Willingboro
Public Schools

"Where Excellence is the Expectation"

Willingboro Public Schools
Grade 2 Science

Revised June, 2022
Jennifer Brandon - Supervisor of Science

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SCIEnCE CURRICULUM AND INSTRUCTION:

The Willingboro Public Schools Science program is dedicated to delivering our students an innovative hands-on science program. Our program supports the State's vision that scientifically literate students will gain the knowledge and understanding of scientific concepts as required for personal decision-making, participation in civic and cultural affairs, and economic productivity.

Students are encouraged to ask questions about the world around them and practice science skills.

- Students' science experiences teach them to connect science concepts to their experience, see how human nature influences science, and explore how science and technology affects their lives.
- The science classes include activities that engage students in applying their science skills and understandings to examine social issues, solve real problems and make decisions.
- Students have the opportunity to use a variety of equipment and technology in their scientific investigations.
- Students learn how to find out and make up their own minds by experimenting and investigating how the world works rather than just memorizing facts.
- Students are learning how to conduct scientific inquiry and use data to explain their conclusions.
- The process of investigation and explanation is just as important as knowing "the" answer.

Teachers plan instruction that builds on what students know and think to increase students' scientific understanding.

- Teachers use the New Jersey Student Learning Standards in Science to plan lessons that are challenging, engaging and age appropriate.
- There are resources and opportunities for students to do at-home science activities like participating in the STEM Conference.

Course Sequence/Table of Contents:

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Overview	**Content Standards - Arranged by Disciplinary Core Idea (DCI)** *Students who demonstrate understanding can:*	**Unit Focus**
ESS Unit **Pebbles, Sand, and Silt**	**2-PS1: Matter and Its Interactions** ● **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-ESS1: Earth's Place in the Universe** ● **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: Earth's Systems** ● **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 grade 2 is a course that is designed to enable students to understand the events that shape the Earth. This comprehensive curriculum guide meets the requirements of the New Jersey Student Learning Standards for Science in grade 2, along with the Career Ready Practice standards for 21st Century Life and Careers. Students engage with the anchor phenomenon of earth materials that cover the planet's surface. They observe the properties of rocks of various sizes and study the components of soil, study the results of weathering and erosion, locate natural sources of water, and determine 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.
Suggested Open Educational Resources	● FOSS Next Generation Science Curriculum Resources ○ Think Link ○ Student Resource Books ● Generation Genius	

Overview	**Content Standards - Arranged by Disciplinary Core Idea (DCI)** *Students who demonstrate understanding can:*	**Unit Focus**
PS Unit **Solids and Liquids**	**2-PS1: Matter and Its Interactions** ● **2-PS1-1** Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.] ● **2-PS1-2** Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.] ● **2-PS1-3** Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.] ● **2-PS1-4** Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]	This module provides grade 2 students with physical sciences core ideas dealing with matter and its interactions and engineering design. The anchor phenomenon for this module is matter in two of its phases—solid and liquid. Students build on the science concepts of matter and its interactions developed in kindergarten using new tools to enrich observations. 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 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.
Suggested Open Educational Resources	● FOSS Next Generation Science Curriculum Resources ○ Think Link ○ Student Resource Books ● Generation Genius	
LS Unit **Insects and Plants**	**2-LS2: Ecosystems: Interactions, Energy, and Dynamics** ● **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-LS2: Ecosystems: Interactions, Energy, and Dynamics**	Science grade 2 is a full-year course that is designed to enable students to understand the relationships among living organisms in specific habitats . This comprehensive curriculum guide meets the requirements of the New Jersey Student Learning Standards for Science in Grade 2, along with Career Ready Practice standards for 21st Century Life and Careers. The anchor phenomenon for this

Overview	**Content Standards - Arranged by Disciplinary Core Idea (DCI)** *Students who demonstrate understanding can:*	**Unit Focus**
	• **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.]	module is the natural history of common insects and their interactions with plants. Students see the life cycles of insects unfold in real time and compare the structures and functions exhibited by each species to reveal patterns.
Suggested Open Educational Resources	• FOSS Next Generation Science Curriculum Resources ○ Think Link ○ Student Resource Books • Generation Genius	

Pebbles, Sand, and Silt: Life and Physical Sciences

Overview

Science grade 2 is a full-year course that is designed to enable students to understand the events that shape the Earth. This comprehensive curriculum guide meets the requirements of the New Jersey Student Learning Standards for Science in grade 2, along with the Career Ready Practice standards for 21st Century Life and Careers.

Students engage with the anchor phenomenon of earth materials that cover the planet's surface. They observe the properties of rocks of various sizes and study the components of soil, study the results of weathering and erosion, locate natural sources of water, and determine 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.

