MOUNT HOLLY TOWNSHIP SCHOOL DISTRICT
1st GRADE SCIENCE CURRICULUM

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

Board Approved: August 17, 2022

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2020 New Jersey Student Learning Standards for Science

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;

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- 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 NJSLS-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 NJSLS-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

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.

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 Jersery 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
Patterns of Change in in the Sky	I	30 days
Characteristics of Living Things	II	30 days
Waves and their Applications in Technologies for Information Transfer	III	15 days
Engineering Design	IV	15 days

New Science Document: https://www.nj.gov/education/standards/science/Docs/NJSLS-Science_K-5.pdf

Science Grade 1	
Unit Title	Earth's Place in the Universe
Recommended Pacing	30 Days
Unit Summary	In this unit of study, students observe, describe, and predict some patterns in the movement of objects in the sky. The crosscutting concept of *patterns* is called out as an organizing concept for the disciplinary core ideas. Students are expected to 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.

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Career Readiness, Life Literacies, and Key Skills	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)	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	Texts, presentations, and lesson materials are strategically chosen with equity in mind. Students will recognize a variety of identities, cultures, and abilities in the characters used to display and explain scientific concepts.
Climate Change	K-PS3-1: Make observations to determine the effect of sunlight on Earth's surface. K-PS3-2: Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area. K-ESS2-1: Use and share observations of local weather conditions to describe patterns over time.
Core/Supplemental Class Resources	Generation Genius BrainpopJr. Seesaw

	Mystery Science Peekaboo Kidz Science Lessons (YouTube)
District/School Formative Assessment Plan	• Teacher Observation • Presentations • Quizzes/Test • Portfolios • Group Projects/Discussions • Performance Tasks • Summative Assessment • Constructed Response

NJSLS-Science: Unit 1:	
Performance Expectation:	
Science & 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. Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2) *Analyzing and Interpreting Data* Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1- ESS1-1)
Articulation of DCI's Across Grade-Levels	• 3.PS2.A (1-ESS1-1) • 5.PS2.B (1-ESS1-1), (1-ESS1-2) • 5.ESS1.B (1-ESS1-1), (1-ESS1-2)

Crosscutting Concepts	*Patterns* Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1), (1-ESS1-2) *Connections to Nature of Science Scientific Knowledge Assumes an Order and Consistency in Natural Systems* Science assumes natural events happen today as they happened in the past. (1-ESS1-1) Many events are repeated. (1- ESS1-1)

Math Student Learning Objectives Covered in this Unit
• MP.2 Reason abstractly and quantitatively. (1-ESS1-2) • MP.4 Model with mathematics. (1-ESS1-2) • MP.5 Use appropriate tools strategically. (1-ESS1-2) • 1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2) • 1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)

ELA Student Learning Objectives Covered in this Unit
• W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-ESS1-1), (1-ESS1-2) • W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-1), (1-ESS1-2)

Modifications
Unit 1 Additional Modifications:

*See lesson plans for tier II and tier III modifications.

SPED: Provide visuals for students throughout the lesson on promethean board and the focus wall; allow extra time for activities to be completed; dictated responses in lieu of written work; hands on activities instead of pencil and paper

ESL/ELL: Describing pictures or classroom objects; Providing information in graphic organizers; Identifying real life objects based on descriptive oral phrases or short sentences;

504 Students: Provide a checklist of the steps needed to complete the problem; Provide lots of white-space to make it less busy; If still struggling, reteach and retest

At-Risk Students: Reduce the number of problems given; Give extra time

Gifted and Talented: Added detail to written work; find connecting stories from classroom library and compare to the lessons;

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

1st Grade Next Generation Science Standards Overview

Science Content:

- Observe, describe, and predict patterns of movement of objects in the sky
- Develop understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs
- Develop understanding of how behaviors of parents and offspring help the offspring survive
- Determine that young plants and animals are like, but not exactly the same as their parents
- Develop understanding of the relationship between sound and vibrating materials
- Develop understanding between the availability of light and ability to see objects
- Determine the effect of placing objects made with different materials in a path of light

Science Concepts:

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

Science Skills:

- Planning and carrying out investigations
- Analyzing and interpreting data
- Constructing explanations and designing solutions
- Obtaining, evaluating, and communicating information

Interdisciplinary Standards	
Science Discipline	***Connection to other Disciplines***
Unit 1: **Patterns in the Sky (Earth's Place in the Universe)**	**Connections to NJSLS--English Language Arts:** NJSLSA.W1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-ESS1-1), (1-ESS1-2). NJSLSA W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1ESS1-1), (1-ESS1-2) **Connections to NJSLS-- Mathematics:** NJSLSA MP.2 Reason abstractly and quantitatively (1-ESS1-2) NJSLSA MP.4 Model with Mathematics (1-ESS1-2) NJSLSA MP.5 Use appropriate tools strategically (1-ESS1-2) NJSLSA 1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem (1-ESS1-2)

	NJSLSA 1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2) **Articulation of DCI's Across Grade Levels:** ● 3.PS2.A (1-ESS1-1) ● 5.PS2.B (1-ESS1-1), (1-ESS1-2) ● 5.ESS1.B (1-ESS1-1), (1-ESS1-2) **Connections to Career Readiness, Life Literacies, and Key Skills:** 9.1.2.CR.1: Recognize ways to volunteer in the classroom, school and community. 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) 9.4.2.DC.7: Describe actions peers can take to positively impact climate change (e.g., 6.3.2.CivicsPD.1). 9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content. 9.4.2.TL.5: Describe the difference between real and virtual experiences. **Connections to Computer Science and Design Thinking:** 8.1.2.NI.1: Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network. 8.1.2.NI.2: Describe how the Internet enables individuals to connect with others worldwide. 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.
Unit Two: **The Structure of a Living Thing Impacts its Function (From Molecules to Organisms; Structure and Processes)**	**Connections to NJSLS --English Language Arts:** NJSLSA RL.1.1 Ask and answer questions about key details in a text. (1-LS1-2) NJSLSA RL.1.2 Identify the main topic and retell key details of a text. (1-LS1-2) NJSLSA RL.1.10 With prompting and support, read and comprehend stories and poetry at grade level text complexity or above. (1-LS1-2) NJSLSA W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions. (1-LS1-1). **Connections to NJSLS-- Mathematics:** NJSLSA 1.NBT.B.3 Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols >, =, and <. (1-LS1-2). NJSLSA 1.NBT.C.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning uses. Understand that in adding two-digit

	numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2) NJSLSA 1.NBT.C5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2) NJSLSA 1.NBT.C.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2) **Articulation of DCI's Across Grade Levels:** ● K.ETS1.A (1-LS1-1) ● 3.LS2.D (1-LS1-2) ● 4.LS1.A (1-LS1-1) ● 4.LS1.D (1-LS1-1) ● 4.ETS1.A (1-LS1-1) **Connections to Career Readiness, Life Literacies, and Key Skills:** 9.1.2.CR.1: Recognize ways to volunteer in the classroom, school and community. 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) 9.4.2.DC.7: Describe actions peers can take to positively impact climate change (e.g., 6.3.2.CivicsPD.1). 9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content. 9.4.2.TL.5: Describe the difference between real and virtual experiences. **Connections to Computer Science and Design Thinking:** 8.1.2.NI.1: Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network. 8.1.2.NI.2: Describe how the Internet enables individuals to connect with others worldwide. 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.
Heredity: Inheritance and Variation of Traits (included as part of Unit 2)	**Connections to NJSLS- -English Language Arts** NJSLSA RI.1.1 Ask and answer questions about key details in a text. (1.LS3-1) NJSLSA W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS3-1) NJSLSA W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-LS3-1) **Connections to NJSLS --Mathematics**

