# Unit #2: Earth and Space Science- Pebbles, Sand, and Silt

Science Grade 2 Second Trimester 12 Week Published

## **Unit Overview**

This unit provides students with earth science core ideas dealing with the observable structures and properties of earth materials (rocks, soil, and water), weathering and erosion of Earth's surface, natural sources of water, and how to represent the shapes and kinds of land and bodies of water on Earth.

Students use simple tools to observe, describe, analyze, and sort solid earth materials and learn how the properties of the materials are suited to different purposes. The investigations compliment the students' experiences in the Solids and Liquids Module with a focus on earth materials and the influence of engineering and science on society and the natural world. Students explore how wind and water change the shape of the land and compare ways to slow the process of erosion. Students learn about the important role that earth materials have as natural resources.

Throughout the unit, students engage in science and engineering practices to collect and interpret data to answer science questions, develop models to communicate interactions and processes, and define problems in order to compare solutions. Students gain experiences that will contribute to understanding of crosscutting concepts of cause and effect; scale, proportion, and quantity; energy and matter; and stability and change.

# **STAGE 1- DESIRED RESULTS**

# **Educational Standards**

# 2020 New Jersey Student Learning Standards- Science

# **Performance Expectations**

# **Physical Sciences**

SCI.2-PS1-3	Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
SCI.2-PS1	Matter and its Interactions
SCI.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.
SCI.2-PS1-4	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
SCI.2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

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# Life Sciences

SCI.2-LS4	Biological Evolution: Unity and Diversity
SCI.2-LS2-1	Plan and conduct an investigation to determine if plants need sunlight and water to grow.
SCI.2-LS4-1	Make observations of plants and animals to compare the diversity of life in different habitats.
SCI.2-LS2-2	Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.
SCI.2-LS2	Ecosystems: Interactions, Energy, and Dynamics

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# Earth and Space Sciences

SCI.2-ESS2-1	Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.
SCI.2-ESS1-1	Use information from several sources to provide evidence that Earth events can occur quickly or slowly.
SCI.2-ESS2-3	Obtain information to identify where water is found on Earth and that it can be solid or liquid.
SCI.2-ESS2-2	Develop a model to represent the shapes and kinds of land and bodies of water in an area.
SCI.2-ESS2	Earth's Systems
SCI.2-ESS1	Earth's Place in the Universe

# Engineering Design

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

SCI.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**

- Practice 1: Asking Questions and Defining Problems
- Practice 2: Developing and Using Models
- Practice 3: Planning and Carrying Out Investigations
- Practice 4: Analyzing and Interpreting Data
- Practice 5: Using Mathematics and Computational Thinking
- Practice 6: Constructing Explanations and Designing Solutions
- Practice 7: Engaging in Argument from Evidence
- Practice 8: Obtaining, Evaluating, and Communicating Information

# **Cross Cutting Concepts**

- Patterns
- Cause and Effect
- Scale, Proportion, and Quantity
- Systems and System Models
- Energy and Matter
- Structure and Functions
- Stability and Change

# **Disciplinary Core Ideas**

# **Physical Sciences**

- PS1. Matter and Its Interaction
- PS1.A: Structure and Properties of Matter
- PS1.B: Chemical Reactions
- PS1.C: Nuclear Processes
- PS2. Motion and Stability: Forces of Interaction
- PS2.A: Forces and Motion
- PS2.B: Types of Interactions

- PS2.C: Stability and Instability in Physical Systems
- PS3. Energy
- PS3.A: Definitions of Energy
- PS3.B: Conservation of Energy and Energy Transfer
- PS3.C: Relationship Between Energy and Forces
- PS3.D: Energy and Chemical Processes in Everyday Life
- PS4. Waves and Their Applications in Technologies for Information Transfer
- PS4.A: Wave Properties
- PS4.B: Electromagnetic Radiation
- PS4.C: Information Technologies and Instrumentation

