Erosion* by Jacqui Bailey

➢ Mystery Science: Erosion Lesson

- Lesson 1: Mapping and Earth's Surface Features
- Lesson 2: Rocks, Sand, and Erosion
- Lesson 3: Erosion, Earth's Surface, and Landforms
- Lesson 4: Erosion and Engineering

Supplemental:

➢ Mentor Texts

- Our Earth (Level D)
- Planet Earth Inside and Out
- The Pebble in my Pocket
- Earthsteps: A Rock's Journey Through Time
- Icebergs and Glaciers (Level P)

➢ BrainPOP Jr. Videos:

- Slow Land Changes

Intervention:

➢ PebbleGo

- What is Earth?
- Landforms
- All About Water
- Earth Features
- Earth in Action
- Natural Resources
- Exploring Science Grade 2

Teacher Notes

OCEAN ACADEMY CHARTER SCHOOL Unit 4 Overview
Content Area: Science
Unit Title: Engineering Design **Duration:** On Going
Target Course/Grade Level: Grade 2
Introduction/Unit Focus

The performance expectations in second grade help students formulate answers to questions such as: “How does land change and what are some things that cause it to change? What are the different kinds of land and bodies of water? How are materials similar and different from one another, and how do the properties of the materials relate to their use? What do plants need to grow? How many types of living things live in a place?” Students are expected to develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination. Students are also expected to compare the diversity of life in different habitats. An understanding of observable properties of materials is developed by students at this level through analysis and classification of different materials. Students are able to apply their understanding of the idea that wind and water can change the shape of the land to compare design solutions to slow or prevent such change. Students are able to 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 concepts of patterns; cause and effect; energy and matter; structure and function; stability and change; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the second grade performance expectations, students are expected to demonstrate grade appropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

Disciplinary Concepts for the Unit

Standard 9.1 Personal Financial Literacy

This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

Standard 9.2 Career Awareness, Exploration, Preparation and Training

This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Standard 9.4 Life Literacies and Key Skills

This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science

Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking

Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

Amistad Law: N.J.S.A. 18A 52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocide in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

Diversity and Inclusion: C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

The instruction shall:

(1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;

(2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and

(3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLS) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

“Twenty-first century themes and skills” means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy.”

Focus Standards (Major Standards) https://www.nj.gov/education/cccs

Content Standards: New Jersey Student Learning Standards for Science

K-2-ETS-1-1 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.		
Science and Engineering Practices	**Discipline Core Ideas/Unit Enduring Understandings**	**Crosscutting Concepts**
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)	**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)	**Structure and Function** The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)
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	**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)	

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)	**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)	

New Jersey Student Learning Standards: Interdisciplinary Connections
https://www.nj.gov/education/cccs

ELA/Writing —

- 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. (2-PS1-4)
- RI.IT.2.3. Describe the connection between a series of historical events, scientific ideas or concepts, or steps in a sequence within a text. (2-PS1-4)
- 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. (2-PS1-1),(2-PS1-2),(2-PS1-3)

Mathematics —

- MP.2 Reason abstractly and quantitatively. (2-ESS1-1),(2-ESS2-1),(2- ESS2-2)
- MP.4 Model with mathematics. (2-ESS1-1),(2-ESS2-1),(2-ESS2-2) MP.5 Use appropriate tools strategically. (2-ESS2-1) 2.NBT.A Understand place value. (2-ESS1-1)
- 2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. (2- ESS2-2) 2.M.B.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 with a symbol for the unknown number to represent the problem. (2-ESS2-1)

New Jersey Student Learning Standards: Career Readiness, Life Literacies, and Key Skills

Core Ideas	Performance Expectations (Identified with Standard Number and statement)
Creativity and Innovation: Brainstorming can create new, innovative ideas.	9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2). 9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
Critical Thinking and Problem-solving: Critical thinkers must first identify a problem then develop a plan	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).

to address it in order to effectively solve a problem.	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).
Information and Media Literacy: Digital tools and media resources provide access to vast stores of information that can be searched.	9.4.2.IML.1: Identify a simple search term to find information in a search engine or digital resource.
Information and Media Literacy: A variety of diverse sources, contexts, disciplines and cultures provide valuable and necessary information that can be used for different purposes.	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).
New Jersey Student Learning Standards: Computer Science and Design Thinking	
Core Ideas	**Performance Expectations (Identified with Standard Number and Statement)**
Data & Analysis: Individuals collect, use, and display data about individuals and the world around them.	8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats
Data & Analysis: Data can be used to make predictions about the world.	8.1.2.DA.3: Identify and describe patterns in data visualizations. 8.1.2.DA.4: Make predictions based on data using charts or graphs.
Algorithms & Programming: Individuals develop and follow directions as part of daily life. A sequence of steps can be expressed as an algorithm that a computer can process.	8.1.2.AP.1: Model daily processes by creating and following algorithms to complete tasks.
Algorithms & Programming: People work together to develop programs for a purpose, such as expressing ideas or addressing problems. The development of a program involves identifying a sequence of events, goals, and expected outcomes, and	8.1.2.AP.5: Describe a program's sequence of events, goals, and expected outcomes. 8.1.2.AP.6: Debug errors in an algorithm or program that includes sequences and simple loops.