	NJSLSA MP.2 Reason abstractly and quantitatively. (1-LS3-1) NJSLSA MP.5 Use appropriate tools strategically. (1-LS3-1) NJSLSA 1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-LS3-1) **Articulation of DCI's Across Grade Levels:** ● 3.LS3.A (1-LS3-1) ● 3.LS3.B (1-LS3-1) **Connections to Career Readiness, Life Literacies, and Key Skills:** 9.1.2.CR.1: Recognize ways to volunteer in the classroom, school and community. 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) 9.4.2.DC.7: Describe actions peers can take to positively impact climate change (e.g., 6.3.2.CivicsPD.1). 9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content. 9.4.2.TL.5: Describe the difference between real and virtual experiences. **Connections to Computer Science and Design Thinking:** 8.1.2.NI.1: Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network. 8.1.2.NI.2: Describe how the Internet enables individuals to connect with others worldwide. 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.
Unit 3: **Waves - Light and Sound (Waves and their Applications in Technologies for Information Transfer)**	**Connections to NJSLS-- English Language Arts:** NJSLSA W1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. (1-PS4-2) NJSLSA W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-1). (1-PS4-2), (1-PS4-3), (1-PS$-4) NJSLSA W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1), (1-PS4-2), (1-PS4-3) NJSLSA SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups (1-PS4-1), (1-PS4-2), (1-PS4-3) **Connections to NJSLS- -Mathematics:** NJSLSA MP.5 Use appropriate tools strategically. (1-PS4-4)

	NJSLSA 1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-PS4-4) NJSLSA 1.MD.A.2 Express the lengthy of an objects as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps (1-PS4-4) **Articulation of DCI's Across Grade Levels:** ● K.ETS1.A (1-PS4-4) ● 2.PS1.A (1-PS4.3) ● 2. ETS1.B (1-PS4-4) ● 4. PS4.C (1-PS4-4) ● 4. PS4.B (1-PS4-2) ● 4. ETS1.A (1-PS4-4) **Connections to Career Readiness, Life Literacies, and Key Skills:** 9.1.2.CR.1: Recognize ways to volunteer in the classroom, school and community. 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) 9.4.2.DC.7: Describe actions peers can take to positively impact climate change (e.g., 6.3.2.CivicsPD.1). 9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content. 9.4.2.TL.5: Describe the difference between real and virtual experiences. **Connections to Computer Science and Design Thinking:** 8.1.2.NI.1: Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network. 8.1.2.NI.2: Describe how the Internet enables individuals to connect with others worldwide. 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.
Unit 4--Engineering Design	**Connections to NJSLS--English Language Arts** NJSLSA 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. (K-2-ETS1-1) NJSLSA 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. (K-2-ETS1-1), (K-2-ETS1-3) NJSLSA W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1), (K-2ETS1-3) NJSLSA 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. (K-2-ETS1-2) **Connections to NJSLS- -Mathematics:** NJSLA MP.2 Reason abstractly and quantitatively. (K-2-ETS1-1), (K-2ETS1-3) NJSLA MP.4 Model with mathematics. (K-2-ETS1-1), (K-2-ETS1-3) NJSLA MP.5 Use appropriate tools strategically. (K-2-ETS1-1), (K-2-ETS1-3) NJSLA MP.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. (K-2-ETS1-1), (K-2-ETS1-3) **Articulation of DCI's Across Grade Levels:** ● K-2-ETS1-A (K-PS2-2), (K-ESS3-2) ● K-2-ETS1.B (K-ESS3-3), (1-PS4-4), (2-LS2-2), (K-ESS3-3) ● K-2-ETS1.C (2-ESS2-1) **Connections to K-2 ETS1.A: Defining and Delimiting Engineering Problems Include:** ● Kindergarten (K-PS2-2), (K-ESS3-2) **Connections to K-2 ETS1.B: Developing Possible Solutions to Problems Include:** ● Kindergarten (K-ESS3-3) ● First Grade (1-PS4-4) ● Second Grade (2-LS2-2) **Connections to K-2-ETS1.C: Optimizing the Design Solution Include;** ● Second Grade (2-ESS2-1) **Connections to Career Readiness, Life Literacies, and Key Skills:** 9.1.2.CR.1: Recognize ways to volunteer in the classroom, school and community. 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) 9.4.2.DC.7: Describe actions peers can take to positively impact climate change (e.g., 6.3.2.CivicsPD.1). 9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content. 9.4.2.TL.5: Describe the difference between real and virtual experiences. **Connections to Computer Science and Design Thinking:** 8.1.2.NI.1: Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network. 8.1.2.NI.2: Describe how the Internet enables individuals to connect with others worldwide. 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.

Unit One: Patterns in the Sky (Earth's Place in the Universe)	
NJ Student Learning Standards: Science Grade 1 **1 - ESS1 - 1. Use observations of the sun, moon, and stars to describe patterns that can be predicted** - Patterns occur in the natural world - The sun and moon appear to rise in one part of the sky, move across the sky, and set - Stars other than our sun are visible at night but not during the day - The sun appears to move in a pattern, but doesn't actually move - The sun and moon create a pattern of day and night - The moon appears in a pattern known as the phases of the moon - The stars appear in patterns known as constellations - It is possible to track these patterns ***"I can 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** - Compare daylight in the winter to daylight in the spring and fall	**30 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 **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

- The amount of daylight depends on the season - Seasons are a pattern created by movement of the Earth and the Moon ***"I can make observations at different times of the year to connect the amount of daylight to the time of year.."***	Interact Effectively with Others Work Effectively in Diverse Teams

Unit Focus and Targets:

"Act like Scientists" (Science and Engineering Practices)	**"Think like Scientists" (Disciplinary Core Ideas/Content)**	**"See the World like Scientists" (Crosscutting Concepts)**
Planning and Carrying Out Investigations - Planning and carrying out investigations to answer questions or test solutions to problems in K-2; builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. - Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)	**ESS1.A: The Universe and its Stars** - Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) **ESS1.B: Earth and the Solar System** - Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)	**Patterns** - Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1), (1-ESS1-2) *Connections to Nature of Science* **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** -Science assumes natural events happen today as they happened in the past. (1-ESS1-1) -Many events are repeated. (1-ESS1-1)

Analyzing and Interpreting Data Analyzing data in K-2 builds on prior experiences and progresses to collecting, recording, and sharing observations. -Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)		

In the Classroom: Unit 1, Part A

Part A Guiding Question:

- Can we predict how the sky will change over time by observing the sun, moon, and stars?

