

MOUNT HOLLY TOWNSHIP SCHOOL DISTRICT
2nd GRADE SCIENCE CURRICULUM



Revised to meet the June 2020 Science NJSLS-S
Board Approval: September 2022

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2020 New Jersey Student Learning Standards for Science (K-5)

2020 New Jersey Student Learning Standards for Science (6-8)

Intent and Spirit

The New Jersey Student Learning Standards for Science (NJSLS-S) describe the expectations for what students should know and be able to do as well as promote three-dimensional science instruction across the three science domains (i.e., physical sciences, life science, Earth and space sciences). From the earliest grades, the expectation is that students will engage in learning experiences that enable them to investigate phenomena, design solutions to problems, make sense of evidence to construct arguments, and critique and discuss those arguments (in appropriate ways relative to their grade level).

The foundation of the NJSLS-S reflects three dimensions — science and engineering practices, disciplinary core ideas, and crosscutting concepts. The performance expectations are derived from the interplay of these three dimensions. It is essential that these three components are integrated into all learning experiences. Within each standard document, the three dimensions are intentionally presented as integrated components to foster sensemaking and designing solutions to problems. Because the NJSLS-S is built on the notions of coherence and contextuality, each of the science and engineering practices and crosscutting concepts appear multiple times across topics and at every grade level. Additionally, the three dimensions should be an integral part of every curriculum unit and should not be taught in isolation.

Mission

All students will possess an understanding of scientific concepts and processes required for personal decision-making, participation in civic life, and preparation for careers in STEM fields (for those that chose).

Vision

Prepare students to become scientifically literate individuals who can effectively:

- Apply scientific thinking, skills, and understanding to real-world phenomena and problems;

- Engage in systems thinking and modeling to explain phenomena and to give a context for the ideas to be learned;
- Conduct investigations, solve problems, and engage in discussions;
- Discuss open-ended questions that focus on the strength of the evidence used to generate claims;
- Read and evaluate multiple sources, including science-related magazine and journal articles and web-based resources to gain knowledge about current and past science problems and solutions and develop well-reasoned claims; and
- Communicate ideas through journal articles, reports, posters, and media presentations that explain and argue.

Three Dimensions of NJSL-S

The performance expectations reflect the three dimensions and describe what students should know and be able to do. In layman's terms, they are "the standards." They are written as statements that can be used to guide assessment and allow for flexibility in the way that students are able to demonstrate proficiency.

The example below is provided to illustrate the interconnected nature of the NJSL-S components.

Disciplinary Core Ideas and Performance Expectations

Disciplinary Core Idea	Performance Expectation
Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models.	Develop and use a model of the Earth-sun moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

Science and Engineering Practices

Developing and Using Models	Develop and use a model to describe phenomena
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Crosscutting Concepts

Scale, Proportion, and Quantity	Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.
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Becoming familiar with the science practices and crosscutting concepts is a critically important first step in designing learning experiences reflective of the three dimensions. A description of each of the science and engineering practices and the cross-cutting concepts can be found in the next sections.

Further, for students to develop proficiency of the NJSLS-S, they will need to engage in learning experiences that are meaningful, cumulative, and progressive. Learning experiences designed to be meaningful, go beyond reading about science concepts and provide opportunities for students to be active learners and make sense of ideas. Cumulative learning experiences provide opportunities for students to use and build on ideas that they have learned in previous units. Progressive learning experiences provide multiple occasions for students to engage in ways that enable them to improve their construction of explanations and solutions over time by iteratively assessing them, elaborating on them, and holding them up to critique and evidence.

Scientific and Engineering Practices

Asking Questions and Defining Problems

A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world works and which can be empirically tested. Engineering questions clarify problems to determine criteria for successful solutions and identify constraints to solve problems about the designed world. Both scientists and engineers also ask questions to clarify the ideas of others.

Planning and Carrying Out Investigations

Scientists and engineers plan and carry out investigations in the field or laboratory, working collaboratively as well as individually. Their investigations are systematic and require clarifying what counts as data and identifying variables or parameters. Engineering investigations identify the effectiveness, efficiency, and durability of designs under different conditions.

Analyzing and Interpreting Data

Scientific investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Scientists identify sources of error in the investigations and calculate the degree of certainty in the results. Modern technology makes the collection of large data sets much easier, providing secondary sources for analysis. Engineering investigations include analysis of data collected in the tests of designs. This allows comparison of different solutions and determines how well each meets specific design criteria—that is, which design best solves the problem within given constraints. Like scientists, engineers require a range of tools to identify patterns within data and interpret the results. Advances in science make analysis of proposed solutions more efficient and effective.

Developing and Using Models

A practice of both science and engineering is to use and construct models as helpful tools for representing ideas and explanations. These tools include diagrams, drawings, physical replicas, mathematical representations, analogies, and computer simulations. Modeling tools are used to develop questions, predictions and explanations; analyze and identify flaws in systems; and communicate ideas. Models are used to build and revise scientific explanations and proposed engineered systems. Measurements and observations are used to revise models and designs.

Constructing Explanations and Designing Solutions

The products of science are explanations and the products of engineering are solutions. The goal of science is the construction of theories that provide explanatory accounts of the world. A theory becomes accepted when it has multiple lines of empirical evidence and greater explanatory power of phenomena than previous theories. The goal of engineering design is to find a systematic solution to problems that is based on scientific knowledge and models of the material world. Each proposed solution results from a process of balancing competing criteria of desired functions, technical feasibility, cost, safety, aesthetics, and compliance with legal requirements. The optimal choice depends on how well the proposed solutions meet criteria and constraints.

Engaging in Argument from Evidence

Argumentation is the process by which explanations and solutions are reached. In science and engineering, reasoning and argument based on evidence are essential to identifying the best explanation for a natural phenomenon or the best solution to a design problem. Scientists and engineers use argumentation to listen to, compare, and evaluate competing ideas and methods based on merits.

Scientists and engineers engage in argumentation when investigating a phenomenon, testing a design solution, resolving questions about measurements, building data models, and using evidence to identify strengths and weaknesses of claims.

Using Mathematics and Computational Thinking

In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; statistically analyzing data; and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable scientists and engineers to predict the behavior of systems and test the validity of such predictions. Statistical methods are frequently used to identify significant patterns and establish correlational relationships.

Obtaining, Evaluating, and Communicating Information

Scientists and engineers must be able to communicate clearly and persuasively the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity. Communicating information and ideas can be done in multiple ways: using tables, diagrams, graphs, models, and equations as well as orally, in writing, and through extended discussions. Scientists and engineers employ multiple sources to acquire information that is used to evaluate the merit and validity of claims, methods, and design.