#### **Life Sciences**

- LS1. From Molecules to Organisms: Structure and Processes
- LS1.A: Structure and function
- LS1.B: Growth and development of organisms
- LS1.C: Growth and development of organisms
- LS1.D: Information Processing
- LS2. Ecosystems: Interactions, Energy, and Dynamics
- LS2.A: Interdependent relationships in ecosystems
- LS2.B: Cycles of matter and energy transfer in ecosystems
- LS2.C: Ecosystem dynamics, functioning, and resilience
- LS2.D: Social interactions and group behavior
- LS3. Heredity: Inheritance and Variation of Traits
- LS3.A: Inheritance of traits
- LS3.B: Variation of traits
- LS4. Biological Evolution: Unity and Diversity
- LS4.A: Evidence of common ancestry and diversity
- LS4.B: Natural selection
- LS4.C: Adaptation
- LS4.D: Biodiversity and humans

#### **Earth and Space Sciences**

- ESS1. Earth's Place in the Universe
- ESS1.A: The universe and its stars
- ESS1.B: Earth and the solar system
- ESS1.C: The history of planet Earth

- ESS2. Earth's System
- ESS2.A: Earth materials and systems
- ESS2.B: Plate tectonics and large-scale system interactions
- ESS2.C: The roles of water in Earth's surface processes
- ESS2.D: Weather and climate
- ESS2.E: Biogeology
- ESS3. Earth and Human Activity
- ESS3.A: Natural resources
- ESS3.B: Natural hazards
- ESS3.C: Human impacts on Earth systems
- ESS3.D: Global climate change

#### **Essential Questions**

# Investigation 1: First Rocks

- Part 1: What happens when rocks rub together?
- Part 2: What happens when rocks are placed in water?
- Part 3: How are river rocks the same?
- Part 4: What are the properties of schoolyard rocks?
- Part 5: How many ways can rocks be sorted?

#### **Investigation 2: River Rocks**

- Part 1: How can rocks be separated by size?
- Part 2: How else can rocks be sorted by size?
- Part 3: Is there an earth material smaller than sand?
- Part 4: What earth material is smaller than silt?

#### **Investigation 3: Using Rocks**

- Part 1: How do people use earth materials?
- Part 2: What does sand do for sandpaper?
- Part 3: How can we make a sand sculpture?

Part 4: What makes clay the best earth material for making beads?

Part 5: How are bricks made?

#### Investigation 4: Soil and Water

- Part 1: What is soil?
- Part 2: How do soils differ?
- Part 3: Where is water found in our community?
- Part 4: How can soil erosion be reduced?

#### **Enduring Understanding**

This earth and space science unit develops students' understanding of:

- 1) What the universe is and Earth's place in it;
- 2) How and why Earth is constantly changing; and
- 3) How to explain the structure, properties, and interactions of matter.

# Students will know...

Vocabulary

#### Investigation 1: First Rocks

basalt, bubble, color, data, dull, earth material, flat, geologist, granite, group, mineral, pattern, pointed, property, rock, rough, round, sand, scoria, shape, sharp, shiny, size, smooth, sort, texture, tuff, weathering

#### **Investigation 2: River Rocks**

beach, boulder, butte, canyon, clay, cobble, delta, erosion, gravel, layer, mesa, mixture, model, particle, pebble, plain, plateau, sand, sand dune, screen, separate, settle, shake, silt, sink, valley, volcano

asphalt, brick, build, coarse, concrete, engineer, fine, harden, matrix, medium, mortar, natural resources, sandpaper, sculpture, sidewalk

#### Investigation 4: Soil and Water

decay, fresh water, gas, humus, lake, liquid, ocean, pond, retain, river, salt water, soil, solid, stream

## Students will be able to...

#### Investigation 1: First Rocks

- Ask questions about rocks and rock properties that are found.
- Plan and carry out investigations of volcanic rocks and river rocks to make comparisons and to understand how they were formed.
- Analyze and interpret data by describing observations of the different kinds and sizes of rocks and making rock records using words and pictures.
- Construct explanations by making firsthand observations of rocks that have been rubbed together and washed to describe how they formed.
- Engage in argument from evidence about the properties that make rocks belong to one group or another.
- Obtain, evaluate, and communicate information about rocks and their properties.