Part A Teaching Points:

- Patterns occur in the natural world
- The sun appears to move in a pattern, but doesn't actually move
- The sun and moon create a pattern of day and night
- The moon appears in a pattern known as the phases of the moon
- The stars appear in patterns known as constellations
- It is possible to track these patterns

Part A Assessment Objectives:

- Observe and use patterns in the natural world as evidence to make predictions
- Use observations to answer scientific questions

Unit 1, Part A, Lesson 1: Patterns

Materials:

Pattern Hunt recording sheet (https://docs.google.com/a/mtholly.k12.nj.us/document/d/10gZh0w7_kZO1YPBgiV049sHATSZyel4lkeT0YngW-Wk/edit?usp=sharing)
Manipulatives

Engage:

1. Show students a pattern - picture or using markers/manipulatives, etc
2. Ask students to identify what the pattern is
3. Show students multiple types of patterns - with colors, objects, size, etc
4. Emphasize that there are patterns all around us in the world and sometimes we study them in science to understand how the world works
5. Watch the following Blazer Fresh pattern song: https://app.gonoodle.com/channels/blazer-fresh/banana-banana-meatball?s=Discover&t=Wo8/21-NF-3DA-Start%20Here

Explore:

1. Pose the challenge to students to find patterns in your classroom
2. In pairs, students will go on a "pattern hunt" around the room looking for patterns
3. Have pairs record what they find with words or pictures on the Pattern Hunt recording sheet
4. Provide students with different colors of markers or crayons so that they can draw the patterns accurately

Explain:

1. Students should gather back on the carpet as a whole group
2. Have pairs take turns sharing a pattern they found in the room

3. Make sure groups explain that the pattern is repeating, happening over and over again

Elaborate:

1. Give each student various types of manipulatives that can be put into a pattern
2. Challenge each student to create a pattern out of their manipulatives
3. Remind students that patterns can be repeating colors, sizes, shapes, types of materials, etc
4. After students complete their original pattern, challenge them to combine manipulatives with a neighbor and create a larger, more elaborate pattern

Evaluate:

1. As students work, circulate the room to coach students that are not creating patterns
2. Prompt students to explain their pattern to you
3. By the end of this week, students should be able to explain that patterns repeat themselves over and over again and that patterns happen in our world all of the time

Differentiation:

General Accommodations/Modifications:

- 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 II:

Engage	Explore	Explain	Elaborate	Evaluate

• Utilize song first to pre-teach vocabulary (pattern). • Kinesthetic - Create a pattern by clapping and stomping. • Visual - Utilize different 2D shapes.	• Create patterns(colors, shapes, sizes, etc.) around the room at different tables. Have students draw the picture of the pattern with crayons.	• Allow students to share with class their drawings.	• Review vocabulary. • Limit amount of manipulatives. • Teacher will model a pattern and students will add onto teacher model. • After teacher model, students can create their own.	• Utilize student work as assessment.

Tier III:

Engage	Explore	Explore	Elaborate	Evaluate
• Utilize song first to pre-teach vocabulary (pattern). • Kinesthetic - Create a pattern by clapping and stomping.	• Visual - Utilize different colors to create a pattern. Use crayons, paint, play-doh etc. • Teacher model with	• Tactile- give students different colored manipulatives. Students reflect teacher pattern and build onto teacher pattern.	• Visual - Utilize different colors to create a pattern. Use crayons, paint, play-doh etc.	• Teacher can document student progress with building/continuing already present pattern.

	manipulatives, students build onto teacher model.			

Unit 1, Part A, Lesson 3: Sun Patterns

Materials:
Day and Night sheet (https://drive.google.com/a/mtholly.k12.nj.us/file/d/0B5e_0qncfnkBQzg4X3RUcktoWGM/view?usp=sharing)
Moving Sun flipchart (https://drive.google.com/a/mtholly.k12.nj.us/file/d/0B5e_0qncfnkBTVVpOU54TGdfWXc/view?usp=sharing)
Paper plates
Rocks to weigh down plates
Pencil to create shadow

Engage:

1. Show students a picture of a sunrise and a sunset
2. Ask students: Where does the sun go when we don't see it?
3. Turn and talk with a partner, then share out answers
4. Explain to students that while it looks like the sun is moving, it really is the Earth that is moving
5. Introduce the idea that this week, students will be learning about two different patterns that have to do with the sun: day and night; and how the sun travels across our sky (again emphasize that it just looks like it is traveling)

Explore:

1. Distribute a Day and Night sheet to each student
2. Review the words axis with students
3. Allow students to color the sun and Earth
4. Instruct students now they need to add in where they are located during the daytime and nighttime

Explain:

1. Explain to students that now that they know one pattern the sun makes it is time to explore another pattern
2. Use the Moving Sun flipchart to introduce the idea that the sun looks like it is different spots throughout the day
3. Have students come forward to show how the sun will move on the question slides
4. On the final slide it poses a question to think about how the sun moves in where you live - this will lead into the "elaborate" experiment

Elaborate:

1. Explain to students that now you are going to study another sun pattern - how the sun appears to travel across the sky all day long
2. Today the class will be creating a sundial
3. Discuss what a sundial is and how it is used to track how the sun moves across the sky in a pattern
4. This can be done individually, in partners, groups, or whole class
    a. Each sundial needs a paper plate, a rock, and a pencil
    b. Place the paper plate outside starting in the morning
    c. Put the pencil down in the center of the paper plate and draw a dot to represent the center
    d. Use another pencil or crayon to trace the shadow line that the pencil creates originally
    e. Record the time of the original line being created
    f. Place the rock on the plate to prevent it from flying away
    g. Every two hours or so, go back outside, place the pencil at the center, and record where the shadow has moved to
5. Discuss each time what is happening
6. If there is time, repeat this procedure on another day to confirm that the pattern is the same each day

Evaluate:

1. While checking the sundial, students should be explaining what is happening, how the sun works like a pattern, and that it is not actually the sun moving
2. Students can draw or write about the sundial to record their results

Differentiation:

General Accommodations/Modifications:

- 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 II:

Engage	Explore	Explain	Elaborate/Evaluate
● Recall prior knowledge by reviewing patterns and different ways to make a pattern (color, shape, size etc.)	● Visual - show a model globe. Provide a stationary light source (lamp, flashlight, etc.) ● Place a giant sticker on the globe on NJ (representation of where we are) ● Show how the Earth rotates around the sun. ● Explain the pattern of day time and night time in reference to the sticker.	● Utilize flipchart, discuss sunrise and sunset and times of the day when certain activities are done. Ex: Sunrise = morning, breakfast, going to school etc. Sunset = evening, dinner time, completing homework, going to bed. etc.	● Utilize sundial activity mentioned above. ● Alternatively, go outside in the morning; create a mark on the sidewalk and have students stand on it. Mark where their shadow ends with chalk. Go out every 2 hours, have students stand on the same spot and mark their shadow line.