Essential Questions	Enduring Understandings
Overarching Driving Questions: *What are properties of rocks and how do they change?* *How do water and wind change landforms?* *How do people use earth materials?* ***Focus Questions for Investigation 1:*** ● How many ways can rocks be sorted? ● What are the properties of schoolyard rocks? ***Focus Questions for Investigation 2:*** ● How are small pieces of rock made and moved to change landforms? ● How can rocks be separated and sorted? ***Focus Questions for Investigation 3:*** ● How are different sizes of rock used as resources to make useful objects? ● How do people use earth materials? ***Focus Questions for Investigation 4:*** ● How can we apply what we know about the ways that land and water interact? ● What is soil? ● How can soil erosion be reduced?	**Anchoring Phenomena: Earth materials that cover the planet's surface.** ● Rocks have distinct and observable properties such as size, color and hardness. ● Rocks can be sorted by their properties and size. ● Rocks are affected by water, wind, and contact with other rocks. ● Rocks have different properties based on where they are found and how they were formed. ● Landforms are created and changed over time by many processes, including water and wind, which can happen slow or fast. ● Bodies of water can be classified by their sizes and shapes. ● The size of small rocks found in soil can change the properties of the soil. ● There are many different types of soil, with different properties and components. ● Humans use rocks in many ways, including building and construction, art and design, and creation of other materials. ● Soil erosion is impacted by human activity, and humans can minimize the impact of soil erosion with preventative methods.

Pebbles, Sand and Silt: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Students who demonstrate understanding can:

2-PS1: Matter and Its Interactions

- **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-ESS1: Earth's Place in the Universe

- **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: Earth's Systems

- **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

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)

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)

Constructing Explanations and Designing Solutions

- Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.
  - Make observations from several sources to construct an evidence based account for natural phenomena. (2-ESS1-1)
  - Compare multiple solutions to a problem. (2-ESS2-1)

Obtaining, Evaluating, and Communicating Information

- Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.
  - Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question. (2- ESS2-3)

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Pebbles, Sand and Silt: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Disciplinary Core Idea

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)

ESS1.C: The History of Planet Earth

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

ESS2.A: Earth Materials and Systems

- Wind and water can change the shape of the land. (2-ESS2-1)

ESS2.B: Plate Tectonics and LargeScale System Interactions

- Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)

ESS2.C: The Roles of Water in Earth's Surface Processes

- Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2- ESS2-3)

ETS1.C: Optimizing the Design Solution

- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (secondary to 2-ESS2-1)

Crosscutting Concepts

Patterns

- Patterns in the natural and human designed world can be observed. (2-PS1-1), (2-ESS2-2), (2-ESS2-3)

Stability and Change

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

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Developing and using technology has impacts on the natural world. (2-ESS2-1)

Connections to Nature of Science Science

Addresses Questions About the Natural and Material World

- Scientists study the natural and material world. (2-ESS2-1)

Student Learning Objectives

Students will be able to…

Investigation 1: First Rocks:

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Students will:

- investigate several kinds of volcanic rocks and begin to understand the properties of rocks.
- observe rocks (using hand lenses), rub rocks, wash rocks, sort rocks, and describe rocks.
- After rubbing two samples together, students find that rock is hard but also susceptible to weathering.
- organize a class rock collection.

Investigation 2: River Rocks

Students will:

- investigate a mixture of different-sized river rocks as a phenomenon.
- separate the rocks using a series of three screens to identify five sizes of rocks: large pebbles, small pebbles, large gravel, small gravel, and sand.
- add water to a vial of sand to discover silt and clay.
- learn how sand is formed and compare slow landform changes of weathering and erosion to rapid landform changes due to volcanic eruptions.

Investigation 3: Using Rocks

Students will:

- learn how people use earth materials to construct objects.
- make rubbings from sandpaper, sculptures from sand, decorative jewelry from clay, and bricks from clay soil.
- They go on a schoolyard field trip to look for places where earth materials occur naturally and where people have incorporated earth materials into building materials.
- discover that rock as a resource is a natural phenomenon occurring in predictable locations all over Earth's surface.

Investigation 4: Soil and Water

Students will:

- investigate a common phenomenon on the surface of Earth—soil.
- put together and take apart soils.
- introduced to humus as an ingredient in soil.
- Homemade and local soils are compared, using techniques introduced in Investigation 2, including water.
- read about sources of natural water, sort images of water sources, both fresh and salt, and discuss where water is found in their community.
- compare different solutions presented in readings to slow the effects of wind and water erosion.
- learn about different ways to represent landforms and bodies of water.

Integrated Accommodations and Modifications		
Special Education Students	**English Language Learners**	**At Risk**
• Utilize modifications & accommodations delineated in the student's IEP	WIDA Can Do Descriptors https://wida.wisc.edu/teach/can-do/descriptors	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments.

• Provide additional manipulatives to support instruction • Allow for alternative strategies to solve algorithms or tasks • Provide the steps needed to complete the task • Model frequently • Provide repetition and practice. • Use visuals to demonstrate/model the processes • Restate, reread, and clarify directions/questions • Ask students to restate information, directions, and assignments. • Provide copy of class notes • Distribute study guide for classroom tests. • Provide preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Provide regular parent/ school communication • Allow extended time to complete assignment • Establish procedures for accommodations / modifications for assessments • Allow student to take/complete tests in an alternate setting as needed <u>Appendix A: Special Education Accommodations and Modifications</u>	• Modify Assignments • Use testing and portfolio assessment • Utilize Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary) • Repeat, rephrase, paraphrase key concepts and directions • Allow for extended time for assignment completion as needed • Highlight key vocabulary • Define essential vocabulary in context • Use graphic organizers, visuals, manipulatives and other concrete materials • Use gestures, facial expressions and body language • Read aloud • Build on what students already know and prior experience	• Provide repetition and and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Provide preferential seating to be mutually determined by the student and teacher • Allow the use of a computer to complete assignments. • Establish expectations for correct spelling on assignments • Provide extra textbooks for home. • Provide Peer Support • Increase one on one time

Gifted and Talented Students	**504 Plan**
• Utilize advanced, accelerated, or compacted content • Provide assignments that emphasize higher- level thinking skills. • Allow for individual student interest • Gear assignments to development in areas of affect, creativity, cognition, and research skills • Allow for a variety in types of resources • Provide problem-based assignments with planned scope and sequence • Utilize inquiry-based instruction • Adjust the pace of lessons • Utilize Choice Boards • Provide Problem-Based Learning	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Break long assignments into smaller parts • Assist student in setting short term goals • Allow for preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home.