{NJDOE NJSLS-S January 2022}

New Jersey Technology Standards

[2020 New Jersey Student Learning Standards: Computer Science and Design Thinking](#)

New Jersey Career Readiness, Life Literacies, and Key Skills Standards

[2020 New Jersey Student Learning Standards: Career Readiness, Life Literacies & Key Skills](#)

New Jersey Climate Change Standards

[2020 New Jersey Student Learning Standards: Climate Change](#)

Pacing Guide

Topic	Unit #	Unit Length
2-PS1: Matter and It's Interactions	1	25 days
2-LS2: Ecosystems: Interactions, Energy, and Dynamics	2a	10 days
2-LS2: Ecosystems: Interactions, Energy, and Dynamics	2b	10 days
2-ESS1: Earth's Place in the Universe	3a	10 days
2-ESS1: Earth's Place in the Universe	3b	10 days

Science Unit 1 Second Grade	
Unit Title	Matter and It's Interactions
Recommended Pacing	25 days
Unit Summary	In this unit of study, students demonstrate an understanding of observable properties of materials through analysis and classification of different materials. The crosscutting concepts of patterns, cause and effect, and the influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in planning and carrying out investigations and analyzing and interpreting data. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Career Readiness, Life Literacies, and Key Skills Standards 9.2 & 9.4	Adapt to Change Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Understanding that: • Different types of jobs require different knowledge and skills. • Income is received from work in different ways including regular payments, tips, commissions, and benefits. • There are benefits and drawbacks to being an entrepreneur 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.
Computer Science and Design Thinking (Technology)	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)
Diversity, Equity, and Inclusion	• Videos featured individuals of different race, color, and gender. • Various forms of learning will occur throughout each lesson based on modifications made which include kinesthetic, auditory, and visual learning which will meet the needs of all students.
Climate Change	• K-ESS3-1: Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. • K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool. • K-2-ETS1-3: Analyze data from tests of two objects designed to solve the same

	problem to compare the strengths and weaknesses of how each performs.
Supplemental Class Resources	● BrainPop, BrainPopJr. ● Generation Genius- videos, lessons, exit tickets ● Mystery Science ● Shared Google Docs ● Hands-on Activities, Foldable Notes ● Recording Sheets
District/School Formative & Summative Assessment Plan	● Teacher Observation ● Presentations ● Quizzes/Test ● Portfolios ● Group Projects/Discussions ● Performance Tasks ● Summative Assessment ● Constructed Response

Disciplinary Core Idea	Performance Expectation
PS1.A: Structure and Properties of Matter - Different kinds of matter exist - Objects can be either solid or liquid depending on temperature - Different properties are suited to different purposes - A great variety of objects can be built up from a	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

small set of pieces PS1.B: Chemical Reactions - Heating or cooling a substance may cause changes that can be observed - Sometimes changes are reversible and sometimes they are not	intended purpose. 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.
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Science & Engineering Practices	- Planning and carrying out investigations - Analyzing and interpreting data - Constructing explanations and designing solutions - Engaging in argument from evidence
Articulation of DCI's Across Grade-Levels	- • 4.ESS2.A (2-PS1-3) - • 5.PS1.A (2-PS1-1), (2-PS1-2), (2-PS1-3) - • 5.PS1.B (2-PS1-4) - • 5.LS2.A (2-PS1-3)
Crosscutting Concepts	Patterns - Patterns in the natural and designed world can be observed Cause and Effect - Events have causes that generate observable patterns - Simple tests can be designed to gather evidence to support or refute ideas about causes Energy and Matter - Objects may break into smaller pieces and be put together into larger pieces, or change shapes Influence of Engineering, Tech, and Science on Society and the Natural World - Human-made products are designed by applying knowledge of the natural world - Human-made products are designed by materials found in the natural world

Math Student Learning Objectives Covered in this Unit
• 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,

ELA Student Learning Objectives Covered in this Unit
• 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) • 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)

Modifications

Example:

Unit 1 Modifications:

Gifted and Talented:

- Student choice for projects
- Access to higher level texts/ articles
- Research opportunities as an extension of content being taught
- Strategic small groups based on IRLA level
- Individual project opportunities
- Critical thinking questions
- At home project suggestions

Special Education:

- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
- Students will be provided with modified graphic organizers
- Modifications will be followed as stated in IEP
- Students will be provided small group instruction to ensure understanding of concepts
- Teachers will modify work when appropriate to meet individual needs
- Students will have access to “Read to Me” books
- Teacher will present information using a multi-sensory approach
- Strategic small group instruction based on IRLA levels
- Differentiated project options and assessments

At Risk Students:

- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
- Teacher will frequently check on understanding and completion of work
- Extension on completion of assignments
- Modified amount based on individual needs
- Provide student choice within projects
- Deliver instruction based on student interests

- Small group instruction
- Positive praise/reinforcement

ELL/ESL:

- Students will be provided visual cards to support new vocabulary words related to unit
- Students will refer to visual vocabulary cards throughout unit
- Modified graphic organizers
- Peer collaboration and opportunities for partner work
- Checklists with visuals will be provided to assist task completion
- Repetition of routines and procedures will be emphasized to support learning
- Relate content to culture when possible
- Language Learning Opportunities
- Cognate Word Wall

ELL/ESL: Grades 2-3 WIDA Can Do Descriptors:

- Listening: Process recounts by • Showing what happens next based on familiar oral stories (e.g., by pointing or drawing) • Drawing or providing other visual displays of people, animals, or objects in response to oral prompts
- Speaking: Recount by • Reproducing facts or statements in context • Participating in multi-media presentations based on research
- Reading: Process recounts by • Identifying key words and phrases in illustrated text
- Writing: Recount by • Listing ideas using graphic organizers • Describing visual information

Additional Modification Option:

<https://www.nextgenscience.org/sites/default/files/Appendix%20D%20Diversity%20and%20Equity%206-14-13.pdf>

Unit One: ****Matter and Its Interactions****

NJ Student Learning Standards: Science Grade 2:

2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

- Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.

“I can plan and conduct an investigation to describe and classify different kinds of materials.”

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.

- Examples of properties could include, strength, flexibility, hardness, texture, and absorbency. Assessment Boundary: Assessment of quantitative measurements is limited to length.

“I can study data collected from testing different materials to figure out which materials have the properties that are best for a certain purpose.”

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.

- Examples of pieces could include blocks, building bricks, or other assorted small objects.

“I can make observations to explain how an object made of a small set of pieces can be taken apart and made into a new object.”

Length: 15 days

NJDOE Science Curricular Framework

[NJ Science Frameworks](#)

21st Century Student Outcomes

<http://www.battelleforkids.org/networks/p21>

Learning and Innovation Skills

highlight appropriate indicators for unit/domain

Think Creatively

Work Creatively with Others

Implement Innovations

Reason effectively

Use Systems Thinking

Make Judgments and Decisions

Solve Problems

Communicate Clearly

Collaborate with Others

Information, Media and Technology Skills

highlight appropriate indicators for unit/domain

Information Literacy

Media Literacy

ICT (Information, Communications and Technology Literacy)

Life and Career Skills

highlight appropriate indicators for unit/domain

2-PS1-4 Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. 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. <i>“I can make observations to explain how matter can change due to temperature.”</i>	Adapt to Change Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Work Effectively in Diverse Teams
Unit Focus and Targets:	
Essential Questions: How do the properties of materials determine their use? Learning Goals: Students will - Analyze and classify states of matter - Observe and classify properties of matter such as color, texture, hardness, flexibility - Understand how different properties are suited for different purposes - Analyze data from tests in order to make decisions	
NJSLS Lessons:	
Unit 1 Lesson 1: Intro to States of Matter Materials: Matter Info chart	