Tier III:

Engage	Explore	Explain	Elaborate/Evaluate
• Recall prior knowledge by reviewing patterns and different ways to make a pattern (color, shape, size etc.) • Show pattern using manipulatives for a visual.	• Use a video of a sunrise and sunset. Use visual schedule to talk about what students do in the morning and what students do at night.	• Utilize a visual schedule to talk about morning routine and evening routines. • Present different activities, (breakfast, going to bed, dinner etc.) to discuss morning vs evening activities.	• Utilize a visual schedule to talk about morning routine and evening routines. • Present different activities, (breakfast, going to bed, dinner etc.) to discuss morning vs evening activities. • Students utilize a visual schedule with a picture of morning or evening to represent for different activities for different parts of the day.

Unit 1, Part A, Lesson 5: Moon Patterns

Materials:
Post its or dry erase boards
Phases of the Moon flipchart (https://drive.google.com/a/mtholly.k12.nj.us/file/d/0B5e_0qncfnkBMU9USGZSUDJOOXc/view?usp=sharing)
Phases of the Moon tracker (https://drive.google.com/a/mtholly.k12.nj.us/file/d/0B5e_0qncfnkBZG5VTkFXVl84WEE/view?usp=sharing)
Moongazer sheet (https://drive.google.com/a/mtholly.k12.nj.us/file/d/0B5e_0qncfnkBLWxhZFF3b1BxUlE/view?usp=sharing)

Engage:

1. Without showing any pictures or prompting discussion, ask students to close their eyes and imagine the moon in the night sky
2. Have students draw on a post-it or dry erase board the moon that they saw in their head
    a. Try to get them to draw whatever they saw in their head and potentially be different than their neighbor
3. Show the responses to the class and see if and why students drew different shapes for the moon
4. Explain that this week we will be studying patterns of the moon and we call this the Phases of the Moon

Explore:

1. Show students the following timelapse video: https://www.youtube.com/watch?v=Fj3bvKczQ90
2. Explain that this video is actually 28 pictures. Every night the photographer took a picture of the moon for one month.
3. Watch the video again and this time ask students what they notice about the shape and size of the moon
    a. Prompt students to state that the moon gets bigger or brighter until it is a giant circle, then gets smaller until it is gone
4. Review the Phases of the Moon flipchart with the group
    a. Discuss and ask questions to connect the different phases of the moon with familiar objects

Explain:

1. Explain to students that in order for us to see the patterns or phases of the moon, we must track what shape the moon is
2. Distribute the Phases of the Moon tracker
3. Use the following website each day: http://www.moongiant.com/phase/today/ to track the phases of the moon
4. Have students record their observation from the website to complete the first day of their tracker
5. Continue this each day until students are able to see the pattern that the moon creates

Elaborate:

1. Explain to students that now you will make a tool that will help you observe the moon and figure out what phase is showing
2. Students will color the moon phases using yellow to show which part of the moon is shining at each phases
3. Glue down the Moongazer sheet to cardstock or construction paper for durability

4. Cut a hole in the middle of the circle so that students can hold the moongazer up to the sky and match the real moon to which phases is similar on their paper (Might be easier for you to cut these ahead of time)

Evaluate:

1. Use the following sites for students to match the phases of the moon and reinforce the patterns in the sky
    a. http://www.softschools.com/science/space/phases_of_moon/
    b. https://www.youtube.com/watch?v=GvkrC4HSLkM
    c. https://jr.brainpop.com/science/space/moon/
2. Coach students to focus on really knowing new moon, full moon, first quarter, and third quarter moons

Differentiation:

General Accommodations/Modifications:

- 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 II:

Engage	Explore	Explain	Elaborate	Evaluate
• Let students choose their utensil for drawing.	• Pre-teach vocabulary using visuals. • Provide 4 shapes to represent phases of the moon. Have students watch	• Support student understanding of material with the daily moon tracker. Have students draw the same shape in their tracker.	• Provide pre-cut moongazer for students. • Send home communication to explain activity to parents.	• Utilize websites to reinforce understanding. • Matching task cards for phases of the moon.

	the video and match the picture of the moon in the video with a shape on their desk.	Students can choose the writing utensil to draw.		

Tier III:

Engage	Explore	Explain	Elaborate/Evaluate
● Discuss when the moon is in the sky. Is it in the day time sky or night time sky?	● Activate prior knowledge of shapes. What shape is a full moon? ● Watch the video and pause to discuss the shapes students see.	● Support student understanding of material with the daily moon tracker. Teacher will model tracking in the class data tracker. Students can create the shape that the teacher draws using geoboard, cubes or other manipulatives. ● Utilize picture cards to identify activities that are done at night vs. during the day.	● Matching task cards for phases of the moon. ● Utilize online resources as a class or one on one with teacher.

Unit 1, Part A, Lesson 7: Star Patterns

Materials:
My Constellation sheet (https://drive.google.com/open?id=0B5e_0qncfnkBOGFoN09KcWphT28)

Engage:

1. Ask students to think about what objects in the sky we haven't really focused on yet
2. Prompt students to think about the things in the sky and realize stars are what our focus will be this week
3. .Watch and listen to the I'm a Star song: https://www.youtube.com/watch?v=7t3aXb3LpWg

Explore:

1. Discuss the video and make a chart of star facts that students already know or learned from the song
2. Some important info to emphasize: the sun is a star, there are different types of stars, stars are balls of hot gas, constellations are patterns of stars
3. Discussion about what stars do during the day - do they disappear? are they still there? Explain that we cannot see the stars in the day sky because our star the sun is so bright
4. Use the following website to show the current night sky to students: https://in-the-sky.org/skymap2.php?day=25&month=7&year=2017&hour=22&min=0
5. Allow students time to ask questions and observe the shapes
    a. Compare the shapes to finding shapes in the clouds - you need to use your imagination

Explain:

1. Explain to students that hundreds of years ago before people had all kinds of technology to entertain themselves, they would find patterns of stars and make up stories about these patterns
2. Use the following game: http://pbskids.org/readyjetgo/games/mindy/index.html to get kids up to the board, connecting the constellations, and listening to the stories behind their patterns

Elaborate:

1. Now students will have the chance to create their own star pattern, make it a constellation, and create a story about it
2. Using the My Constellation sheet, have students complete the star shape and connect the lines

3. Allow students to write a short story to explain the constellation they designed

Evaluate:

1. As students work on their constellations, circulate the room and ask students questions about what types of patterns we see in the stars
2. Students should be able to explain that patterns in the stars were made up and are called constellations

Differentiation:

General Accommodations/Modifications:

- 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 II:

Engage	Explore	Explain	Elaborate	Evaluate
● Provide visuals of objects in the sky ● Activate prior knowledge	● Demonstration: turn off classroom lights and turn on a flashlight. Notice how the flashlight is bright in the darker classroom. ● While keeping	● Have students compare constellations to pictures of what they look like. Match constellations to picture	● Provide visuals to support student design.	● Collect constselation for assessment.

	the flashlight on, turn the classroom lights on. Guide students to understand that the light hasn't changed brightness, but the brightness from the lights (the sun) blocks the light from the flashlight (the stars)			

Tier III:

Engage	Explore	Explain	Elaborate	Evaluate
● Provide visuals of objects in the sky ● Visuals of daytime and nighttime objects in the sky	● Sort objects between daytime and nighttime sky	● Have students compare constellations to pictures of what they look like. Match constellations to picture (utilize shapes as the	● Trace constellation of their choice. Use dot paint to create the constellation.	● Collect constellation rather than verbal explanation.

		constellation)		

Science Grade 1	
Unit Title	The Structure of a Living Thing Impacts its Function (From Molecules to Organisms: Structure and Process)
Recommended Pacing	30 days
Unit Summary	In this unit of study, students develop an understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs, as well as how the behaviors of parents and offspring help offspring survive. The understanding that young plants and animals are like, but not exactly the same as, their parents is developed. The crosscutting concept of *patterns* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *obtaining, evaluating, and communicating information* and *constructing explanations*. Students are also expected to use these practices to demonstrate understanding of the core ideas.
Career Readiness, Life Literacies, and Key Skills	*There are actions an individual can take to help make this world a better place.* 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)	*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	Texts, presentations, and lesson materials are strategically chosen with equity in mind. Students will recognize a variety of identities, cultures, and abilities in the characters used to display and explain scientific concepts. Cross-curricular connections with Career Readiness, Life Literacies, and Key Skills are also covered in this unit.
Climate Change	K-LS1-1: Use observations to describe patterns of what plants and animals (including humans) need to survive. K-ESS2-2: Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. 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-ESS3-3: Communicate solutions that will reduce the impact of climate change and humans on the land, water, air, and/or other living things in the local environment. 2-LS2-1: Plan and conduct an investigation to determine if plants need sunlight and water to grow.
Core/Supplemental Class Resources	Generation Genius BrainpopJr.

	Seesaw Mystery Science Peekaboo Kidz Science Lessons (YouTube)
District/School Formative Assessment Plan	• Teacher Observation • Presentations • Quizzes/Test • Portfolios • Group Projects/Discussions • Performance Tasks • Summative Assessment • Constructed Response

NJSLS-Science: Unit 2:	
Performance Expectation:	
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. Use materials to design a device that solves a specific problem or a solution to a specific problem. (1- LS1-1) *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. Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)
Articulation of DCI's Across Grade-Levels	• K.ETS1.A (1-LS1-1) • 3.LS2.D (1-LS1-2) • 4.LS1.A (1-LS1-1) • 4.LS1.D (1-LS1-1) • 4.ETS1.A (1-LS1-1)
Crosscutting Concepts	*Patterns* Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2) *Structure and Function* The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1) *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. (1-LS1-1) *Connections to Nature of Science* Scientific Knowledge is Based on Empirical Evidence Scientists look for patterns and order when making observations about the world. (1-LS1-2)

Math Student Learning Objectives Covered in this Unit
• 1.NBT.B.3 Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols >, =, and <. (1-LS1-2)

• 1.NBT.C.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning uses. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2)
• 1.NBT.C.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2)
• 1.NBT.C.6 Subtract multiples of 10 in the range 10–90 from multiples of 10 in the range 10–90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2)

ELA Student Learning Objectives Covered in this Unit

• RL.1.1 Ask and answer questions about key details in a text. (1-LS1-2)
• RL.1.2 Identify the main topic and retell key details of a text. (1-LS1-2)
• RL.1.10 With prompting and support, read and comprehend stories and poetry at grade level text complexity or above. (1-LS1-2)
• W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS1-1)

Modifications

Unit 2 Additional Modifications:
*See lesson plans for tier II and tier III modifications.
SPED: Provide visuals for students throughout the lesson on promethean board and the focus wall; allow extra time for activities to be completed; dictated responses in lieu of written work; hands on activities instead of pencil and paper

ESL/ELL: Describing pictures or classroom objects; Providing information in graphic organizers; Identifying real life objects based on descriptive oral phrases or short sentences;

504 Students: Provide a checklist of the steps needed to complete the problem; Provide lots of white-space to make it less busy; If still struggling, reteach and retest

At-Risk Students: Reduce the number of problems given; Give extra time

Gifted and Talented: Added detail to written work; find connecting stories from classroom library and compare to the lessons;

Lessons:	Modification Option:
Lesson 3	-SPED/ESL/ELL: Students may draw the living/non-living object/thing that they see instead of describing it.
Lesson 5	-Have bilingual word cards for children to cut and paste when labeling parts of the plant
Lesson 7	-When introducing the word classification, provide a vocabulary word that is both english and spanish, with a labeled picture for the children to reference -Worksheets can be translated into native language so that parents can help children at home (if needed)
Lesson 13	--Provide bilingual vocabulary cards and integrate spanish into the lessons for the words: scales, skin, shells, feathers, and fur (for when we are looking at the pictures on the promethean board.
Part B:	-If students need further understanding, we can create a venn diagram -comparing people and how parents/adults help us and how animal babies need help from their parents.

Unit Two: The Structure of a Living Thing Impacts its Function (From Molecules to Organisms: Structure and Process)	
NJ Student Learning Standards: Science Grade 1 **1 - LS1 - 1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.**	**30 days** **NJDOE Science Curricular Framework** NJ Science Frameworks **21st Century Student Outcomes** http://www.battelleforkids.org/networks/p21

Plants and animals have parts of their bodies that help them do certain jobs - Specific movements - Camouflage - Body coverings Human problems can be solved by looking at how plants and animals solve problems - Designing clothes or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales - Stabilizing structures by mimicking animal tails and roots of a plant - Keeping out intruders by mimicking thorns on branches and animal quills - Detecting danger like animals with special ears and eyes ***"I can use materials to design a solution to a problem by copying how plants and/or animals use their parts to help them survive."*** **1 - LS1 - 2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.** - Patterns of behavior could include - Signals that offspring make (crying, cheeping) - Responses by parents (feeding, comforting, carrying, protecting offspring)	**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 **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

"I can figure out patterns in the behavior of parents and offspring that help offspring survive."
 	