#### **Investigation 2: River Rocks**

- Develop and use models to represent how earth materials break down into smaller pieces (weathering). Students use models to explain how rock pieces interact with water and how to describe landforms. They compare the model to the actual object.
- Plan and carry out investigations with rocks to separate them into sizes using a variety of tools (screens, water, settling). Students collect data from firsthand investigations to make comparisons of rocks.
- Analyze and interpret data from investigations with rocks of different sizes to explore their properties and their behavior in water.
- Construct explanations on the effects of wind and water on land formations.
- Engage in argument from evidence about the results of investigations to find a rock particle smaller than sand.
- Obtain, evaluate, and communicate information about earth materials and processes that change the shape of the surface of Earth by text, photos, diagrams, models, and videos.

#### **Investigation 3: Using Rocks**

- Define problems related to the development of sandpaper to explore what engineers were trying to solve.
- Plan and carry out investigations by making observations and collecting data about the use of earth materials to make everyday things. Students use and share with partners pictures, drawings, and written observations recorded in their notebooks.

- Analyze and interpret data from tests with sandpaper and sand sculptures to determine if the product and tool work as intended.
- Construct explanations by making firsthand observations to construct an evidence-based account for how clay is a good material for making beads or for making bricks. Students compare the effect of different kinds of sandpaper (the solution or tool) on the sanding of wood and the results of different mixtures of sand and matrix on making sand sculptures.
- Engage in argument from evidence involving the effect of different kinds of sandpaper on wood.
- Obtain, evaluate, and communicate information about the use of earth materials by engineers to make things for everyday life. Students gather information from text to answer questions, and communicate information orally and in written forms using drawings, words, and numbers.

#### Investigation 4: Soil and Water

- Ask questions about how best to take soil apart to find out its component parts to compare one sample to another.
- Define a simple problem about how to use tools to develop a process to study soil.
- Develop and use models to represent the shape and kinds of land and water; compare the models to identify common features and differences in photographs, drawings, and maps; and distinguish between the actual land and formations and the model. Use the models to identify the relationships between the land formations and water.
- Plan and carry out investigations with soil samples, both homemade and locally collected, in order to use tools to make comparisons.
- Analyze and interpret data dealing with different soil samples, and make predictions based on previous work with other earth materials. Record information in a notebook using drawings and words and share those observations with partners to answer questions.
- Construct explanations and design solutions about soil components through firsthand investigations, text, and video. Compare multiple solutions to preventing or slowing erosion.
- Engage in argument from evidence to answer the question of what is soil and the claim that soil doesn't change.
- Obtain, evaluate, and communicate information about soil, natural sources of water, soil erosion by wind and water, and how to represent land and water formations using media to gather information to answer questions and by communicating information orally and in written forms using models, drawings, words, and numbers.

# **STAGE 2- EVIDENCE OF LEARNING**

## **Formative Assessment Suggestions**

- 3- Minute Pause
- A-B-C Summaries
- Analogy Prompt
- Choral Response

- Debriefing
- Exit Card / Ticket
- Hand Signals
- Idea Spinner
- Index Card Summaries
- Inside-Outside Circle Discussion (Fishbowl)
- Journal Entry
- Misconception Check
- Observation
- One Minute Essay
- One Word Summary
- Portfolio Check
- Questions & Answers
- Quiz
- Self-Assessment
- Student Conference
- Think-Pair-Share
- Web or Concept Map

# **Authentic Assessments Suggestions**

# Investigation 1: First Rocks

- Science notebook entries
- Performance assessment
- Investigation 1 I-Check

#### **Investigation 2: River Rocks**

- Performance assessment
- Science notebook entries
- Investigation 2 I-Check

#### **Investigation 3: Using Rocks**

- Science notebook entries
- Performance assessment

• Investigation 3 I-Check

#### Investigation 4: Soil and Water

- Performance assessment
- Science notebook entries
- Investigation 4 I-Check

#### **Benchmark Assessments**

Unit Posttest

## **STAGE 3- LEARNING PLAN**

#### **Instructional Map**

- Investigation 1: First Rocks
- Investigation 2: River Rocks
- Investigation 3: Using Rocks
- Investigation 4: Soil and Water

#### Investigation 1: First Rocks

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#### Investigation 1: Part 1-Three Rocks

Students investigate and sort a set of six rocks. They gather information about the rocks by observing and comparing, then rub them together to simulate weathering.

#### Content:

• Rocks can be described by their properties.

• Smaller rocks (sand) result from the breaking (weathering) of larger rocks.