• Establish flexible Grouping	• Model and reinforce organizational systems (i.e. color-coding) • Write out homework assignments, check student's recording of assignments
Interdisciplinary Connections	**Computer Science and Design Thinking**
Connections to NJSLS - English Language Arts *Reading* • RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (2-ESS1-1) • RI.2.3 Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-ESS1-1), (2-ESS2-1) • RI.2.9 Compare and contrast the most important points presented by two texts on the same topic. (2-ESS2-1) *Writing* • W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (2-ESS1-1), (2-ESS2-3) • W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-PS1-1), (2-ESS1-1) • W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-PS1-1), (2-ESS1-1), (2-ESS2-3) *Speaking and Listening* • SL.2.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. (2-ESS1-1) • SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (2-ESS2-2) **Connections to NJSLS - Mathematics** • MP.2 Reason abstractly and quantitatively. (2-ESS1-1), (2-ESS2-1), (2-ESS2-2) • MP.4 Model with mathematics. (2-PS1-1), (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)	**Computer Science and Design Thinking Practices** 1. ☐ Fostering an Inclusive Computing and Design Culture 2. ✓ Collaborating Around Computing and Design 3. ☐ Recognizing and Defining Computational Problems 4. ✓ Developing and Using Abstractions 5. ☐ Creating Computational Artifacts 6. ☐ Testing and Refining Computational Artifacts 7. ☐ Communicating About Computing and Design **Computer Science and Design Thinking Standards** *Data and 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. • Computers store data that can be retrieved later. Data can be copied, stored in multiple locations, and retrieved. ◦ 8.1.2.DA.2: Store, copy, search, retrieve, modify, and delete data using a computing device. • 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* • 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. *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.

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● 2.MD.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) ● 2.MD.D.10 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)	○ 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. ● Limitations (constraints) must be considered when engineering designs. ○ 8.2.2.ED.4: Identify constraints and their role in the engineering design process. *Nature of Technology* ● Innovation and the improvement of existing technology involves creative thinking ○ 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.

Career Readiness, Life Literacies and Key Skills

Career Readiness, Life Literacies and Key Skills Practices

- Act as a responsible and contributing community member and employee.
- Attend to financial well-being.
- Consider the environmental, social and economic impacts of decisions.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them.
- Model integrity, ethical leadership and effective management.
- Plan education and career paths aligned to personal goals.
- Use technology to enhance productivity, increase collaboration and communicate effectively.
- Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies and Key Skills Standards

9.1 Personal Financial Literacy

Civic Responsibility

- 9.1.2.CR.1: Recognize ways to volunteer in the classroom, school and community.
- 9.1.2.CR.2: List ways to give back, including making donations, volunteering, and starting a business

9.2 Career Awareness, Exploration, Preparation, and Training

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

Creativity and Innovation
- 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
- 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).

Digital Citizenship
- 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 (e.g., 8.1.2.NI.3, 8.1.2.NI.4).
- 9.4.2.DC.4: Compare information that should be kept private to information that might be made public.
- 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 (e.g., 6.3.2.CivicsPD.1).

Global and Cultural Awareness
- 9.4.2.GCA:1: Articulate the role of culture in everyday life by describing one's own culture and comparing it to the cultures of other individuals (e.g., 1.5.2.C2a, 7.1.NL.IPERS.5, 7.1.NL.IPERS.6).

Information and Media Literacy
- 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 (e.g., 2.MD.D.10).
- 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
- 9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1).
- 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

Climate Change

2-ESS2-1: Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

SEL Competencies

- **Self - Awareness**
- **Self - Management**
- **Social Awareness**
- **Responsible Decision Making**
- **Relationship Skills**

https://www.nj.gov/education/safety/wellness/selearning/index.shtml

District/School Formative Assessment Plan	District/School Summative Assessment Plan
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. Teachers are encouraged to incorporate Formative Assessments into all lessons. During instruction, teachers will collect ongoing information on students' mastery of content through a variety of methods: ● Pre-Assessment ● Questioning: using Socratic method, probing questions, a hierarchical system in complexity (Bloom's Taxonomy) ● Exit tickets, rotational activities (stations), quizzes, and small group activities ● Classwork, homework, group work (formative assessment) ● Teacher's observation, class discussion, and Student Notebook	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* **Benchmark Assessments:** ● Assessment 1.1: Mid-Unit Assessment ● Assessment 1.2: End of Unit Assessment ● Assessment 1.3: End of Unit Performance Assessment **Standardized Assessments:** ● NJSLA **Other Summative Assessments:** Teachers are encouraged to design and implement their own assessments (topic/module tests and quizzes) individually and/or with their department or grade-level partners, as per Uniform Grading Profile.

