Science / 2nd Grade

Unit 1: Pebbles, Sand and Silt

Subject	Grade	Unit	Suggested Timeline
Science	Second	Pebbles, Sand and Silt	9 weeks

Grade Level Summary
The second grade science curriculum focuses on giving students a broad understanding of solids and liquids. The focus is on physical science, earth science, life/biological science, technology and engineering education, and crosscutting concepts. Students will experience an inquiry based learning approach using observation and scientific method that encourages collaboration, critical thinking, creativity, and communication.

Grade Level Units
Pebbles, Sand, and Silt
Solids and Liquids
Insects and Plants

Unit Title
Pebbles, Sand and Silt

Unit Summary
This module provides grade 2 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 di erent purposes. The investigations complement 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 Pebbles, Sand, and Silt Module, students engage in science and engineering practices to collect and interpret data to answer science questions, develop models to communicate interactions and processes, and de ne problems in order to compare solutions. Students gain experiences that will contribute to understanding of crosscutting concepts of cause and e ect; scale, proportion, and quantity; energy and matter; and stability and change.

Unit Essential Questions

1. What materials make up the Earth and how can they be changed?

Key Understandings

1. Students will be able to observe, describe and classify different types of rocks.
2. Students will be able to differentiate between slow and rapid changes of weathering and erosion.
3. Students will be able to recognize the use of Earth's materials in their environment.
4. Students will be able to define soil and compare homemade and local soils.
5. Students will be able to identify where water is found in their community.

Focus Standards Addressed in the Unit	
3.3.1.A1	Observe, describe and sort Earth materials. Compare the composition of different soils.
3.3.1.A4	Identify and describe types of fresh and saltwater bodies (ocean, rivers, lakes, ponds).
3.2.2.A4	Experiment and explain what happens when two or more substances are combined (e.g. mixing, dissolving), and separated (e.g. filtering, evaporation).
3.3.3.A1	Explain and give examples of the ways in which soil is formed.

Important Standards Addressed in the Unit	
CC.1.2.2.E (ELA)	Use various text features and search tools to locate key facts or information in a text efficiently.
CC.1.5.2.A (ELA)	Participate in collaborative conversations with peers and adults in small and larger groups.
CC.1.2.2.A (ELA)	Identify the main idea of a multiparagraph text as well as the focus of specific paragraphs within the text.
CC.1.4.2.W (ELA)	Recall information from experiences or gather information from provided sources to answer a question.

Misconceptions	Proper Conceptions
● All rocks are the same. ● All water on the Earth is freshwater. ● Structures and objects are built using man-made materials.	● Rocks can be different shapes and sizes. ● We have fresh and salt-water on the Earth. ● Structures and objects can be made up of Earth's materials in addition to man-made materials.

Concepts	Competencies	Vocabulary
● Rocks can be described by their properties. ● Some Earth events happen rapidly; other's occur slowly over a long period of time. ● Earth materials are commonly used in the construction of buildings and streets. ● Soil can be described by their properties (color, texture, ability to support plant growth). ● Natural sources of water in include streams, rivers, ponds, lakes,	● Observe, describe, and classify rocks by properties. ● Discover how sand is formed, compare slow changes of weather and erosion to rapid changes, due to volcanic eruptions. ● Construct rubbings from sand paper, sculptures from sand, jewelry from clay, and bricks from clay soil and locate places where Earth's materials occur naturally. ● Analyze soil and its ingredients (humus) and compare homemade and local soils. ● Research sources of natural water, sort images of water sources, both	Asphalt Basalt Bead Boulder Brick Cement Clay Coarse Cobble Concrete Crystal Decay Fossil Geologist Gravel Humus Layer Matrix Minerals Mortar Nutrients

marshes, and the ocean. Sources of water can be fresh or salt-water.	fresh and salt and discuss where water is found in their community.	Particle Pebble Sandpaper Scoria Sculpture Settle Sort Texture Tuff

Assessments:
Performance assessments
Science notebook entries
Investigation I-checks

Suggested Strategies to Support Design of Coherent Instruction
Charlotte Danielson's Framework for Teaching: Domain 3 Instruction

Apply knowledge of science and technology in public discussion on relevant issues in a changing world
Conduct investigations individually and collaboratively to answer questions
Validate scientific claims for validity
Think Systemically

Differentiation:
Provide multiple means of representation. Give learners various ways to acquire information and knowledge.
Provide multiple means of action and expression. Offer students alternatives for demonstrating what they know.
Provide multiple means of engagement. Help learners become interested, be challenged, and stay motivated.

Interdisciplinary Connections:
See FOSS and Common Core ELA - Grade 2 Guide
See FOSS and Common Core Math - Grade 2 Guide

Additional Resources:
- Digital-Only Resources (www.fossweb.com)
- BrainPOP Jr videos
- Trade books

Created By:
Second Grade Teachers

Science / 2nd Grade

Unit 2: Solids and Liquids

Subject	Grade	Unit	Suggested Timeline
Science	Second	Solids and Liquids	9 weeks

Grade Level Summary
The second grade science curriculum focuses on giving students a broad understanding of solids and liquids. The focus is on physical science, earth science, life/biological science, technology and engineering education, and crosscutting concepts. Students will experience an inquiry based learning approach using observation and scientific method that encourages collaboration, critical thinking, creativity, and communication.