<u>Heredity: Inheritance and Variation of Traits</u>
 	
1 - LS3 - 1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
- Examples of patterns could include features plants or animals share
  - Leaves from the same kind of plant that are different sizes
  - Baby animals look like parents, but are smaller
 	
"I can make observations to understand that young plants and animals are like, but not exactly like, their parents."	

Unit Focus and Targets:

"Act like Scientists" (Science and Engineering Practices)	**"Think like Scientists" (Disciplinary Core Ideas/Content)**	**"See the World like Scientists" (Crosscutting Concepts)**
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	**LS1.A: Structure and Function** - All organisms have external parts. Different animals use their body parts in different ways to see, hear, grab objects, protect themselves, move from place to place,	**Patterns** - Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2)

evidence-based accounts of natural phenomena and designing solutions. -Use materials to design a device that solves a specific problem or a solution to a specific problem (1-LS1-1) **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. -Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1.LS1-2) --- *(1-LS3.1-Heredity: Inheritance and Variation of Traits)* **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.	and seek/find/take in food, air, and water - Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1) **LS1.B: Growth and Development of Organisms** - Adult plants and animals can have young. In many kinds of animals, parents and offspring engage in behaviors that help offspring to survive. (1-LS1-2) **LS1.D: Information Processing** - Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. - Plants also respond to some external inputs. (1-LS1-1) --- *(1-LS3.1-Heredity: Inheritance and*	**(1-LS3:Heredity: Inheritance and Variation of Traits)** **Structure and Function** - The shape and ability of structures of natural and designed objects are related to their function(s). (1-LS1-1) *Connections to Engineering, Technology, and Applications of Science* **Influence of Engineering, Technology, and Science on Society and the Natural World** - Every man-made product is designed by applying knowledge of the world and is built by using material derived from the natural world. (1-LS1-1) *Connections to Nature of Science* **Scientific Knowledge is Based on Empirical Evidence** **-**Scientists look for patterns and order when making observations about the world. (1-LS1-2) --- *(1-LS3.1-Heredity: Inheritance and Variation of Traits)* **Patterns**

-Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1)	*Variation of Traits)* **1-LS3.A: Inheritance of Traits** - Young animals are very much, but not exactly, like their parents. Plants are very much, but not exactly, like their parents. (1-LS3-1) **LS3.B: Variation of Traits** - Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1)	**-**Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-LS3-1)

In the Classroom: Unit 2, Part A

Part A Guiding Question:

- How do plants and animals use their parts to grow and survive?

Part A Teaching Points:

- We can classify the world into living and nonliving things
- Plants have specific parts that do specific jobs to make sure a plant grows and survives
- Animals have specific parts and behaviors that do specific jobs to make sure an animal grows and survives
    - Vertebrates vs. Invertebrates
    - Movements
    - Camouflage
    - Coverings

Part A Assessment Objectives:

- With guidance, make observations to use as evidence to scientific questions
- Create an argument to explain natural phenomena

Unit 2, Part A, Lesson 1: Living vs. Nonliving

Materials:

Is it Living Flipchart (https://drive.google.com/open?id=0B5e_0qncfnkBVEsxb2FSMkF6Q00)
Living and nonliving scavenger hunt sheets (https://drive.google.com/open?id=0B5e_0qncfnkBb1NIX21LdkZOOFU)
Living and nonliving sort (2 versions) (https://drive.google.com/open?id=0B5e_0qncfnkBYXJEQS1yNTlvRkE)

Engage:

1. Discuss with students that our next study is going to be about living things, but first we need to find out what it means to be a living things
2. Ask students to turn and talk, then share out asking: What does it mean to be living? What does it mean to be nonliving?
3. Once students have presented various ideas about what it means to be living and nonliving, brainstorm examples as a group: What are examples of living things? What are examples of nonliving things?

Explore:

1. Watch the following video about Cookie Monster and Living Things: https://www.youtube.com/watch?v=giWqEPNLtBo&t=20s
2. Discuss the video and ask students to list the three things that all living things do: grow, breathe, and eat
3. Use the Is it Living Flipchart to show students pictures and prompts about living or nonliving things
4. Allow students to discuss each picture and make decisions based on the characteristics of living things: eating, breathing, and growing

Explain:

1. Review the questions towards the end of the Flipchart. These questions about seeds, eggs, and apples will prompt deeper thinking. Challenge students to think about each characteristic of living things to see what conclusion they come to.
2. Explain to students that seeds are considered living things as long as they are not roasted or have been eaten by humans, the egg is considered if a baby chick is inside, and the apple is considered alive if it is still attached to the apple tree

Elaborate:

1. Take students outside on a living and nonliving thing scavenger hunt
2. Instruct students to hunt for 3 living things and 3 nonliving things outside of our school
3. Students will write the three living and nonliving things on their Scavenger Hunt sheet
4. Draw the items that were found on the scavenger hunt

Evaluate:

1. Complete the Living or nonliving thing sort to assess students knowledge of the characteristics of living things and ability to provide examples - can be done independently, partners, small group, or whole group

Differentiation:

General Accommodations/Modifications:

- 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 II:

Engage	Explore	Explain	Elaborate	Evaluate
● Provide visuals of	● Provide a diagram	● Demonstration:	● Differentiated	● Collect scavenger

living things and nonliving things to activate prior knowledge.	of a living thing (ex. A bear) and label the needs of the living thing with other visuals (water, air, shelter, food)	show students a stuffed animal. Have items that the animal would need and wouldn't need (food, cell phone, water, hat etc.) ● Have students identify which item the animal would need. Can pair up with a friend and different students can have different animals.	scavenger hunt. ● Students can draw the living and non living things they see outside.	hunt

Tier III:

Engage	Explore	Explain	Elaborate	Evaluate
● Provide visuals of living things and nonliving things to activate prior knowledge.	● Show a picture of an animal (ex: puppy) and have students circle what a puppy needs to survive. (treats, bed, water bowl etc.)	● Demonstration: show students a stuffed animal. Have items that the animal would need and wouldn't need (food, cell phone, water, hat etc.)	● Differentiated scavenger hunt. ● Students can circle the living and non living things they see outside.	● Collect scavenger hunt

		• Have students identify which item the animal would need.		