#### Investigation 1: Part 2-Washing the Rocks

Students wash their rocks to see how they change when they are wet, and to see what happens to the wash water. Students are introduced to the names of these volcanic rocks (tuff, scoria, basalt) and view a video on volcanoes to find out how they formed.

#### Content:

- Rocks can be described by their properties.
- When rocks are washed in water, the colors or sparkling qualities are enhanced.
- Some rocks (such as tuff, scoria, and basalt) are formed from lava and other materials produced by erupting volcanoes.
- Volcanoes are mountains built by melted rock that flow out of weak areas in Earth's crust.

#### Investigation 1: Part 3-First Sorting

Students are introduced to river rocks, describe their properties, and compare and sort them into groups based on one property at a time.

#### Content:

- Rocks can be sorted by their properties.
- When rocks are washed in water, the colors or sparkling qualities are enhanced.

#### Investigation 1: Part 4-Start a Rock Collection

Students take a field trip to collect and observe schoolyard rocks. They describe the properties of the various rocks.

#### Content:

- Rocks are all around us.
- Rocks are the solid material of Earth.

#### Investigation 1: Part 5-Sorting Activities

Students use sorting mats to compare and sort the river rocks.

#### Content:

- Rocks can be described by their properties.
- Rocks are composed of minerals.

#### Investigation 2: Part 1-Screening River Rocks

Students separate a river-rock mixture, using a set of three screens. They discover five sizes of materials: large pebbles, small pebbles, large gravel, small gravel, and sand.

#### Content:

- Rocks can be described by the property of size.
- Screens can be used to sort the sizes of earth materials.
- Rock sizes include sand, small gravel, large gravel, small pebbles, and large pebbles.
- Rocks are earth materials.

#### Investigation 2: Part 2-River Rocks by Size

Students use squares of three sizes as a tool (instead of screens) to separate rock particles into sand, gravel, and pebbles.

#### Content:

- Rocks can be categorized visually by size.
- Rock sizes include sand, small gravel, large gravel, small pebbles, and large pebbles.
- Rocks larger than pebbles are cobbles.
- Rocks larger than cobbles are boulders.
- Smaller rocks result from the weathering of larger rocks.

#### Investigation 2: Part 3-Sand and Silt

Students take a close look at sand and separate sand particles from silt particles, which are smaller than the sand, by mixing the sand with water and allowing the particles to settle. They observe that the sand settles to the bottom and the silt forms a layer on top of the sand.

#### Content:

- Sand often contains smaller particles, called silt.
- Water can be used to sort the sizes of earth materials.

#### Investigation 2: Part 4-Exploring Clay and Landforms

Students investigate the properties of the smallest rock particles, clay. They read about and view a video about ways

that wind and water move and shape the land. Students compare the time it takes to change the surface of the land.

#### Content:

- Clay particles are very small, even smaller than silt.
- Weathering, caused by wind or water, causes larger rocks to break into smaller rocks.
- Some Earth events happen very quickly (volcanic eruptions, floods); others occur very slowly over a long period of time (weathering of rock).

#### Investigation 3: Part 1-Rocks in Use

Students learn how people use rocks as natural resources to construct objects and to make useful materials. They start by looking outside the school building for places where earth materials can be found naturally or as building materials.

#### Content:

- Earth materials are natural resources.
- The properties of different earth materials make them suitable for specific uses.
- Earth materials are commonly used in the construction of buildings and streets.

#### Investigation 3: Part 2-Observing Sandpaper

Students observe sandpaper and compare it to sand. They make and compare rubbings of three grades of sandpaper. Students compare the effectiveness of each grade of sandpaper in sanding a stick and make a claim from evidence.

#### Content:

- The properties of different earth materials make them suitable for specific uses.
- Different sizes of sand are used on sandpaper to change the surface of wood from rough to smooth.

#### Investigation 3: Part 3-Sand Sculptures

Students mix sand with a cornstarch matrix to make durable sand sculptures. They monitor the mixing process to determine the best amount of sand to mix with a given amount of matrix and analyze the results.

#### Content:

- The properties of different earth materials make them suitable for specific uses.
- Earth materials are used to make sculptures and jewelry.