Targeted Academic Vocabulary
Rocks, properties, size, color, hardness, observe, sort, classify, water, wind, erosion, contact, location, formation, landform, bodies of water, shape, time, soil, soil components, soil properties, use, usefulness, building/construction, art, design, materials, human activity, prevent, impact, conserve.

District/School Tasks	District/School Primary and Supplementary Resources
● Common Formative Assessments ● Common District Summative Assessments ● See above Assessment Sections for more information	**District-Mandated Resources** ● FOSS Curriculum **Assessment Resources:** ● Available on FOSS - ThinkLink ● For additional resources, log in to https://edconnectnj.schoolnet.com **Other Resources:**

	• For a complete list of physical and digital materials for each investigation, please visit https://edconnectnj.schoolnet.com/ or ThinkLink • Teaching about the Holocaust/Genocide, Prejudice & Bullying Using UDL (Grades K5) (Holocaust Law) • Climate Change Activities for Early Elementary (Climate Change Resource) • Famous African American Climate Scientist (Amistad) • Generation Genius: "Oceans Lakes and Rivers", "Maps of Landforms", "Changing the Shape of Land", "Timescale of Earth's Events" **Project Ideas:** • Modeling erosion in a sandbox • Identifying how rocks are used in our lives and community journal • Soil sample comparisons
Instructional Best Practices and Exemplars	
See Appendix A for Instructional Best Practices and Exemplars	
Pacing Guide	
Grade 2 Unit 1 "Pebbles, Sand, and Silt" Pacing Guide	

Solids and Liquids: Life and Physical Science

Overview

This module provides grade 2 students with physical sciences core ideas dealing with matter and its interactions and engineering design. The anchor phenomenon for this module is matter in two of its phases—solid and liquid. Students build on the science concepts of matter and its interactions developed in kindergarten using new tools to enrich observations. 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 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.

Essential Questions	Enduring Understandings
Overarching Driving Questions: *What are some observable properties of solids and liquids?* *How are solid particles and liquids the same and different?* *How do properties of materials change when they are heated or cooled?* ***Focus Questions for Investigation 1 Solids:*** ● What are some observable and describable properties of solid materials? ● How can we use those properties to make useful objects? ● Can two or more objects have the same property? ● What are solid objects made of? ***Focus Questions for Investigation 2 Liquids:*** ● What are some observable and describable properties of liquids? ● How are liquids similar to and different from each other? ● How do liquids change in containers? ***Focus Questions for Investigation 3 Bits and Pieces:*** ● How can mixtures of particles be separated? ● How do particles of solids move in bottles? ● What can happen when solids and liquids are mixed with water? ***Focus Questions for Investigation 4 Solids, Liquids, and Water:***	**Anchoring Phenomenon: Solids and Liquids** ● Solids and liquids have observable properties that can be described. ● The properties of objects can be compared and contrasted. ● The properties of solids and liquids determine their uses. ● Solids and liquids are all around us. ● Solids keep their shape, liquids take the shape of their container. ● Solid materials can occur as masses of small particles. ● Mixtures are the combination of two or more substances. ● Different types of solids and liquids will interact with water differently based on their properties. ● Engineers use knowledge of material properties to design structures that solve problems.

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• What is the effect of heating or cooling materials? • What happens when solids or liquids are mixed with water?	

Solids and Liquids: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Students who demonstrate understanding can:

2-PS1: Matter and Its Interactions

- **2-PS1-1** Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]
- **2-PS1-2** Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]
- **2-PS1-3** Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]
- **2-PS1-4** Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]

Scientific and Engineering Practices

Planning and Carrying Out Investigations

- Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.
    - Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-PS1-1)

Analyzing and Interpreting Data

- Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
    - Analyze data from tests of an object or tool to determine if it works as intended. (2-PS1-2)

Constructing Explanations and Designing Solutions

- Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.
    - Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (2-PS1-3)

Engaging in Argument from Evidence

- Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).
    - Construct an argument with evidence to support a claim. (2- PS1-4)

Solids and Liquids: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)
- Different properties are suited to different purposes. (2-PS1-2), (2- PS1-3)
- A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

PS1.B: Chemical Reactions

- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)

Crosscutting Concepts

Patterns

- Patterns in the natural and human designed world can be observed. (2-PS1-1)

Cause and Effect

- Events have causes that generate observable patterns. (2-PS1-4)
- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2)

Energy and Matter

- Objects may break into smaller pieces and be put together into larger pieces or change shapes. (2- PS1-3)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. (2-PS1-2)

Connections to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

- Scientists search for cause and effect relationships to explain natural events. (2-PS1-4)

Student Learning Objectives

Students will be able to…

Investigation 1:

Students will:

- explore solid objects, such as pieces of wood, plastic, and metal.
- observe, describe, and sort the objects according to their properties.
- construct towers (and other structures), using the properties inherent in the materials to accomplish the task.

- discover solid objects in the schoolyard environment, and sort the found objects into natural and human-made.

Investigation 2:
Students will:
- investigate liquids in a variety of settings to become familiar with their properties.
- learn precise liquids vocabulary, using liquid properties cards.
- use representational materials to enhance their understanding of the unique behaviors of liquids.
- explore the properties of water puddles in the schoolyard.

Investigation 3:
Students will:
- work with beans, rice, and cornmeal to find out how solids behave when the pieces are small.
- shake, rattle, and roll the materials in bottles, pour them from container to container, and separate them by using screens.
- go outdoors to find particulate solid materials.
- observe the particles when poured on a flat surface and compare the particles to water on the same surface.