- States of matter sort (https://drive.google.com/a/mtholly.k12.nj.us/file/d/0B5e_0qncfnkBR3JBU0hvLUw0akE/view?usp=sharing)
- States of Matter Flipchart (https://drive.google.com/open?id=0B5e_0qncfnkBShZ2a0U0SVYzRXM)

Engage:

1. Google Image “liquid” on the board and pull up one of the images - try to avoid showing students the search bar
2. Present students with the image of the liquid and ask them to describe it
3. Share out student responses and guide students to describe it as “liquid”
4. Emphasize this and then point to a desk - ask “Is this a liquid?”
5. Guide students to discuss what the desk is if it’s not a liquid
6. Once students have described the desk as solid, explain that these words - solid, liquid, and also gas - are states of matter
7. <https://www.youtube.com/watch?v=C33WdI64FiY> stop at 2:23

Explore:

1. Google Image “liquid” on the board and pull up one of the images - try to avoid showing students the search bar
2. Present students with the image of the liquid and ask them to describe it
3. Share out student responses and guide students to describe it as “liquid”
4. Emphasize this and then point to a desk - ask “Is this a liquid?”
5. Guide students to discuss what the desk is if it’s not a liquid
6. Once students have described the desk as solid, explain that these words - solid, liquid, and also gas - are states of matter

Explain:

1. In pairs, provide students with the States of Matter sort
2. Ask students to take turns picking a card and deciding where to sort it
3. The other partner will then ask how they know it is a solid, liquid, or gas
4. While pairs are working on the sort, circulate and prompt students to think about how solids have their own shape, liquids and gases take up the space of their container to describe objects

Elaborate:

1. Start to create a chart of “Matter Info” with a section for solid, liquid, and gas
2. Discuss and share out information from the song to fill in the chart with facts and examples
3. Watch the BrainPopJr.: <https://jr.brainpop.com/science/matter/solidsliquidsandgases/>
4. Continue to add to the chart and discuss
 - a. Emphasize that solids have their own shape; liquids take the shape of their container; gases take up the space of their container

Evaluate:

1. Allow students to complete a “states of matter scavenger hunt” around the classroom or outside
2. Have students fold their paper into 3 sections and fill the sections with examples they find on their hunt
3. As a whole group, use the States of Matter Flipchart to continue review

Unit 1 Lesson 2: Intro to States of Matter- Investigation

Objective: I can plan and conduct an investigation to describe and classify different kinds of materials

Activities/Procedures:

1. Introduce the concept that our world is made of matter and Read aloud What is the World Made of
2. Discuss examples of matter and how we know certain things are certain types of matter
3. Use Magic ink pen to discuss and reveal examples of solids, liquids, and gasses
4. Present student groups with balloon poke activity in groups of 3
5. In groups, students will observe and pass balloons filled with air, water, and ice to describe and guess what is inside of them
6. Emphasize how gas fills a space, liquid takes the shape of an object, solids don't change

Essential Question(s): How do properties of matter determine use?

Differentiation: Grouping, preview of vocab, questioning and prompting provided

Assessment: discussion responses, observation and questioning throughout

Unit 1 Lesson 3: Properties of Matter

Materials:

- Properties of Matter foldable (https://drive.google.com/open?id=0B5e_0qncfnkBMlgxTjFWd0s4SVU)
- Various objects from the classroom
- I Spy Recording Sheet (https://drive.google.com/open?id=1sDctUosI2JgWtyLNI3Qc_X0sb48hGxgiGSzrdnXb-AI)

Engage:

1. Break students into groups and give each group a random object from the classroom
2. Tell the groups that they will have 2 minutes to write down as many words that they can to describe that object
3. Set the timer for 2 minutes and circulate while groups work
4. Have groups share out their words to the class
5. Ask the class if there are words that they can add to the list

Explore:

1. Explain to students that the way we talk about matter (which all of the items are) is by describing their “properties”
2. Ask students to see what types of properties they wrote down. Look for categories of words like size, shape, color, texture, temperature, sharpness
3. Create a list of as many properties as groups can come up with

- a. Emphasize and redirect students to think of the category not the specific description of their object
4. Pair students up and explain to them how to play “I Spy”
5. Pass out the I Spy Recording Sheet
6. Give students time to take turns playing “I Spy” and emphasize to them that they should be trying to use as many properties of matter to describe their item as possible

Explain:

1. Watch the States of Matter song again: <https://www.youtube.com/watch?v=C33Wdl64FiY>
2. This time, continue to the end so that students can hear the part about properties of matter

Elaborate:

1. Provide each student/pair/small group with the Properties of Matter foldable
2. Glue/tape together the foldable pieces so that students are able to write under the flaps
3. Explain that students will be hunting for objects that represent examples of these properties (different sizes, different shapes, colors, hardness, and texture)
4. Students will hunt for objects and either trace/write the name of the object in their foldable

Evaluate:

1. Allow students to share out their foldables with the class
2. Discuss the different objects students recorded and prompt the class to challenge or question the types of objects selected
3. Students should be able to explain why they selected each object and use the property of matter to describe it

Unit 1 Lesson 4: Intro to States of Matter-Investigation

Materials:

- Various objects
- Rootbeer Float Lab sheet (https://drive.google.com/open?id=0B5e_0qncfnkBTnQ4OVZ2WUhvUIU)

- Cups
- Ice cream
- Rootbeer
- *What is the World Made of?*

Engage:

1. Present students with various objects
2. Ask the group to review the states of matter and ways to describe them based on the discussion of these objects

Explore:

1. Using their lab sheet, students will create a question based on the experiment, make predictions, and record initial observations
2. Students will conduct the root beer float experiment
3. Students will record final observations and write conclusions about the states of matter in root beer floats

Explain:

1. Review with students conclusions on their sheets to ensure accuracy of information

Elaborate:

1. Review with students conclusions on their sheets to ensure accuracy of information

Evaluate:

1. Students should be able to provide examples of solids, liquids, and gases
2. Students should be able to explain that solids keep their shape, while liquids and gases take the shape of their container

****OR****

Materials:

- Lab Sheet (https://drive.google.com/open?id=0B5e_0qncfinkBVI9tbU5icF8wZk0)

- Variety of crackers to test

Engage:

1. Review properties of matter with the class by playing I Spy
2. Ask volunteers to describe objects and have students identify the property being described

Explore:

1. Students will be given their Properties of Matter lab sheet
2. Groups will make observations of the crackers and record answers on their lab sheet

Explain:

1. Groups will share their lab sheets with the class
2. Review the types of properties and emphasize the differences

Elaborate:

1. Students will continue the lab and make comparisons about the crackers

Evaluate:

1. Students should be able to describe the various categories of properties and examples of properties of matter

Unit 1 Lesson 5: Intro to States of Matter-Investigation**Materials:**

- Properties Planning Sheet (<https://drive.google.com/open?id=1JYB7ktiITQy-Y4X3p6Z9qVk8kSU4wKqv5lHxVm5UNLE>)
- Variety of Plates (borrow from Cicchino)