#### Investigation 3: Part 4-Clay Beads

Students use clay to make beads or something decorative, which they paint and keep as a memento of their investigation of clay.

#### Content:

- The properties of different earth materials make them suitable for specific uses.
- Earth materials are used to make sculptures and jewelry.

#### Investigation 3: Part 5-Making Bricks

Students make adobe clay bricks with a mixture of clay soil, dry grass or weeds, and water. After the bricks dry, they can be used to build a class wall.

#### Content:

- The properties of different earth materials make them suitable for specific uses.
- Simple bricks are made by combining clay soil with plant material.

#### Investigation 4: Part 1-Homemade Soil

Students put together and take apart soils. They are introduced to humus, an important soil ingredient. They mix together homemade soil containing sand, gravel, pebbles, and humus. They shake some of the soil on a paper plate and observe what happens. They use screens to separate the homemade soil. They shake soil and water together in a vial and draw what they observe.

#### Content:

- Humus is decayed material from plants and animals.
- The ingredients of soil can be observed by mixing soil with water, shaking it, and letting it settle.
- Soil is made partly from weathered rock and partly from organic material.

#### Investigation 4: Part 2-Local Soil

Students go on a schoolyard field trip to collect soil samples. They try to find soil in as many places as possible: next to sidewalks, near trees, and in landscaped areas. Students study their schoolyard soil samples. They shake vials with the soil and water, then draw the results. They compare the vials and drawings of their schoolyard samples with the vials and drawings of the homemade soil.

#### Content:

• Soils can be described by their properties (particle size, color, texture, ability to support plant growth).

- Soils vary from place to place.
- Soils differ in their ability to support plants.

#### Investigation 4: Part 3-Natural Sources of Water

Students read about sources of natural water, sort images of water sources, both fresh and salt, and discuss where water is found in their community.

#### Content:

- Earth materials are natural resources.
- Natural sources of water include streams, rivers, ponds, lakes, marshes, and oceans. Sources of water can be fresh or salt water.
- Water can be a solid, liquid, or gas.

#### Investigation 4: Part 4-Land and Water

Students compare a variety of solutions to slow down the effects of wind and water erosion on land. They go out on the schoolyard to look for erosion. They end the module by studying a variety of images, representing different landforms and bodies of water, and identify common features and differences.

#### Content:

- The shapes and kinds of land and water can be represented in photos, drawings, and maps.
- Wind and water change the shape of the land.
- Engineers design methods to slow erosion by wind and water.

# **Modifications/Differentiation of Instruction**

Differentiation Strategies for Special Education Students

- Remove unnecessary material, words, etc., that can distract from the content
- Use of off-grade level materials
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Time allowed
- Level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in "chunks"
- Varied texts and supplementary materials
- Use technology, if available and appropriate

- Varied homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Ability to work at their own pace
- Present ideas using auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment
- Differentiated checklists and rubrics, if available and appropriate

# Differentiation Strategies for Gifted and Talented Students

- Increase the level of complexity
- Decrease scaffolding
- Variety of finished products
- Allow for greater independence
- Learning stations, interest groups
- Varied texts and supplementary materials
- Use of technology
- Flexibility in assignments
- Varied questioning strategies
- Encourage research
- Strategy and flexible groups based on formative assessment or student choice
- Acceleration within a unit of study
- Exposure to more advanced or complex concepts, abstractions, and materials
- Encourage students to move through content areas at their own pace
- After mastery of a unit, provide students with more advanced learning activities, not more of the same activity
- Present information using a thematic, broad-based, and integrative content, rather than just singlesubject areas

# Differentiated Strategies for ELL Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required

- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in "chunks"
- Varied texts and supplementary materials, including visuals
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Allow students to work at their own pace
- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Role play
- Provide graphic organizers, highlighted materials
- Strategy and flexible groups based on formative assessment

# Differentiation Strategies for At Risk Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in "chunks"
- Varied texts and supplementary materials
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment

# 504 Plans

Students can qualify for 504 plans if they have physical or mental impairments that affect or limit any of their abilities to:

- walk, breathe, eat, or sleep
- communicate, see, hear, or speak
- read, concentrate, think, or learn
- stand, bend, lift, or work

Examples of accommodations in 504 plans include:

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- adjusted class schedules or grading
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits
- occupational or physical therapy