Investigation 4:
Students will:
- investigate interactions between solids and water and liquids and water.
- observe, describe, record, and organize the results.
- test toothpaste to determine if it is a solid or a liquid.
- investigate melting and freezing of familiar liquids.
- collect solid materials outdoors and mix them with water.
- look for changes in the color and clarity of the water as evidence that something mixed with the water.

Integrated Accommodations and Modifications		
Special Education Students	**English Language Learners**	**At Risk**
• Utilize modifications & accommodations delineated in the student's IEP • Provide additional manipulatives to support instruction • Allow for alternative strategies to solve algorithms or tasks • Provide the steps needed to complete the task • Model frequently • Provide repetition and practice.	WIDA Can Do Descriptors https://wida.wisc.edu/teach/can-do/descriptors • Modify Assignments • Use testing and portfolio assessment • Utilize Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary)	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Provide preferential seating to be mutually determined by the student and teacher

• Use visuals to demonstrate/model the processes • Restate, reread, and clarify directions/questions • Ask students to restate information, directions, and assignments. • Provide copy of class notes • Distribute study guide for classroom tests. • Provide preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Provide regular parent/ school communication • Allow extended time to complete assignment • Establish procedures for accommodations / modifications for assessments • Allow student to take/complete tests in an alternate setting as needed Appendix A: Special Education Accommodations and Modifications	• Repeat, rephrase, paraphrase key concepts and directions • Allow for extended time for assignment completion as needed • Highlight key vocabulary • Define essential vocabulary in context • Use graphic organizers, visuals, manipulatives and other concrete materials • Use gestures, facial expressions and body language • Read aloud • Build on what students already know and prior experience	• Allow the use of a computer to complete assignments. • Establish expectations for correct spelling on assignments • Provide extra textbooks for home. • Provide Peer Support • Increase one on one time

Gifted and Talented Students	**504 Plan**
• Utilize advanced, accelerated, or compacted content • Provide assignments that emphasize higher- level thinking skills. • Allow for individual student interest • Gear assignments to development in areas of affect, creativity, cognition, and research skills • Allow for a variety in types of resources • Provide problem-based assignments with planned scope and sequence • Utilize inquiry-based instruction • Adjust the pace of lessons • Utilize Choice Boards • Provide Problem-Based Learning • Establish flexible Grouping	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Break long assignments into smaller parts • Assist student in setting short term goals • Allow for preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Model and reinforce organizational systems (i.e. color-coding) • Write out homework assignments, check student's recording of assignments
Interdisciplinary Connections	**Computer Science and Design Thinking**

Connections to NJSLS - English Language Arts

Reading

- RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (2-PS1-4)
- RI.2.3 Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-PS1-4)
- RI.2.8 Describe how reasons support specific points the author makes in a text. (2-PS1-2), (2-PS1-4)

Writing

- W.2.1 Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section. (2-PS1-4)
- W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-PS1-1), (2-PS1-2), (2-PS1-3)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-PS1-1), (2-PS1-2), (2-PS1-3)

Connections to NJSLS - 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.MD.D.10 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)

Computer Science and Design Thinking Practices

1. ☐ Fostering an Inclusive Computing and Design Culture
2. ✓ Collaborating Around Computing and Design
3. ☐ Recognizing and Defining Computational Problems
4. ✓ Developing and Using Abstractions
5. ☐ Creating Computational Artifacts
6. ☐ Testing and Refining Computational Artifacts
7. ☐ Communicating About Computing and Design

Computer Science and Design Thinking Standards

Data and 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.
- Computers store data that can be retrieved later. Data can be copied, stored in multiple locations, and retrieved.
    - 8.1.2.DA.2: Store, copy, search, retrieve, modify, and delete data using a computing device.
- 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

- 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.

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.
- Limitations (constraints) must be considered when engineering designs.

	○ 8.2.2.ED.4: Identify constraints and their role in the engineering design process. *Nature of Technology* ● Innovation and the improvement of existing technology involves creative thinking ○ 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.

Career Readiness, Life Literacies and Key Skills

Career Readiness, Life Literacies and Key Skills Practices

- Act as a responsible and contributing community member and employee.
- Attend to financial well-being.
- Consider the environmental, social and economic impacts of decisions.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them.
- Model integrity, ethical leadership and effective management.
- Plan education and career paths aligned to personal goals.
- Use technology to enhance productivity, increase collaboration and communicate effectively.
- Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies and Key Skills Standards

9.1 Personal Financial Literacy

Civic Responsibility

- 9.1.2.CR.1: Recognize ways to volunteer in the classroom, school and community.
- 9.1.2.CR.2: List ways to give back, including making donations, volunteering, and starting a business

9.2 Career Awareness, Exploration, Preparation, and Training

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

Creativity and Innovation

- 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

- 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).

Digital Citizenship

- 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 (e.g., 8.1.2.NI.3, 8.1.2.NI.4).
- 9.4.2.DC.4: Compare information that should be kept private to information that might be made public.
- 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 (e.g., 6.3.2.CivicsPD.1).

Global and Cultural Awareness

- 9.4.2.GCA:1: Articulate the role of culture in everyday life by describing one's own culture and comparing it to the cultures of other individuals (e.g., 1.5.2.C2a, 7.1.NL.IPERS.5, 7.1.NL.IPERS.6).