Engage:

1. Review the states of matter and properties of matter with students, as this will be the first science class in awhile

2. Watch and discuss the matter song from previous lesson: <https://www.youtube.com/watch?v=C33WdI64FiY>
3. Play I Spy to get students practicing and thinking about properties of various objects
4. After students have guessed the object you were thinking of, ask them a question to initiate a connection between the properties of objects having specific purposes
 - a. Why is the carpet soft? What would it be like if the properties of the carpet were different? (hardy, sharp, cold)
 - b. Why is the exit sign red? What would it be like if the properties of the exit sign were different? (small, see-through, blue)
 - c. Why is the desk hard? What would it be like if the properties of the desk were different? (rough, sharp, soft)
5. Emphasize the idea that properties of an object have a purpose

Explore:

1. Explain to students that they are going to be building bridges in ACE this week, but first they needed to decide what materials to use
2. Break students into teams and provide each student with a Properties Planning Sheet
3. Show students the various types of plates to make initial observations - just observe!
4. Complete the Properties Planning Sheet
 - a. Groups will discuss and conclude on which property they need to test the plates for in order to build the best bridge to hold weight. Essentially, what is the most important property to consider when building a bridge?
 - b. Groups will discuss and plan out the simple investigation that they can conduct to test their plates. Record the investigation - emphasize that it should
 - c. be simple - stepping on it, flicking it, poking it with a pencil, folding it over the edge of a desk

Explain:

1. Review with students the types of plates that they are testing and fill in the left-hand column of the chart on the Properties Planning Sheet (styrofoam, paper, plastic, compartments, small)
2. Explain to students that now they will test the plates for the property they selected by conducting their investigation

Elaborate:

1. Groups will conduct their simple test on the 5 types of plates
2. After each test, students should record their results in the chart of the Properties Planning Sheet
3. Once groups have finished testing, groups should complete the conclusion steps on the Properties Planning Sheet

Evaluate:

1. On the Properties Planning Sheet, groups will sketch the bridge they will be building using the plate that performed best during the investigation
2. Students should be able to explain that they selected this specific plate because it has the properties needed to build the strongest bridge based on the test they conducted.

Unit 1 Lesson 6: Properties with a Purpose**Materials:**

- Properties Planning Sheet from science class
- Variety of plates
- Tape
- Toilet paper tubes
- Popsicle Sticks
- Legos
- Weights

Engage:

1. Review of Properties Planning Sheet
2. Discussion of materials and expectations for building challenge
3. Present students with challenge: Build the strongest bridge using the material selected from tests

Explore:

1. Teams will build their bridges using the supplies provided

Explain:

1. Groups will present their bridges to the class

Elaborate:

1. Using weights, teams will test their bridges
2. Data will be collected using a flip chart to track how strong each plate was and how important the various properties were to building a strong bridge

Evaluate:

1. Students should be able to explain that various properties are used for specific purposes and that we can test objects to discover what properties they have and what purposes they can be used for

Differentiation:**Accommodations/Modifications:****Tier II:**

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier III:

- Visuals of vocabulary
- Review vocabulary from previous lesson
- Show pictures of people/animals working together and not working together/working as an individual
- Have students show which pictures show community
- Provide visuals

- Utilize song first to pre-teach vocabulary (pattern).
- Kinesthetic learning
- Teacher model with manipulatives, students build onto teacher model.
- Limit amount of manipulatives.
- Tactile- give students different colored manipulatives.
- One-on-one instruction as needed
- Teacher can document student progress
- Alternative forms of assessment

Science Unit 2A Second Grade	
Unit Title	2-LS2: Ecosystems: Interactions, Energy, and Dynamics
Recommended Pacing	10 Days
Unit Summary	Students will use prior and present knowledge to compare the diversity of life in different habitats. They will understand what plants need to grow and how plants depend on animals for seed dispersal and pollination. Through observation and experimentation, they will find the properties of matter by analyzing and classifying different objects. They will also use information and models to identify and represent shapes of the land and how wind and water can change the shape of land to compare design solutions to slow or prevent such change.

Career Readiness, Life Literacies, and Key Skills Standards	• 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).
Computer Science and Design Thinking (Technology)	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)
Diversity, Equity, and Inclusion	• Videos featured individuals of different race, color, and gender. • Various forms of learning will occur throughout each lesson based on modifications made which include kinesthetic, auditory, and visual learning which will meet the needs of all students.
Climate Change	• K-ESS3-1: Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. • K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool. • K-2-ETS1-3: Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
Supplemental Class Resources	• BrainPop, BrainPopJr. • Generation Genius- videos, lessons, exit tickets • Mystery Science • Shared Google Docs

	• Hands-on Activities, Foldable Notes • Recording Sheets
District/School Formative & Summative Assessment Plan	• Teacher Observation • Presentations • Quizzes/Test • Portfolios • Group Projects/Discussions • Performance Tasks • Summative Assessment • Constructed Response

Disciplinary Core Idea	Performance Expectation
Unit 2: Ecosystems	NJSLSA.R3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text. NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words. NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

Science & Engineering Practices	• 2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. • 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. • 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.
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	• 2-PS1-4 Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
Articulation of DCI's Across Grade-Levels	- • 4.ESS2.A (2-PS1-3) - • 5.PS1.A (2-PS1-1), (2-PS1-2), (2-PS1-3) - • 5.PS1.B (2-PS1-4) - • 5.LS2.A (2-PS1-3)
Crosscutting Concepts	Patterns - Patterns in the natural and designed world can be observed Cause and Effect - Events have causes that generate observable patterns - Simple tests can be designed to gather evidence to support or refute ideas about causes Energy and Matter - Objects may break into smaller pieces and be put together into larger pieces, or change shapes Influence of Engineering, Tech, and Science on Society and the Natural World - Human-made products are designed by applying knowledge of the natural world - Human-made products are designed by materials found in the natural world

Math Student Learning Objectives Covered in this Unit

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)

ELA Student Learning Objectives Covered in this Unit

2 - LS4 - 1. Make observations of plants and animals to compare the diversity of life in different habitats

- Emphasis on the diversity of living things in each of a variety of different habitats

“I can make observations of plants and animals compare how life is different in different habitats.”

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

- Assessing impact of one variable at a time

“I can plan and conduct an investigation to figure out if plants need sunlight and water to grow.”

2 - LS2 - 2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants

Next Generation Science Standards Overview

Science Content:

- Compare the diversity of life in different habitats
- Understand what plants need to grow and how plants depend on animals for seed dispersal and pollination
- Understand observable properties of matter by analyzing and classifying
- Use information and models to identify and represent shapes of the land
- Apply understanding that wind and water can change the shape of land to compare design solutions to slow or prevent such change

Science Concepts:

- Cause and effect
- Patterns
- Energy and matter
- Structure and function

- Stability and change
- Influence of engineering, technology, and science on society and the natural world

Science Skills:

- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

Unit 2A: **Ecosystems: Interactions, Energy, and Dynamics**

NJ Student Learning Standards: Science Grade 2:

2 - LS4 - 1. Make observations of plants and animals to compare the diversity of life in different habitats

- Emphasis on the diversity of living things in each of a variety of different habitats

“I can make observations of plants and animals compare how life is different in different habitats.”