# **Modification Strategies**

- Extended Time
- Frequent Breaks
- Highlighted Text
- Interactive Notebook
- Modified Test
- Oral Directions
- Peer Tutoring
- Preferential Seating
- Re-Direct
- Repeated Drill / Practice

- Shortened Assignments
- Teacher Notes
- Tutorials
- Use of Additional Reference Material
- Use of Audio Resources

# **High Preparation Differentiation**

- Alternative Assessments
- Choice Boards
- Games and Tournaments
- Group Investigations
- Guided Reading
- Independent Research / Project
- Interest Groups
- Learning Contracts
- Leveled Rubrics
- Literature Circles
- Menu Assignments
- Multiple Intelligence Options
- Multiple Texts
- Personal Agendas
- Project Based Learning (PBL)
- Stations / Centers
- Think-Tac-Toe
- Tiered Activities / Assignments
- Varying Graphic Organizers

# **Low Preparation Differentiation**

- Choice of Book / Activity
- Cubing Activities
- Exploration by Interest (using interest inventories)
- Flexible Grouping
- Goal Setting With Student
- Homework Options
- Jigsaw
- Mini Workshops to Extend Skills

- Mini Workshops to Re-teach
- Open-ended Activities
- Think-Pair-Share by Interest
- Think-Pair-Share by Learning Style
- Think-Pair-Share by Learning Style
- Think-Pair-Share by Readiness
- Use of Collaboration
- Use of Reading Buddies
- Varied Journal Prompts
- Varied Product Choice
- Varied Supplemental Materials
- Work Alone / Together

# **Horizontal Integration- Interdisciplinary Connections**

New Jersey Student Learning Standards for Mathematics

N-Q.A.Reason quantitatively and use units to solve problems.

- 1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; chose and interpret the scale and the origin in graphs and data displays
- 2. Define appropriate quantities for the purpose of descriptive modeling.
- 3. Choose the level of accuracy appropriate to limitations on measurement when reporting quantities.

N-CN.A. Perform arithmetic operations with complex numbers.

- 1. Know there is a complex number.
- 2. Use the commutative, associative, and distributive properties.

A-SSE.A. Interpret the structure of expressions

1. Interpret expressions that represent a quantity in terms of its context.

A-SSE.B. Write expressions in equivalent forms to solve problems.

- 1. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
- F-IF.A. Understand the concept of a function and use functional notation.
  - 1. Understand that a function from one set to another set.
- F-IF.B Interpret functions that arise in applications in terms of the context.
- F-IF.C. Analyze functions using different representations

S-ID.A. Summarize, represent, and interpret data on a single count or measurement variable

- 1. Represent data with plots on a real number line.
- S-ID.B. Summarize, represent, and interpret data on two categorical and quantitative variables.
- S-ID.C. Interpret linear models.
- S-IC.A. Understand and evaluate random processes underlying statistical experiments.
- S-IC.B. Make inferences and justify conclusions from surveys, experiments, and observational studies.

English Language Arts Standards – Grade 2

- RI 1: Ask and answer questions about key details.
- RI 2: Identify main topic and retell key details.
- RI 3: Describe the connection between two ideas.
- RI 4: Ask and answer questions about unknown words.
- RI 5: Identify the front cover, back cover, and title page of a book.
- RI 7: Describe the relationship between illustrations and the text.
- RI 8: Identify the reasons an author gives to support points.
- RI 9: Identify similarities in and differences between text on the same topic.
- W 3: Write narratives.
- W 5: Strengthen writing by revising and editing.
- W 7: Record science observations.
- W 8: Gather information to answer a question.
- RF 4: Read text with purpose and understanding.
- SL 1: Participate in collaborative conversations.
- SL 2: Ask and answer questions about key details and request clarification.
- SL 3: Ask and answer questions to seek help, information, or to clarify.
- SL 4: Describe with details.
- SL 5: Add drawings or other visual displays to recounts of experiences.

- SL 6: Speak audibly, express clearly.
- L 1: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- L 4: Determine or clarify the meaning of unknown or multiple meaning words and phrases.
- L 5: Demonstrate understanding of word relationships and nuances in word meanings.
- L 6: Use acquired words and phrases.