Information and Media Literacy

- 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 (e.g., 2.MD.D.10).
- 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

- 9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1).
- 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

Climate Change
Addressed in Units 1 and 3
SEL Competencies

- **Self - Awareness**
- **Self - Management**
- **Social Awareness**
- **Responsible Decision Making**
- **Relationship Skills**

https://www.nj.gov/education/safety/wellness/selearning/index.shtml

District/School Formative Assessment Plan	**District/School Summative Assessment Plan**

Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. Teachers are encouraged to incorporate Formative Assessments into all lessons. During instruction, teachers will collect ongoing information on students' mastery of content through a variety of methods: ● Pre-Assessment ● Questioning: using Socratic method, probing questions, a hierarchical system in complexity (Bloom's Taxonomy) ● Exit tickets, rotational activities (stations), quizzes, and small group activities ● Classwork, homework, group work (formative assessment) ● Teacher's observation, class discussion, and Student Notebook	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* **Benchmark Assessments:** ● Assessment 1.1: Mid-Unit Assessment ● Assessment 1.2: End of Unit Assessment ● Assessment 1.3: End of Unit Performance Assessment **Standardized Assessments:** ● NJSLA **Other Summative Assessments:** Teachers are encouraged to design and their own assessments (topic/module tests and quizzes) individually and/or with their department or grade-level partners, as per Uniform Grading Profile.

Targeted Academic Vocabulary

Solids, liquids, matter, properties, temperature, color, texture, hardness, flexibility, trength, flexibility, absorbency, mixture, physical change, chemical change, reversible change, irreversible change, length, shape

District/School Tasks	District/School Primary and Supplementary Resources
● Common Formative Assessments ● Common District Summative Assessments ● See above Assessment Sections for more information	**District-Mandated Resources** ● FOSS Curriculum **Assessment Reosurces:** ● Available on FOSS - ThinkLink ● For additional resources, log in to https://edconnectnj.schoolnet.com **Other Resources:** ● Generation Genius ● Teaching about the Holocaust/Genocide, Prejudice & Bullying Using UDL (Grades K5) (Holocaust Law) ● Climate Change Activities for Early Elementary (Climate Change Resource)

	Project Ideas: ● Modeling sea level rise with melting ice cubes ● Modeling mixtures with soup ● Separating iron filings, salt, and black pepper challenge
Instructional Best Practices and Exemplars	
See Appendix A for Instructional Best Practices and Exemplars	
Pacing Guide	
Grade 2 Unit 2: "Solids and Liquids" Pacing Guide	

Insects and Plants: Life and Physical Sciences

Overview

Science grade 2 is a full-year course that is designed to enable students to understand the relationships among living organisms in specific habitats . This comprehensive curriculum guide meets the requirements of the New Jersey Student Learning Standards for Science in Grade 2, along with Career Ready Practice standards for 21st Century Life and Careers. The anchor phenomenon for this module is the natural history of common insects and their interactions with plants. Students see the life cycles of insects unfold in real time and compare the structures and functions exhibited by each species to reveal patterns.

Essential Questions	Enduring Understandings
Overarching Driving Questions: *How have plants and insects affected the natural history of each other?* *Where do insects live and what do they need in their habitat?* ***Focus Questions for Investigation 1 Mealworms:*** ● What do mealworms need to live? ● How do mealworms grow and change? ● What are the stages of a beetle's life cycle? ***Focus Questions for Investigation 2 Brassica Seeds:*** ● What is the natural history of a flowering plant? ● How does a young plant change as it grows? ***Focus Questions for Investigation 3 Milkweed Bugs:*** ● What are the yellow objects and how do they change over time? ● What do milkweed bugs need in their habitat? ● How do milkweed bugs grow and change? ***Focus Questions for Investigation 4 Silkworms:*** ● What is the life cycle of the silkworm and what does it need to live? ● How can we compare the animals that live in different habitats? ● What evidence is there that insects are eating plants in the schoolyard? ***Focus Questions for Investigation 5 Butterflies:*** ● How is a painted lady pupa different from a silkworm pupa? ● How might insects pollinate schoolyard flowers? ● What plants in our schoolyard have pollen?	**Anchoring Phenomenon: Natural History of Insects and Plants** ● Insects have life cycles that are unique yet similar in many ways. ● Insect species have a long natural history. ● The natural habitats of insects impact some of their characteristics. ● Flowering plants have specific structures and behaviors that have allowed them to survive. ● Young plants change as they grow. ● We can observe evidence of insect activity on plants without seeing the insect. ● Pollination of flowers by insects is critical to the ecosystem. ● Insects and the plants they pollinate are all around us.

Insects and Plants: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Students who demonstrate understanding can:

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

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

- **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

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)

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)
    - Make observations (firsthand or from media) to collect data that can be used to make comparisons. (2-LS4-1)

Disciplinary Core Ideas

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)

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)

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)

Crosscutting Concepts

Cause and Effect

- Events have causes that generate observable patterns. (2-LS2-1)

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)

Insects and Plants: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

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)

Student Learning Objectives

Students will be able to…

Investigation 1: Mealworms

Students will:

- study biodiversity by focusing on insects and plants and their interactions. Students begin by investigating firsthand the phenomenon of mealworms and observe their structures and behaviors. Each student receives two larval mealworms in a vial to care for and observe. Over 10 weeks, students observe the larvae grow, molt, pupate, and turn into beetles (adults), which mate, lay eggs, and die.
- read about and use media to gather information about the diversity of plants and animals that live in different habitats.