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

- Assessing impact of one variable at a time

Length: 10 Days

NJDOE Science Curricular Framework
[NJ Science Frameworks](#)

21st Century Student Outcomes
<http://www.battelleforkids.org/networks/p21>

Learning and Innovation Skills
highlight appropriate indicators for unit/domain
 Think Creatively
 Work Creatively with Others
 Implement Innovations
 Reason effectively
 Use Systems Thinking

	Make Judgments and Decisions Solve Problems Communicate Clearly Collaborate with Others Information, Media and Technology Skills highlight appropriate indicators for unit/domain Information Literacy Media Literacy ICT (Information, Communication and Technology Literacy) Life and Career Skills highlight appropriate indicators for unit/domain Adapt to Change Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Work Effectively in Diverse Teams
Unit Focus and Targets:	
Essential Questions: - How does the diversity of plants and animals vary among different habitats? Teaching Points: - Patterns occur in the natural world - There are many different types of habitats in our world - There are many different kinds of living things in any habitat	

Learning Goals:

- Look for patterns and order in the natural world
- Make observations to collect data that can be used to make comparisons
- Make observations of plants and animals to compare diversity in habitats

NJSLS Lessons:

Unit 2a:

Lesson 1:

Materials:

- Animals in their Habitats Flipchart (https://drive.google.com/open?id=0B5e_0qncfnkBVDJvV3Zoa1M0YVvk)
- Animals in their Habitats Recording sheet (https://drive.google.com/open?id=0B5e_0qncfnkBOGE2ZEK2QUdpR1k)
- Magazines (borrowed from Cicchino if needed)
- Construction paper
- Chromebooks

Engage:

1. Ask students to think about the word habitat: where have they heard it before, what does it have to deal with, what does it mean
2. Turn and talk/stop and jot, then share out ideas
3. Create a list of Habitat Information that students already know to activate prior knowledge

Explore:

1. Show students the Animals in their Habitats Flipchart
2. Provide students with the Animals in their Habitats recording sheet and explain that they will be making observations like a scientist to record the different types of animals they see in different habitats
3. As you go through the slides, allow students time to make and record observations before discussing
4. Discuss and emphasize the diversity of both plants and animals within each habitat

5. Ask and discuss for each slide:

- a. Can you observe and describe this habitat? Think about the temperature, how much rain that habitat gets, types of vegetation
- b. What kinds of plants do you see?
- c. What kinds of animals do you see?
- d. How is this habitat different from the previous habitat
- e. Could a _____ (fill in the animal) live in this habitat? Use the observations as evidence
- f. What allows _____ (fill in the animal) to live in this habitat? (ex. fish have gills so that they can survive under water)

Explain:

1. Allow students to play following habitat games: http://www.bbc.co.uk/schools/scienceclips/ages/8_9/habitats.shtml
<http://www.scholastic.com/magicschoolbus/games/habitat/index.htm>
2. Circulate while students play and prompt them to think about the diversity of animals and plants that live in the same place
3. Wrap up the games and explain to students that now they are going to study different habitats and the life inside of them

Elaborate:

1. Separate students into groups and give each group a habitat to study:
 - a. Rainforest
 - b. Arctic
 - c. Desert
 - d. Freshwater
 - e. Ocean
 - f. Forest
2. Each group will be using the corresponding BrainPopJr. Video and the following sites as starting points to research their habitat
http://www.skyenimals.com/browse_habitat.cgi
3. Give groups a large piece of construction paper
4. Provide students with criteria for their posters: number of facts; list of animals/plants; hand-drawn pictures; magazine cut outs
5. Allow groups time to research and complete their research posters

Evaluate:

1. Groups will present their habitat posters to the class
2. Students should be explaining and focusing on the diversity of animals and plants in their habitats - many animals and plants living together in the same place

Lesson 2:**Materials:**

- *One World, Many Biomes* read aloud
- Habitat sorting cards (https://drive.google.com/open?id=0B5e_0qncfnkBdTJZMUs1cmFFakE)
- Habitat Recording Sheet (<https://drive.google.com/open?id=10Xi5wBtM0Dx6KKSA1hgIx1rzlG7oIXzPUdxSQw0GLuo>)

Engage:

1. Review and discuss with students the meaning of habitat
2. Watch the following video: <https://www.youtube.com/watch?v=w12Kn5dEEec> to activate prior knowledge
3. Brainstorm and discuss the types of habitats shown in the video and create a list of animal examples within each habitat

Explore:

1. Explain to students that sometimes when scientists talk about habitats, they call them biomes at that biomes are different all over the world
2. Using a map to show the area, read aloud *One World, Many Biomes*
3. Emphasize and discuss diversity of plants and animals introduced in the book
4. Ask questions to focus students on the interdependence of each biome

Explain:

1. Challenge students to think about how different animals and plants are connected in their habitats
2. Ask: how would habitats change if one animal left? One plant?

Elaborate:

1. In pairs, have students sort out their Habitat sorting cards

2. Once sorted, pairs will select animals and plants in each habitat that are directly connected and record those cards on their Recording Sheet

Evaluate:

1. While students work on their sort and record, circulate to prompt and question students about why certain animals and plants are in certain groups
2. Assess recording sheets for accuracy

Lesson 3:**Materials:**

- Animal Research sheets (https://drive.google.com/open?id=0B5e_0qncfnkBX2VTMDRXNEpSbE0)
- Animal book selections
- Chromebooks

Engage:

1. Display the Houston Zoo Cam: <https://www.houstonzoo.org/meet-the-animals/animal-webcams/>
2. Watch the different cameras and ask questions about the habitats for each camera
3. Allow students to discuss what they are seeing and share their observations

Explore:

1. Explain to students that this week, they will be focusing on learning about a specific animal within their habitat
2. In pairs made up of students from last week's small group, allow students to select an animal that lives within the habitat they studied last week
3. Distribute an Animal Research sheet
4. Students will research their animal using books, <http://www.animalfactguide.com/animal-facts/>, and <http://kids.nationalgeographic.com/animals/>

Explain:

1. Continually check in with students while they are researching
2. For the first day, they likely will spend most of the time watching videos and looking at pictures - emphasize that these should be treated like scientific observations
3. By the second day, students should be recording facts and information
4. Remind students that they should be writing about the pictures they see, not just the words they find on the websites

Elaborate:

1. As students work through their Animal Research sheet, explain to them that they should use the “interesting Facts” box to explain how the animal they are researching is connected to its environment (polar bear has thick fur, monkey’s have long tails to swing on branches, etc)

Evaluate:

1. Pairs will share their animal research and the habitat they created in ACE
2. Students should be able to emphasize their animal’s connection to the specific habitat

Lesson 4:

Materials:

- Paper plates
- Scissors
- Colored pencils
- Tape
- Animal cut outs

Engage:

1. Groups will share out the animal they are researching
2. As groups share their animal, the rest of the class will guess what habitat that animal lives in