Grade Level Units
Unit 1 - Pebbles, Sand, and Silt
Unit 2 - Solids and Liquids
Unit 3 - Insects and Plants

Unit Title
Solids and Liquids

Unit Summary
This module provides grade 2 students with physical sciences core ideas dealing with matter and its interactions and engineering design. The experiences help students to develop an understanding about how materials are similar and different from one another and how the properties of materials relate to their use. Students observe, describe, and compare properties of solids and liquids. They conduct investigations to find out what happens when solids and water are mixed and when liquids and water are mixed. They use their knowledge of solids and liquids to conduct an investigation on an unknown material (toothpaste). They gain firsthand experience with reversible changes caused by heating or cooling, and read about changes caused by heating that are irreversible. Throughout the Solids and Liquids Module, students engage in science and engineering practices to collect data to answer questions, and to define problems in order to develop solutions. Students gain experiences that will contribute to the understanding of crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems system and models; energy and matter; structure and function; and stability and change.

Unit Essential Questions

1. How can one explain the structure, properties, and interactions of matter?

Key Understandings

1. Students will be able to observe, describe, and classify matter by properties and uses (e.g., size, shape, weight, solid, liquid, gas, texture, flexibility, hardness, color, etc.).
2. Students will be able to demonstrate how heating and cooling may cause changes in the properties of materials (e.g., solid to liquid, liquid to solid).
3. Students will be able to differentiate between reversible and irreversible changes in matter.

Focus Standards Addressed in the Unit	
3.2.1.A1	Observe and describe the properties of liquids and solids. Investigate what happens when solids are mixed with water and other liquids are mixed with water.
3.2.1.A4	Observe and describe what happens when substances are heated or cooled. Distinguish between changes that are reversible (melting, freezing) and not reversible (e.g. baking a cake, burning fuel).
3.2.2.A3	Demonstrate how heating and cooling may cause changes in the properties of materials.
3.2.2.A5	Recognize that everything is made of matter.

Important Standards Addressed in the Unit	
CC.1.2.2.E (ELA)	Use various text features and search tools to locate key facts or information in a text efficiently.
CC.1.5.2.A (ELA)	Participate in collaborative conversations with peers and adults in small and larger groups.
CC.1.2.2.A (ELA)	Identify the main idea of a multiparagraph text as well as the focus of specific paragraphs within the text.
CC.1.4.2.W (ELA)	Recall information from experiences or gather information from provided sources to answer a question.

Misconceptions	Proper Conceptions
● Liquids are only things we drink. ● Gases are not matter because they are invisible. ● All changes in matter are reversible.	● Many liquids are not safe for human consumption. ● Gas is matter even though it is invisible. ● There can be reversible or irreversible changes with matter.

Concepts	Competencies	Vocabulary
● Different kinds of matter exist in various states. ● Matter can be described and classified by its observable properties. ● Different kinds of matter exist in various states, depending on temperature. ● Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. ● Different properties are suited for different purposes.	● Observe, describe, and classify matter by properties and uses (e.g., size, shape, weight, texture, flexibility, hardness, color solid, liquid, gas, etc.) ● Plan and carry out investigations to test the idea that warming some materials causes them to change from solid to liquid and cooling causes them to change from liquid and solid. ● Construct an argument and provide evidence that some changes caused by heating and cooling can be reversed and some cannot. ● Analyze data from testing objects made from different materials to	Classify Describe Gas Liquid Matter Patterns Solid Weight Color Flexibility Properties Texture Argument Boiling Cause and Effect Evidence Freezing Melting Reverse Data Functions

● A great variety of objects can be built up from a small set of pieces.	determine if a proposed object functions as intended. ● Design an object built from a small set of pieces to solve a problem and compare solutions designed by peers given the same set of pieces. ● Make observations of how an object made of small set of pieces can be disassembled and made into a new object.	Test Construct Design Engineer Problem-solving Solutions Disassemble

Assessments:
Performance assessments
Science notebook entries
Investigation I-checks

Suggested Strategies to Support Design of Coherent Instruction
Charlotte Danielson's Framework for Teaching: Domain 3 Instruction

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Conduct investigations individually and collaboratively to answer questions.
Validate scientific claims for validity.
Think Systemically.

Differentiation:
Provide multiple means of representation. Give learners various ways to acquire information and knowledge.
Provide multiple means of action and expression. Offer students alternatives for demonstrating what they know.
Provide multiple means of engagement. Help learners become interested, be challenged, and stay motivated.