Investigation 2: Brassica Seeds

Students will:

- engage with biodiversity of plants by studying the natural history of a flowering plant and in the process uncover the phenomenon of a flower.
- plants tiny rapid-cycling brassica seeds in a planter cup. The brassica plants grow under continuous light and develop for a month.
- analyze the experimental results of growing seeds in different conditions and design an experiment to test the effects of water and light on mature plants.
- study pollination through video and by cross-pollinating their brassica plants.
- observe and record thecomplete life cycle from seed to seed.
- search for seeds outdoors and learn about ways that animals disperse seeds to new locations.

Investigation 3: Milkweed Bugs

Students will:

- observe a second insect—the milkweed bug—through its stages of life, and compare the phenomena of complete and simple metamorphosis. Groups of students receive vials of milkweed bug eggs.
- prepares a habitat for the bugs, providing air, food, water, and space, including shelter.
- observe structure, pattern, and behavior as the insects advance through simple metamorphosis.
- gather information using media about garden and backyard insects and other animals.

- search for insects living naturally on the ground and on plants and design an insect habitat. They continue to explore biodiversity of animals by investigating schoolyard habitats to observe insects and other small animals and design an insect habitat.

Investigation 4: Silkworms

Students will:

- observe the life history of one of the most commercially successful insects, silkworm moths, and discover that this insect is responsible for an interesting phenomenon, the production of silk. They start with eggs and observe the growth and changes to larvae, pupae, and adults, which produce eggs.
- search the schoolyard for evidence of plants being eaten by insects.
- Through a video, they observe a team of students in an urban school plan and conduct a biodiversity study in a natural area to answer the question will a native willow tree habitat have the same animals as a nonnative palm tree habitat?

Investigation 5: Butterflies

Students will:

- conclude their study of animal biodiversity by nurturing and studying another insect—the painted lady butterfly.
- observes painted lady larvae grow, pupate, and emerge as adult butterflies.
- observe the stages of complete metamorphosis and compare the natural history of moths and butterflies.
- study pollination through a video and outdoor flowering plant observations, and construct, test, and share models of pollinators.
- Through video and firsthand investigations in the schoolyard, students explore the phenomena of pollination and the important role insects play in the life cycle of flowering plants. Students construct, test, and share models of pollinators.

Integrated Accommodations and Modifications		
Special Education Students	**English Language Learners**	**At Risk**
• Utilize modifications & accommodations delineated in the student's IEP • Provide additional manipulatives to support instruction • Allow for alternative strategies to solve algorithms or tasks • Provide the steps needed to complete the task • Model frequently • Provide repetition and practice. • Use visuals to demonstrate/model the processes • Restate, reread, and clarify directions/questions	WIDA Can Do Descriptors https://wida.wisc.edu/teach/can-do/descriptors • Modify Assignments • Use testing and portfolio assessment • Utilize Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary) • Repeat, rephrase, paraphrase key concepts and directions • Allow for extended time for assignment completion as needed	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Provide preferential seating to be mutually determined by the student and teacher • Allow the use of a computer to complete assignments.

• Ask students to restate information, directions, and assignments. • Provide copy of class notes • Distribute study guide for classroom tests. • Provide preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Provide regular parent/ school communication • Allow extended time to complete assignment • Establish procedures for accommodations / modifications for assessments • Allow student to take/complete tests in an alternate setting as needed Appendix A: Special Education Accommodations and Modifications	• Highlight key vocabulary • Define essential vocabulary in context • Use graphic organizers, visuals, manipulatives and other concrete materials • Use gestures, facial expressions and body language • Read aloud • Build on what students already know and prior experience	• Establish expectations for correct spelling on assignments • Provide extra textbooks for home. • Provide Peer Support • Increase one on one time

Gifted and Talented Students	**504 Plan**
• Utilize advanced, accelerated, or compacted content • Provide assignments that emphasize higher- level thinking skills. • Allow for individual student interest • Gear assignments to development in areas of affect, creativity, cognition, and research skills • Allow for a variety in types of resources • Provide problem-based assignments with planned scope and sequence • Utilize inquiry-based instruction • Adjust the pace of lessons • Utilize Choice Boards • Provide Problem-Based Learning • Establish flexible Grouping	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Break long assignments into smaller parts • Assist student in setting short term goals • Allow for preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Model and reinforce organizational systems (i.e. color-coding) • Write out homework assignments, check student's recording of assignments

Interdisciplinary Connections	**Computer Science and Design Thinking**
Connections to NJSLS - English Language Arts *Writing*	**Computer Science and Design Thinking Practices** 1. ☐ Fostering an Inclusive Computing and Design Culture 2. ✓ Collaborating Around Computing and Design

- W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-LS2-1), (2-LS4-1)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-LS2-1), (2-LS4-1)

Speaking and Listening

- SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (2-LS2-2)

Connections to NJSLS - 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.MD.D.10 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)

3. ☐ Recognizing and Defining Computational Problems
4. ✓ Developing and Using Abstractions
5. ☐ Creating Computational Artifacts
6. ☐ Testing and Refining Computational Artifacts
7. ☐ Communicating About Computing and Design

Computer Science and Design Thinking Standards

Data and 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.
- Computers store data that can be retrieved later. Data can be copied, stored in multiple locations, and retrieved.
    - 8.1.2.DA.2: Store, copy, search, retrieve, modify, and delete data using a computing device.
- 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

- 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.