Explore:

1. Students will each build their own paper plate diorama as a way to model the habitat their animal is in
2. Using the paper plate, tape, and cut out, students will construct their habitat

Explain:

1. Explain to students that they must include two other animals and two plants in the habitat that live alongside their researched animal

Elaborate:

1. Students will work with their partner to draw conclusions about the animals and plants in their habitats
2. Allow students time to complete their habitat diorama

Evaluate:

1. Students will present their dioramas to the class while presenting their animal research

Differentiation:**Accommodations/Modifications:****Tier II:**

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier III:

- Visuals of vocabulary
- Review vocabulary from previous lesson
- Show pictures of people/animals working together and not working together/working as an individual
- Have students show which pictures show community
- Provide visuals

- Utilize song first to pre-teach vocabulary (pattern).
- Kinesthetic learning
- Teacher model with manipulatives, students build onto teacher model.
- Limit amount of manipulatives.
- Tactile- give students different colored manipulatives.
- One-on-one instruction as needed
- Teacher can document student progress
- Alternative forms of assessment

Unit Assessments: Final Presentation or Projects

Formative: Research Questions, Notes, Notebook/Journal Entries

Summative: Presentation to class

Science Unit 2B Second Grade	
Unit Title	2-LS2: Ecosystems: Interactions, Energy, and Dynamics
Recommended Pacing	10 Days
Unit Summary	Students will use prior and present knowledge to compare the diversity of life in different habitats. They will understand what plants need to grow and how plants depend on animals for seed dispersal and pollination. Through observation and experimentation, they will find the properties of matter by analyzing and classifying different objects. They will also use

	information and models to identify and represent shapes of the land and how wind and water can change the shape of land to compare design solutions to slow or prevent such change.
Career Readiness, Life Literacies, and Key Skills Standards	• 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).
Computer Science and Design Thinking (Technology)	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)
Diversity, Equity, and Inclusion	• Videos featured individuals of different race, color, and gender. • Various forms of learning will occur throughout each lesson based on modifications made which include kinesthetic, auditory, and visual learning which will meet the needs of all students.
Climate Change	• K-ESS3-1: Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. • K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool. • K-2-ETS1-3: Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
Supplemental Class Resources	• BrainPop, BrainPopJr.

	● Generation Genius- videos, lessons, exit tickets ● Mystery Science ● Shared Google Docs ● Hands-on Activities, Foldable Notes ● Recording Sheets
District/School Formative & Summative Assessment Plan	● Teacher Observation ● Presentations ● Quizzes/Test ● Portfolios ● Group Projects/Discussions ● Performance Tasks ● Summative Assessment ● Constructed Response

Disciplinary Core Idea	Performance Expectation
2 - LS4 - 1. Make observations of plants and animals to compare the diversity of life in different habitats - Emphasis on the diversity of living things in each of a variety of different habitats <i>“I can make observations of plants and animals compare how life is different in different habitats.”</i> 2 - LS2 - 1. Plan and conduct an investigation to determine if plants need sunlight and water to grow - Assessing impact of one variable at a time	● Asking questions ● Planning and carrying out investigations ● Engaging in arguments from evidence ● Constructing explanations ● Developing and using models ● Analyzing and interpreting data ● Defining problems and designing solutions ● Evaluating findings ● Communicating information ● Using scientific and engineering practices

<i>“I can plan and conduct an investigation to figure out if plants need sunlight and water to grow.”</i> 2 - LS2 - 2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants <i>“I can develop a simple model that has the similar functions of an animal in spreading seeds or pollinating plants.”</i>	
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Science & Engineering Practices	• 2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. • 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. • 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. • 2-PS1-4 Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
Articulation of DCI's Across Grade-Levels	- • 4.ESS2.A (2-PS1-3) - • 5.PS1.A (2-PS1-1), (2-PS1-2), (2-PS1-3) - • 5.PS1.B (2-PS1-4) - • 5.LS2.A (2-PS1-3)
Crosscutting Concepts	Cause and Effect - Events have causes that generate observable patterns Structure and Function - The shape and stability of structures of natural or designed objects are related to their

	functions
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Math Student Learning Objectives Covered in this Unit
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)

ELA Student Learning Objectives Covered in this Unit
NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

Gifted and Talented: ● Student choice for projects ● Access to higher level texts/ articles ● Research opportunities as an extension of content being taught ● Strategic small groups based on IRLA level ● Individual project opportunities ● Critical thinking questions ● At home project suggestions Special Education: ● Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
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- Students will be provided with modified graphic organizers
- Modifications will be followed as stated in IEP
- Students will be provided small group instruction to ensure understanding of concepts
- Teachers will modify work when appropriate to meet individual needs
- Students will have access to “Read to Me” books
- Teacher will present information using a multi-sensory approach
- Strategic small group instruction based on IRLA levels
- Differentiated project options and assessments

Next Generation Science Standards Overview

Science Content:

- Compare the diversity of life in different habitats
- Understand what plants need to grow and how plants depend on animals for seed dispersal and pollination
- Understand observable properties of matter by analyzing and classifying
- Use information and models to identify and represent shapes of the land
- Apply understanding that wind and water can change the shape of land to compare design solutions to slow or prevent such change

Science Concepts:

- Cause and effect
- Patterns
- Energy and matter
- Structure and function
- Stability and change
- Influence of engineering, technology, and science on society and the natural world

Science Skills:

- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

Unit 2B: **Ecosystems: Interactions, Energy, and Dynamics**

NJ Student Learning Standards: Science Grade 2:

Length: 10 days

NJDOE Science Curricular Framework
[NJ Science Frameworks](#)

21st Century Student Outcomes
<http://www.battelleforkids.org/networks/p21>

Learning and Innovation Skills
highlight appropriate indicators for unit/domain
 Think Creatively
 Work Creatively with Others
 Implement Innovations
 Reason effectively
 Use Systems Thinking
 Make Judgments and Decisions
 Solve Problems
 Communicate Clearly
 Collaborate with Others

	Information, Media and Technology Skills highlight appropriate indicators for unit/domain Information Literacy Media Literacy ICT (Information, Communication and Technology Literacy) Life and Career Skills highlight appropriate indicators for unit/domain Adapt to Change Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Work Effectively in Diverse Teams
Unit Focus and Targets:	
Essential Questions: - How do plants depend on their habitats? Learning Goals: - Observe patterns in relationships - Plan and conduct investigations to collect evidence - Develop a model based on evidence to represent an object	
NJSLS Lessons:	
Unit 2b: Lesson 1:	

Materials:

- Plant Information Flipchart (https://drive.google.com/open?id=0B5e_0qncfnkBb0VYcWo1N3JhN0U)
- Chlorophyll Rubbing Sheet (https://drive.google.com/open?id=0B5e_0qncfnkBZklGUmFyTIVIR0k)
- Plant Investigation Planning Sheet (https://drive.google.com/open?id=11ld4x03GBVdltg84_bg-OY-pqgRKNsF77pivMX5O-Is)

Engage:

1. Explain to students that we have learned so much about habitats, now we are going to see how the different parts within a habitat work together
2. Have students turn and talk/stop and jot, then share out to list the needs of a plant
3. Create a chart showing what plants need to survive

Explore:

1. View the Plant Information Flipchart with the class
2. Discuss each slide and allow students to share observations
3. Challenge students to explain how the plants are working together with their habitat to survive (eating parts of it, growing a certain shape, smelling a certain way)

Explain:

1. Review the Needs of a Plant song: <https://www.youtube.com/watch?v=dUBIQ1fTRzI>
2. Pause the video on the full plant or show a picture of a plant
3. Ask students to label the parts of a plant
4. Explain to students that the plant gets what it needs from its habitat: roots are in the ground to absorb nutrients, stem is bring nutrients to the plant, and leaves are turning sunlight into chlorophyll.