addressing errors (when necessary).	
Engineering Design: Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions.	8.2.2.ED.1: Communicate the function of a product or device. 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process. 8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process.
Engineering Design: Limitations (constraints) must be considered when engineering designs.	8.2.2.ED.4: Identify constraints and their role in the engineering design process.

New Jersey Student Learning Standards: Climate Change Mandate	
Core Ideas	**Performance Expectations (Identified with Standard Number and Statement)**
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.	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.
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: 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.
Because there is always more than one possible solution to a problem, it is useful to compare and test designs.	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.

Knowledge and Skills
Unit Learning Targets (Objectives): *Students will be able to…*

- Ask questions to define a simple problem.
- Make observations.
- Gather information about a situation people want to change.
- Develop a new or improved object or tool.
- Sketch, draw, or model an object to help solve a problem.
- Analyze data to compare the strengths and weaknesses of objects..

Unit Enduring Understandings:
Students will know…

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

Unit Essential Questions:

- How are asking questions, gathering information, and making observations 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?

Instructional Plan

Activities:
Students will engage in a science framework that enables them to investigate phenomena, design solutions to problems, make sense of evidence to construct arguments, and critique and discuss those arguments. This is a model to support students through mastery of the Next Generation Science Standards.
Science Resources

5 E Instructional Model provides opportunities for students to engage, explore, explain, elaborate and evaluate science content. (See STEAM Lab Resources)

The Science block will consist of the following components:

Engage: Raise a question and use compelling storytelling and visuals to introduce students to a scientific phenomenon and get them excited to investigate. Activate prior knowledge and prepare students for the day's learning. This is also known as an advance organizer, hook, or set induction.

Explore: Students experience key concepts through a collaborative hands-on, inquiry activity. They test predictions, share ideas and record observations. Teachers act as a facilitator, supporting students in establishing relationships and communicating their experience and

ideas. This could be done through read alouds, videos, experiments, STEM/STEAM challenges and projects.

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Evidence of Student Learning

Formative Assessments:

- ➢ Graphic Organizers & Guided Note Taking
- ➢ Directed Reading
- ➢ Cooperative Group Learning
- ➢ Homework
- ➢ Journal Entries

Summative Assessments:

- ➢ Mystery Science Unit Assessments
- ➢ Projects

Benchmark Assessments:

- ➢ RST- Research Simulation Task
- ➢ Associated Unit tests, quizzes
- ➢ Labs and engineering based projects

Alternative Assessments:

- ➢ Projects

Performance Tasks

- ➢ STEM planning blueprints
- ➢ Executing plan
- ➢ Reflecting on process

Suggested Options for Differentiation and Modifications

Special Education

- Follow all IEP modifications.
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- Use visuals and clear, simple language.
- Collaborate with support staff and language professionals.
- Create a structured, inclusive classroom environment.
- Provide wait time before calling on students to ensure participation.
- Build positive connections with families and caregivers.

Supplemental Resources

Instructional:

- Read Alouds:
  - *Engineering Activity Book* by Jenny Jacoby
  - *The Way Things Work Out* by David Macaulay
  - *Engineered: Engineering Design at Work* by Shannon Hunt
  - *How To Be an Engineer* by Carol Vorderman
- Mystery Science: Material Magic
  - Lesson 1: Materials, Properties, and Engineering
  - Lesson 4: Inventions and Engineering
  - Lesson 5: Materials, Properties, and Engineering
- Mystery Science: Animal Adventures
  - Lesson 3: Biodiversity & Engineering
- Mystery Science: Erosion Lesson

- Lesson 4: Erosion and Engineering

Supplemental:

- Mentor Text:
  - Scientists Ask Questions (Level I)
  - Making Things Move (Level H)
  - Lever, Screw, and Inclined Plane: The Power of a Simple Machine Roller Coaster
- BrainPOP Jr.:
  - Engineering and Design Process
  - Making and Testing Predictions
  - Making Observations
  - Science Projects
  - Science Skills
  - Science Tools
  - Scientific Method
  - Tally Charts and Bar Graphs

Intervention:

- Pebble Go
  - Answers and Solutions
  - Arguments and Opinions
  - Asking Questions
  - Finding and Sharing Information
  - Let's Investigate
  - Science and Math
  - Using Facts
  - Using Models

Teacher Notes