## 2020 New Jersey Student Learning Standards- Computer Science and Design Thinking

## **Computer Science and Design Thinking Practices**

CSDT.K-12.CSDTP1	Fostering an Inclusive Computing and Design
	Culture
CSDT.K-12.CSDTP2	Collaborating Around Computing and Design
CSDT.K-12.CSDTP3	Recognizing and Defining Computational Problems
CSDT.K-12.CSDTP4	Developing and Using Abstractions
CSDT.K-12.CSDTP5	Creating Computational Artifacts
CSDT.K-12.CSDTP6	Testing and Refining Computational Artifacts
CSDT.K-12.CSDTP7	Communicating About Computing and Design

#### 8.2 Design Thinking

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.

8.2.2.ED.4: Identify constraints and their role in the engineering design process.

8.2.2.ITH.1: Identify products that are designed to meet human wants or needs.

8.2.2.ITH.2: Explain the purpose of a product and its value.

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.

8.2.2.NT.1: Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together.

8.2.2.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

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.

8.2.2.EC.1: Identify and compare technology used in different schools, communities, regions, and parts of the world.

## 2020 New Jersey Student Learning Standards- Career Readiness, Life Literacies, and Key Skills

## Career Readiness, Life Literacies, and Key Skills Practices

CRP.K-12.CRP1	Act as responsible and contributing community members and employee.
CRP.K-12.CRP2	Attend to financial well-being.
CRP.K-12.CRP3	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP4	Demonstrate creativity and innovation.

CRP.K-12.CRP5	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP6	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP7	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP8	Use technology to enhance productivity, increase collaboration and communicate effectively.
CRP.K-12.CRP9	Work productively in teams while using cultural/global competence.

## 9.2 Career Awareness and Planning

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

## 9.4 Life Literacies and Key Skills

9.4.2.Cl.1: Demonstrate openness to new ideas and perspectives.

9.4.2.CI.2: Demonstrate originality and inventiveness in work.

9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem.

9.4.2.CT.2: Identify possible approaches and resources to execute a plan.

9.4.2.CT.3: Use a variety of types of thinking to solve problems.

9.4.2.DC.1: Explain differences between ownership and sharing of information.

9.4.2.DC.2: Explain the importance of respecting digital content of others.

9.4.2.DC.3: Explain how to be safe online and follow safe practices when using the internet.

9.4.2.DC.4: Compare information that should be kept private to information that might be made public.

9.4.2.DC.5: Explain what a digital footprint is and how it is created.

9.4.2.DC.6: Identify respectful and responsible ways to communicate in digital environments.

9.4.2.DC.7: Describe actions peers can take to positively impact climate change.

9.4.2.IML.1: Identify a simple search term to find information in a search engine or digital resource.

9.4.2.IML.2: Represent data in a visual format to tell a story about the data.

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.

9.4.2.IML.4: Compare and contrast the way information is shared in a variety of contexts. 9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool.

9.4.2.TL.2: Create a document using a word processing application.

9.4.2.TL.3: Enter information into a spreadsheet and sort the information.

9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content.

9.4.2.TL.5: Describe the difference between real and virtual experiences.

9.4.2.TL.6: Illustrate and communicate ideas and stories using multiple digital tools.

9.4.2.TL.7: Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts.

#### **Vertical Integration- Discipline Mapping**

ESS1: Grade 1: Air and Weather

Grade 4: Soils, Rocks, and Landforms

Grade 5: Earth and Sun

Grade 6: Weather and Water

Grade 7: Planetary Science

Grade 8: Earth's History; Heredity and Adaptations

#### ESS2: KDG: Animals Two by Two; Trees and Weather

Grade 1: Air and Weather

Grade 3: Water and Climate

Grade 4: Soils, Rocks, and Landforms

Grade 5: Earth and Sun; Living Systems

Grade 6: Weather and Water

Grade 7: Planetary Science

Grade 8: Earth's History

PS1: Grade 2: Solids and Liquids

Grade 3: Water and Climate

Grade 5: Mixtures and Solutions; Earth and Sun

Grade 6: Weather and Water

Grade 8: Earth's History; Chemical Interactions

Preparation for high school science courses

## **Additional Materials**

Visit FOSSWEB.com for list of websites, and additional readings.