Elaborate:

1. Take students outside. Each student needs to find a green leaf - you want them to pick leaves that have “lots of chlorophyll”
2. Explain to students that the green color is chlorophyll which helps soak in the sun, mix with water and air and feed the plant - the plant gets everything it needs to survive from its habitat!
3. Have students fold the Chlorophyll Rubbing Sheet in half and put their leaf in between

4. Lay pencils down horizontally and use as a roller to collect a chlorophyll rubbing on the sheet
5. After students have rubbed a green print, open up the sheet and observe the chlorophyll print
6. Emphasize and discuss with students how this green plant food is coming from sunlight and water in the plant's habitat

Evaluate:

1. Pose a question to students: What would happen to a plant if it didn't have sunlight? What would happen if a plant didn't have water?
2. Have students turn and talk/stop and jot down their ideas about how they could test what would happen
3. In groups, have students write down in steps how they would test what happens if a plant doesn't get sunlight or water on the Plant Investigation Planning Sheet

Differentiation:

Accommodations/Modifications:

Tier II:

- Extended time for assignments
- Alternative forms of assessment if appropriate
- Visuals for vocabulary
- Pre-teach new vocabulary when appropriate
- Reduce auditory and visual distractions
- Small group instruction as needed

Tier III:

- Visuals of vocabulary
- Review vocabulary from previous lesson
- Show pictures of people/animals working together and not working together/working as an individual
- Have students show which pictures show community
- Provide visuals
- Utilize song first to pre-teach vocabulary (pattern).
- Kinesthetic learning
- Teacher model with manipulatives, students build onto teacher model.
- Limit amount of manipulatives.
- Tactile- give students different colored manipulatives.

- One-on-one instruction as needed
- Teacher can document student progress
- Alternative forms of assessment

Unit Assessments: Final Presentation or Projects

Formative: Research Questions, Notes, Notebook/Journal Entries

Summative: Presentation to class

Science Unit 3A Second Grade	
Unit Title	2-ESS1: Earth's Place in the Universe
Recommended Pacing	10 days
Unit Summary	In this unit, students will investigate what types of shapes do we find on our Earth. Through research and discovery, they will explore water in areas such as oceans, rivers, lakes, and ponds. Also, that water exists on Earth as frozen ice and in liquid form. While researching, they will explore many different landforms and bodies of water on Earth. They will wonder if it is possible to represent the shapes of the Earth in different ways.

Career Readiness, Life Literacies, and Key Skills Standards	● 9.4.8.IML.7: Use information from a variety of sources, contexts, disciplines, and cultures for a specific purpose (e.g., 1.2.8.C2a, 1.4.8.CR2a, 2.1.8.CHSS/IV.8.AI.1, W.5.8, 6.1.8.GeoSV.3.a, 6.1.8.CivicsDP.4.b, 7.1.NH. IPRET.8). ● 9.4.8.IML.8: Apply deliberate and thoughtful search strategies to access high-quality information on climate change (e.g., 1.1.8.C1b).
Computer Science and Design Thinking (Technology)	8.1 Educational Technology All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge. 8.2 Technology Education, Engineering, Design and Computational Thinking - Programming All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
Diversity, Equity, and Inclusion	● Videos featured individuals of different race, color, and gender. ● Various forms of learning will occur throughout each lesson based on modifications made which include kinesthetic, auditory, and visual learning which will meet the needs of all students.
Climate Change	● K-ESS2-1: Use and share observations of local weather conditions to describe patterns over time.
Supplemental Class Resources	● BrainPop, BrainPopJr.

	● Generation Genius- videos, lessons, exit tickets ● Mystery Science ● Shared Google Docs ● Hands-on Activities, Foldable Notes ● Recording Sheets
District/School Formative & Summative Assessment Plan	● Teacher Observation ● Presentations ● Quizzes/Test ● Portfolios ● Group Projects/Discussions ● Performance Tasks ● Summative Assessment ● Constructed Response

Disciplinary Core Idea	Performance Expectation
LS4.D: Biodiversity and Humans - There are many different kinds of living things in any area - Living things exist in different places on land and water LS2.A: Interdependent Relationships in Ecosystems - Plants depend on water and light to grow - Plants depend on animals for pollination or to move their seeds around ETS1.B: Developing Possible Solutions - Designs can be conveyed through sketches, drawings, or models - Designs are useful in sharing ideas	- Asking questions - Planning and carrying out investigations - Engaging in arguments from evidence - Constructing explanations - Developing and using models - Analyzing and interpreting data - Defining problems and designing solutions - Evaluating findings - Communicating information - Using scientific and engineering practices

Science & Engineering Practices	- Developing and using models - Constructing explanations and designing solutions - Obtaining, evaluating, and communicating information
Articulation of DCI's Across Grade-Levels	ESS1.C: The History of Planet Earth - Some events happen very quickly - Some events happen very slowly, over a time period much longer than one can observe ESS2A: Earth Materials and Systems - Wind and water can change the shape of the land ESS2.B: Plate Tectonics and Large-Scale System Interactions - Maps show where things are located - It is possible to map the shapes and kinds of land and water in an area 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 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
Crosscutting Concepts	Patterns - Patterns in the natural world can be observed Stability and Change - Things may change slowly or rapidly Influence of Engineering, Tech, and Science on Society and the Natural World - Developing and using tech has impacts on the natural world

Math Student Learning Objectives Covered in this Unit	
• MP.2 Reason abstractly and quantitatively. (2-LS2-1) • MP.4 Model with mathematics. (2-LS2-1), (2-LS2-2) 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)

ELA Student Learning Objectives Covered in this Unit

- 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)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-LS2-1)
- 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-LS2-2)

Unit 3A: **Earth's Place in the Universe**

NJ Student Learning Standards: Science Grade 2:

- 1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.
- 1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.