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.
- Limitations (constraints) must be considered when engineering designs.
    - 8.2.2.ED.4: Identify constraints and their role in the engineering design process.

Nature of Technology

- Innovation and the improvement of existing technology involves creative thinking

	○ 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.

Career Readiness, Life Literacies and Key Skills

Career Readiness, Life Literacies and Key Skills Practices

- Act as a responsible and contributing community member and employee.
- Attend to financial well-being.
- Consider the environmental, social and economic impacts of decisions.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them.
- Model integrity, ethical leadership and effective management.
- Plan education and career paths aligned to personal goals.
- Use technology to enhance productivity, increase collaboration and communicate effectively.
- Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies and Key Skills Standards

9.1 Personal Financial Literacy

Civic Responsibility

- 9.1.2.CR.1: Recognize ways to volunteer in the classroom, school and community.
- 9.1.2.CR.2: List ways to give back, including making donations, volunteering, and starting a business

Financial Psychology

- 9.1.2.FP.2: Differentiate between financial wants and needs.

9.2 Career Awareness, Exploration, Preparation, and Training

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

Creativity and Innovation

- 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

- 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).

Digital Citizenship

- 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 (e.g., 8.1.2.NI.3, 8.1.2.NI.4).
- 9.4.2.DC.4: Compare information that should be kept private to information that might be made public.
- 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 (e.g., 6.3.2.CivicsPD.1).

Global and Cultural Awareness

- 9.4.2.GCA:1: Articulate the role of culture in everyday life by describing one's own culture and comparing it to the cultures of other individuals (e.g., 1.5.2.C2a, 7.1.NL.IPERS.5, 7.1.NL.IPERS.6).

Information and Media Literacy

- 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 (e.g., 2.MD.D.10).
- 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

- 9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1).
- 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

Climate Change

2-LS2-1 Plan and conduct an investigation to determine if plants need sunlight and water to grow.

SEL Competencies

- **Self - Awareness**
- **Self - Management**
- **Social Awareness**
- **Responsible Decision Making**
- **Relationship Skills**

https://www.nj.gov/education/safety/wellness/selearning/index.shtml

District/School Formative Assessment Plan	District/School Summative Assessment Plan
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. Teachers are encouraged to incorporate Formative Assessments into all lessons. During instruction, teachers will collect ongoing information on students' mastery of content through a variety of methods:	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* **Benchmark Assessments:** • Assessment 1.1: Mid-Unit Assessment • Assessment 1.2: End of Unit Assessment • Assessment 1.3: End of Unit Performance Assessment

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• Pre-Assessment • Questioning: using Socratic method, probing questions, a hierarchical system in complexity (Bloom's Taxonomy) • Exit tickets, rotational activities (stations), quizzes, and small group activities • Classwork, homework, group work (formative assessment) • Teacher's observation, class discussion, and Student Notebook	**Standardized Assessments:** • NJSLA **Other Summative Assessments:** Teachers are encouraged to design and their own assessments (topic/module tests and quizzes) individually and/or with their department or grade-level partners, as per Uniform Grading Profile.

Targeted Academic Vocabulary

Natural history, insect, beetle, head, thorax, abdomen, worm, butterfly, caterpillar, habitat, life cycle, life stages, metamorphosis, egg, nymph, larvae, pupa, molt, food, water, shelter, plant, flower, pollinate, pollen, seed, grow, biodiversity,

District/School Tasks	District/School Primary and Supplementary Resources
• Common Formative Assessments • Common District Summative Assessments • See above Assessment Sections for more information	**District-Mandated Resources** • FOSS Curriculum **Assessment Reosurces:** • Available on FOSS - ThinkLink • For additional resources, log in to https://edconnectnj.schoolnet.com **Other Resources:** • Generation Genius • Teaching about the Holocaust/Genocide, Prejudice & Bullying Using UDL (Grades K5) (Holocaust Law) • Climate Change Activities for Early Elementary (Climate Change Resource) • Books about Pollination for Young Readers • Honeybees: National Geographic Kids • Life Cycle of Plants: National Geographic Kids **Project Ideas:** • Raising and observing Monarch butterflies in the classroom (and releasing them!) • Visit from a beekeeper, botanist, or other local conservationist

Instructional Best Practices and Exemplars
See Appendix A for Instructional Best Practices and Exemplars
Pacing Guide
Grade 2 Unit 3: "Insects and Plants" Pacing Guide

Appendix A: **Instructional Best Practices and Exemplars**

Appendix A: Instructional Best Practices and Exemplars: Unit 1

Appendix A: Instructional Best Practices and Exemplars: Unit 2

Appendix A: Instructional Best Practices and Exemplars: Unit 3

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Appendix B:
Exemplars and Explanations

Appendix B: Instructional Exemplars and Explanations: Unit 1

Appendix B: Instructional Exemplars and Explanations: Unit 2

Appendix B: Instructional Exemplars and Explanations: Unit 3

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Appendix C:

<subject> Classroom Philosophy, Schedule, Structure, and Expectations

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