Unit 2, Part A, Lesson 3: Plant Needs

Materials:
Needs of a Plant Cut and Paste (https://drive.google.com/open?id=0B5e_0qncfnkBMzZ6b2pQUEtxLWc)

Engage:

1. Tell students that you are thinking of something and they will guess what you are thinking about
    a. It is a living thing
    b. It grows
    c. Sometimes it is green
2. Give students time to guess that you are thinking about plants
3. Activate prior knowledge by creating a chart of different plants that students can brainstorm
    a. Encourage students to think about how trees, flowers, bushes, grass, fruits, vegetables, etc are all plants and are all living things

Explore:

1. Watch the following video and instruct students to focus on the 5 things a plant needs to survive: https://www.youtube.com/watch?v=dUBIQ1fTRzI
2. Create a chart of the 5 things plants need to survive
3. Discuss and connect the 5 things plants need to survive (air, water, sun, space, soil) to the characteristics of living things

a. Plants need air because they breathe
b. Plants need soil, sun, and water to eat and grow

4. Provide students with the Needs of a Plant cut and paste sheet
5. Allow students time to discuss, complete and label the sheet

Explain:

1. Explain to students that plants have certain body parts to help them get the 5 things that are needed for survival
2. Challenge students to think about the 5 needs of a plant and which parts of plants they see outside might be connected with each need

Elaborate:

1. Take students outside on a walk to observe the plant life around Brainerd
2. Remind students to think about what parts of a plant might help a plant drink water, soak up the sun, absorb the air, etc
3. Share out ideas and observations as a whole group
    a. Continue to emphasize that plants have parts that help meet their 5 survival needs, but do not get too specific yet
    b. Continue to emphasize the 5 survival needs (water, air, sun, soil, space)
    c. Prompt students to draw connections between different types of plants but similar parts (trunk vs. stem; leaf vs. flower)

Evaluate:

1. While discussing, students should be using their observations to make their points
2. Students should be able to recall the 5 needs of a plant and understand that plants are living things

Differentiation:

General Accommodations/Modifications:

- 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 II:

Engage	Explore	Explain	Elaborate	Evaluate
● Provide a visual of a plant	● Provide a diagram of a plant and label the needs of the living thing with other visuals (water, air, soil, space, sunlight)	● Plant a kidney (or any other) seed and walk through what the seed will need to survive. ● Students can plant their own seeds with teacher support. ● Have a student water one plant, but not the other.	● Continue to monitor plant growth. Students should observe eventually that the plant that receives water is growing and the plant that doesn't receive water isn't growing. ● Draw picture of seed that sprouted	● Collect drawing.

Tier III:

Engage	Explore	Explain	Elaborate	Evaluate
● Provide a visual of a plant.	● Provide a diagram of a plant. ● Show visuals of the needs of the plant (water, air, space, food, sunlight) ● All students to cut and paste or circle	● Plant a kidney (or any other) seed into at least 2 different pots and walk through what the seed will need to survive. ● Students can plant their own seeds or	● Once the seed has sprouted, show students both pots. (One should be sprouting and one should be empty) ● Students can draw a picture of the	● Collect drawing

	needs.	plant seeds as a class with teacher support. ● Have a student water one plant, but not the other.	seeds that sprouted.	

Unit 2, Part A, Lesson 5: Each part has a job

Materials:
Plant Sort (https://drive.google.com/open?id=0B5e_0qncfnkBQWJCX0xCMVUyeG8)
Parts and Needs Flipchart (https://drive.google.com/open?id=0B5e_0qncfnkBbnE2YmNfSmtpZlE)
Functions of Plant Parts Matching sheet (https://drive.google.com/open?id=0B5e_0qncfnkBa3FScmtnZVZMbnc)

Engage:
1. Review with students the characteristics of living things and that we are focusing on how plants are living things
2. Prompt students to discuss the parts of a plant and needs of a plant by completing the Plant Sort independently, in partners, or as a whole group
3. Discuss answers with students to get students reminded of the parts and needs

Explore:
1. Watch the Parts of a Plant BrainPopJr.: https://www.youtube.com/watch?v=giWqEPNLtBo&t=20s
2. Pause the video to discuss each part of plants and the purposes for them
    a. Roots: Beginning to 1:33
    b. Stem: 1:33 to 2:00
    c. Leaves: 2:00 to 2:40

    d. Flowers: 2:40 to 3:05
    e. Seeds and Fruit: 3:05 to End
3. Review the parts of a plant but emphasize the fact that there is a purpose for each plant part to help with survival and growth
4. Using the Parts and Needs Flipchart, allow students to come forward and match the plant parts with their job

Explain:

1. As students come forward to complete the matching task, prompt students to review the answer
2. Explain and emphasize how each part of a plant has a job to do so that the plant survives

Elaborate:

1. Distribute the Functions of Plant Parts matching sheet
2. Depending on your students, either have them draw the plant part that fulfills the listed function or have them cut and paste the word in the box
3. Allow students to discuss with partners the parts and functions as they work to encourage use of the vocabulary
4. Continue to observe the celery in food coloring experiment that was set up in ACE, cut the ends off a few times and discuss with students what changes are occurring and why

Evaluate:

1. Have students share answers with one another
2. Check of accuracy and understanding through this sharing and their sheet answers
3. Discuss with students other types of plants parts they could have drawn in the box (trunk instead of stem, apple instead of flower)

Differentiation:

General Accommodations/Modifications:

- 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 II:

Engage	Explore	Explain	Elaborate	Evaluate
• Provide a visual of a plant. • (Anchor chart of plant) • Watch video.	• Provide a visual of a plant. • (Anchor chart of plant). • Conduct celery experiment (see link for details) • Draw "before" observation of celery. • https://www.acs.org/content/dam/acsorg/education/resources/k-8/science-activities/motionenergy/graphing/celery-soaks-it-up-science-for-kids.pdf	• Ask students what each part does. • Observe celery experiment. • Draw picture of celery	• Ask students to explain what happened with the celery. (The celery should have absorbed the water with the food coloring and changed colors)	• Utilize student observation drawings of before and after as assessment.

Tier III:

Engage	Explore	Explain	Elaborate	Evaluate

• Introduce a giant model of (or real life) plant with labeled parts.	• Have students touch the giant model of (or real life) plant with labels. Have students say the part while touching that part of the plant.	• Ask students to point to the part of the plant thatabsorvs nutrients and water. • Observe celery experiment.	• Draw picture of celery before and after.	• Utilize student observation drawings of before and after as assessment.