Length: 10 days

NJDOE Science Curricular Framework
[NJ Science Frameworks](#)

21st Century Student Outcomes
<http://www.battelleforkids.org/networks/p21>

Learning and Innovation Skills
highlight appropriate indicators for unit/domain
 Think Creatively
 Work Creatively with Others
 Implement Innovations
 Reason effectively
 Use Systems Thinking

	Make Judgments and Decisions Solve Problems Communicate Clearly Collaborate with Others Information, Media and Technology Skills highlight appropriate indicators for unit/domain Information Literacy Media Literacy ICT (Information, Communication and Technology Literacy) Life and Career Skills highlight appropriate indicators for unit/domain Adapt to Change Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Work Effectively in Diverse Teams
Unit Focus and Targets:	
Essential Questions: What types of shapes do we find on our Earth? Learning Goals: Part A Teaching Points: - Water is found in oceans, rivers, lakes, and ponds - Water exists on Earth as frozen ice and in liquid form - There are many different landforms and bodies of water on Earth	

- It is possible to represent the shapes of the Earth in different ways

Part A Assessment Objectives:

- Obtain information from texts and other sources to answer scientific questions
- Understand that water is found on Earth in many forms

NJSLS Lessons:

Unit 3a:

Gifted and Talented:

- Student choice for projects
- Access to higher level texts/ articles
- Research opportunities as an extension of content being taught
- Strategic small groups based on IRLA level
- Individual project opportunities
- Critical thinking questions
- At home project suggestions

Special Education:

- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
- Students will be provided with modified graphic organizers
- Modifications will be followed as stated in IEP
- Students will be provided small group instruction to ensure understanding of concepts
- Teachers will modify work when appropriate to meet individual needs
- Students will have access to “Read to Me” books
- Teacher will present information using a multi-sensory approach
- Strategic small group instruction based on IRLA levels
- Differentiated project options and assessments

At Risk Students:

- Key vocabulary terms related to unit focus will be reviewed and accompanied with visuals
- Teacher will frequently check on understanding and completion of work
- Extension on completion of assignments
- Modified amount based on individual needs
- Provide student choice within projects
- Deliver instruction based on student interests
- Small group instruction
- Positive praise/reinforcement

ELL/ESL:

- Students will be provided visual cards to support new vocabulary words related to unit
- Students will refer to visual vocabulary cards throughout unit
- Modified graphic organizers
- Peer collaboration and opportunities for partner work
- Checklists with visuals will be provided to assist task completion
- Repetition of routines and procedures will be emphasized to support learning
- Relate content to culture when possible
- Language Learning Opportunities
- Cognate Word Wall

ELL/ESL: Grades 2-3 WIDA Can Do Descriptors:

- Listening: Process recounts by • Showing what happens next based on familiar oral stories (e.g., by pointing or drawing) • Drawing or providing other visual displays of people, animals, or objects in response to oral prompts
- Speaking: Recount by • Reproducing facts or statements in context • Participating in multi-media presentations based on research
- Reading: Process recounts by • Identifying key words and phrases in illustrated text
- Writing: Recount by • Listing ideas using graphic organizers • Describing visual information

Unit Assessments: Final Presentation or Projects

Formative: Research Questions, Notes, Notebook/Journal Entries

Summative: Presentation to class

Science Unit 3B Second Grade	
Unit Title	2-ESS1: Earth's Place in the Universe
Recommended Pacing	10 days
Unit Summary	In this unit, students will investigate what types of changes happen on our Earth. Through research and discovery, they will explore changes in land. Some changes are extremely slow and happen over long periods of time. Some changes can be quick such as an earthquake, landslide, or volcanic eruption. Students will investigate to find evidence to prove that Earth events can occur quickly or slowly. They will make observations from sources to construct an evidence-based account for the natural world and research information to understand examples of fast and slow land changes.
Career Readiness, Life Literacies, and Key Skills Standards	● 9.4.8.IML.7: Use information from a variety of sources, contexts, disciplines, and cultures for a specific purpose (e.g., 1.2.8.C2a, 1.4.8.CR2a, 2.1.8.CHSS/IV.8.AI.1, W.5.8, 6.1.8.GeoSV.3.a, 6.1.8.CivicsDP.4.b, 7.1.NH. IPRET.8). ● 9.4.8.IML.8: Apply deliberate and thoughtful search strategies to access high-quality information on climate change (e.g., 1.1.8.C1b).

Computer Science and Design Thinking (Technology)	8.1 Educational Technology All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge. 8.2 Technology Education, Engineering, Design and Computational Thinking - Programming All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
Diversity, Equity, and Inclusion	• Videos featured individuals of different race, color, and gender. • Various forms of learning will occur throughout each lesson based on modifications made which include kinesthetic, auditory, and visual learning which will meet the needs of all students.
Climate Change	• K-ESS2-1: Use and share observations of local weather conditions to describe patterns over time.
Supplemental Class Resources	• BrainPop, BrainPopJr. • Generation Genius- videos, lessons, exit tickets • Mystery Science • Shared Google Docs • Hands-on Activities, Foldable Notes • Recording Sheets

Disciplinary Core Idea	Performance Expectation
ESS1.C: The History of Planet Earth - Some events happen very quickly	• Asking questions

- Some events happen very slowly, over a time period much longer than one can observe ESS2A: Earth Materials and Systems - Wind and water can change the shape of the land ESS2.B: Plate Tectonics and Large-Scale System Interactions - Maps show where things are located - It is possible to map the shapes and kinds of land and water in an area 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 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	● Planning and carrying out investigations ● Engaging in arguments from evidence ● Constructing explanations ● Developing and using models ● Analyzing and interpreting data ● Defining problems and designing solutions ● Evaluating findings ● Communicating information ● Using scientific and engineering practices
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Science & Engineering Practices	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 evidenceESS1.C:
Articulation of DCI's Across Grade-Levels	• 3.LS2.C (2-ESS1-1) • 4.ESS1.C (2-ESS1-1) • 4.ESS2.A (2-ESS1-1)
Crosscutting Concepts	Cause and Effect - Events have causes that generate observable patterns Structure and Function - The shape and stability of structures of natural or designed objects are related to their functions

Math Student Learning Objectives Covered in this Unit
● MP.2 Reason abstractly and quantitatively. (2-ESS1-1) ● MP.4 Model with mathematics. (2-ESS1-1) ● 2.NBT.A Understand place value. (2-ESS1-1)

ELA Student Learning Objectives Covered in this Unit
● 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) ● 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) ● 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-ESS1-1) ● W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-ESS1-1)

Unit 3B Modifications:
Gifted and Talented: ● Student choice for projects ● Access to higher level texts/ articles ● Research opportunities as an extension of content being taught ● Strategic small groups based on IRLA level ● Individual project opportunities ● Critical thinking questions

- At home project suggestions

Special Education:

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- Differentiated project options and assessments

At Risk Students:

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ELL/ESL:

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- Relate content to culture when possible
- Language Learning Opportunities
- Cognate Word Wall

ELL/ESL: Grades 2-3 WIDA Can Do Descriptors:

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Next Generation Science Standards Overview

Unit 3B: **Earth's Place in the Universe**

NJ Student Learning Standards: Science Grade 2

Length: 10 days

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Unit Focus and Targets:	
Essential Questions: What factors effect the Earth and cause the land to change? Learning Goals: Part B Teaching Points: - Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land - Develop a model to represent the shapes and kinds of land and bodies of water in an area.	

Part B Assessment Objectives:

- Use information from several sources to provide evidence that Earth events can occur quickly or slowly.
- Understand that the Earth goes through many changes and why

NJSLS Lessons:**Unit 3B****Modifications:**

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