Interdisciplinary Connections:
See FOSS and Common Core ELA - Grade 2 Guide
See FOSS and Common Core Math - Grade 2 Guide

Additional Resources:
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- Trade books

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Second Grade Teachers

Science / 2nd Grade

Unit 3: Insects and Plants

Subject	Grade	Unit	Suggested Timeline
Science	Second	Insects and Plants	9 weeks

Grade Level Summary
The second grade science curriculum focuses on giving students a broad understanding of solids and liquids. The focus is on physical science, earth science, life/biological science, technology and engineering education, and crosscutting concepts. Students will experience an inquiry based learning approach using observation and scientific method that encourages collaboration, critical thinking, creativity, and communication.

Grade Level Units
Unit 1 - Solids and Liquids
Unit 2 - Pebbles, Sand, and Silt
Unit 3 - Insects and Plants

Unit Title
Insects and Plants

Unit Summary
This module provides grade 2 students with life science core ideas dealing with structure and function of living things, growth and development of plants and animals, interactions of organisms with their environment, and biodiversity of organisms on land and in water. Students build on the science concepts of growth and development of plants and animals from grades K–1 by observing new organisms over time. Students see the life cycles of insects unfold in real time and compare the stages exhibited by each species to reveal patterns. At the same time, students grow one type of plant from seed and observe it through its life cycle to produce new seeds. They gain experience with the ways that plants and insects interact in feeding relationships, seed dispersal, and pollination, and students develop models to communicate their understanding. Throughout the Insects and Plants Module, 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 develop solutions. Students gain experiences that will contribute to understanding of crosscutting concepts of patterns; cause and effect; and structure and function.

Unit Essential Questions

1. How do living things grow and change?

Key Understandings

1. Students will be able to observe and describe the life cycle of mealworms, milkweed bugs, silkworms and caterpillars.
2. Students will be able to identify the parts of an adult insect (head, thorax, abdomen).
3. Students will be able to explain the needs (air, food, water, and space) of different insects and their habitats.

Focus Standards Addressed in the Unit

4.1.K.D	Observe and describe what happens to living things when needs are met.
4.1.1.A	Identify and describe the basic needs of living things in a terrestrial habitat.

4.1.3.D	Identify organisms that are dependent on one another in a given ecosystem. Define habitat and explain how a change in habitat affects an organism.
4.4.3.C	Use scientific inquiry to investigate what animals and plants need to grow.

Important Standards Addressed in the Unit	
CC.1.2.2.E (ELA)	Use various text features and search tools to locate key facts or information in a text efficiently.
CC.1.5.2.A (ELA)	Participate in collaborative conversations with peers and adults in small and larger groups.
CC.1.2.2.A (ELA)	Identify the main idea of a multiparagraph text as well as the focus of specific paragraphs within the text.
CC.1.4.2.W (ELA)	Recall information from experiences or gather information from provided sources to answer a question.

Misconceptions	**Proper Conceptions**
● Baby insects are just smaller versions of adult insects. ● Humans are responsible for planting seeds. ● All insects are pests.	● Some baby insects go through a change to become and adult insect. ● Animals disperse and move seeds from one location to another. ● Insects can be helpful to our environment.

Concepts	**Competencies**	**Vocabulary**
● Insects need air, food, water and space and different insects meet these needs in different ways. ● The life cycle of insects include different stages (egg, larva, pupa and adult). ● Adult insects have a head, thorax, and abdomen. ● Plants need water, air, nutrients, light and space. ● The life cycle of plants include roots, stems, leaves, buds, flowers, and seeds.	● Provide for and design an insect habitat that meets the basic needs of living insects. ● Observe, describe and recreate the life cycle of a mealworm, milkweed bug, silkworm, and caterpillar. ● Compare the structure of one insect to another insect. ● Provide for the needs of plants (water, air, nutrients, light, and space. ● Develop a model to describe a process in the life cycle of plants. ● Record and communicate observation of the brassica life cycle.	Bran Habitat Insect Mealworm Observe Organism Space Structure Abdomen Adult Antenna(e) Darkling beetle Dropping Exoskeleton larva(e) Molting Pupa(e) Segment Stage Thorax Brassica Bud Fertilizer Fruit Germinate Nutrient Plant Pollen

		Pollination Root Seed Seedling Seedpod Sprout Stem Bug Female Hatch Male Mating Milkweed bug Nymph Proboscis Shelter Clasper Cocoon Engineering Evidence Eyespot Metamorphosis Mulberry leaf Proleg Silk Silkworm Spinneret Spiracle Butterfly Caterpillar Chrysalis Nectar Offspring Painted lady Predict Waste

Assessments:

Performance assessments
Science notebook entries
Investigation I-checks

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Unit 3: Insects and Plants

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Science	Second	Insects and Plants	9 weeks

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		Seed Seedling Seedpod Sprout Stem Bug Female Hatch Male Mating Milkweed bug Nymph Proboscis Shelter Clasper Cocoon Engineering Evidence Eyespot Metamorphosis Mulberry leaf Proleg Silk Silkworm Spinneret Spiracle Butterfly Caterpillar Chrysalis Nectar Offspring Painted lady Predict Waste

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Investigation I-checks

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