Unit 2, Part A, Lesson 7: Ways animals use their parts to survive: Vertebrates vs. Invertebrates

Materials:
What is the Animal Part Used For? Sheet (https://drive.google.com/open?id=0B5e_0qncfnkBcVoyM1F6RTlHWE0)
Vertebrates and Invertebrates readers (https://drive.google.com/open?id=0B5e_0qncfnkBUmtmcEtsaFFzem8)

Engage:
1. Activate prior knowledge and make a connection to the previous lessons by explaining to students that just like plants, animals have certain body parts that have jobs too
2. Prompt students to turn and talk, then share out to think about what are some things humans need to survive
3. After considering the varied ideas from students focus in on the fact that animals have body parts with the jobs of: communication, movement, protection, and hunting/eating

Explore:
1. Whole group, small group, partners, or individually, provide students with the What is the Animal Part Used For? Sheet
2. Allow time for discussion of the pictures and jobs needed for survival

3. Students very likely will struggle with this but the idea is not accuracy at this point. Prompt students to discuss and think about how animals have specific body parts to do specific jobs

Explain:

1. Discuss and review answers with students, again emphasizing the broad idea that animal parts have specific jobs
2. Explain to students that in order for scientists to research and study how animals use their parts for certain jobs, they have to be able to classify them

Elaborate:

1. Introduce the word "Classification" - a way of sorting different items, in this case we will be sorting animals.
2. Practice classification by sorting items in the classroom into various categories - supplies for different subjects, by color, by shape, by time of day that you use them, etc
3. Watch the BrainPopJr. On classifying animals: https://jr.brainpop.com/science/animals/classifyinganimals/ - emphasize and focus on the Beginning to 1:39. This is the discussion on vertebrates vs. invertebrates
4. After the video, ask students to discuss what vertebrates are and what invertebrates are. Think about more examples and allow students to reach around to feel their spine.
5. Ask students to turn and talk to decide: We know that animals have certain body parts that have jobs to keep animals alive. Why do some animals have spines and others do not?
    a. Push students to think about how for some animals, backbones help with movement and protection and that for some animals, having no spine helps with movement and protection
    b. Guide students to the conclusion that while animals have the same needs, they have different body parts to help them meet those needs
6. Split the class in half and provide 1 group with the vertebrates readers and the other group with the invertebrates readers
7. Using choral reading, have 1 group of students read their readers aloud, then the other
8. Again, discuss the examples of animals and the reasons why certain animals have backbones, while others do not

Evaluate:

1. Allow students to practice classifying animals using the following sites:

http://www.sheppardsoftware.com/preschool/animals.htm --> This site has animals divided up into ocean, jungle, forest, and farm. There are "movies" and games for each of those categories.
http://www.sheppardsoftware.com/content/animals/kidscorner/games/animalclassgame.htm --> a game where students can drag different animal characteristics into the category they belong in
2. Students should be using vocabulary to classify animals such as habitat and backbone56

Tier II:

Engage	Explore	Explain/Elaborate	Evaluate
• Show human skeleton to show bones. Discuss if you've ever broken a bone. This is what makes an animal a vertebrate. • Discuss human body parts and what its function is using the terms, "Communication, movement, protection, hunting/eating"	• Show pictures and work in small groups to classify different animal parts for different function. • This should be done as part of the lesson above.	• Read the different leveled readers in small group to review animal vertebrates and invertebrates.	• Have students sort and name different animals using the links above. • (Can be done as a class) • Discuss one or two animals and what certain body parts of that animal are used for.

Tier III:

Engage	Explore	Explain/Elaborate	Evaluate
• Show human skeleton to show bones. Discuss if you've ever broken a bone. This is what makes	• Show pictures and work in small groups to classify different animal parts for different	• Read the different leveled readers in small group to review animal vertebrates and	• Have students sort and name different animals using the links above. • (Can be done as a class)

an animal a vertebrate. ● Discuss human body parts and what its function is using the terms, “Communication, movement, protection, hunting/eating”Utilize visuals rather than words to explain their function.	function. ● This should be done as part of the lesson above. ● Students point to the card to indicate the function.	invertebrates.	● Discuss one or tw o animals and what certain body parts of that animal are used for.

Unit 2, Part A, Lesson 9: Ways animals use their parts to survive: Movements and Communication

Materials:
Human movement sheet (https://drive.google.com/open?id=0B5e_0qncfnkBU05NekRIeXJVNXM)
Movement and communication chart

Engage:
1. Place two objects across the room on the floor.
2. Stand beside one object and ask students what possible ways you could move to the other object
3. Allow students to turn and talk, then share out their possible movements with the class
4. Allow volunteers to come forward and demonstrate the movements
5. Create a chart with 2 sections: Movement and Communication
6. Add the movement ideas shared by students to the movement side of the chart

Explore:
1. Explain to students that since humans are animals, we use our body parts to move in certain ways, just like animals do
2. Challenge students to think of reasons why we use different movements
    a. Running from danger

    b. Swimming to get through water
    c. Climbing to get new places
3. Emphasize that just like animals, humans use their bodies in ways to help them survive
4. Distribute the Human Movement sheet
5. Students will draw and describe three human movements

Explain:

1. Once completed, allow students to share the human movements they recorded
2. Allow students to demonstrate their movements and ask the class to explain possible reasons why our bodies move in that way
3. Introduce to students that not only do humans use movements for survival, but also communicate for survival

Elaborate:

1. Ask student volunteers to demonstrate different ways of communicating with each other from across the room
2. Encourage students to think of nonverbal methods of communication
    a. Waving
    b. Stomping
    c. Clapping
3. Add student ideas to the other side of the movement and communication chart
4. Prompt students to think of ways humans communicate feelings like hugs, holding hands, pushing, kicking, crying, etc
5. Emphasize that humans have body parts that help with communication and movement

Evaluate:

1. Students should be able to explain different examples of human movement and communication
2. Students should have an understanding that humans have body parts that help us move and communicate to keep us alive

Differentiation:

General Accommodations/Modifications:

- 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 II:

Engage	Explore	Explain/Elaborate	Evaluate
• Discuss human 3-4 body parts and their function (hands for grabbing, feet for walking, mouth for eating, eyes for seeing, etc.) to activate prior knowledge. Show visuals for each human body part.	• Show pictures of different animals and their body part. Have students verbalize what the function is (polar bear and its skin, shark and its fins, lion and its teeth, bird and its wings)	• Review answers from the sort on a flipchart.	• Create additional sort for students to match independently.

Tier III:

Engage	Explore	Explain/Elaborate	Evaluate
• Discuss human 3-4 body parts and their function (hands for grabbing, feet for walking, mouth for eating, eyes for seeing, etc.) to activate prior knowledge. Show visuals for each human	• Students sort animal body parts to their function (similar to what we did with the human body parts).	• Teacher check for understanding during match.	• Utilize teacher observation as assessment.

body part. ● Have students match the body part to a picture of the action (feet = picture of someone running).			

Unit 2, Part A, Lesson 13: Ways animals use their parts to survive:
Body Coverings

Materials:
Body coverings flipchart (https://drive.google.com/open?id=0B5e_0qncfnkBYkF2QzE2ZGNLR0k)
Skin Features Animals Share sheet (https://drive.google.com/open?id=0B5e_0qncfnkBSXVWSmppQVdDWU0)

Engage:
1. Ask students the following question: Besides predators, what else might animals need to protect themselves from?
2. Turn and talk, then share out ideas
3. Guide students to think about how animals might need to protect themselves from their habitat or the environment

Explore:
1. Tell students that today their challenge is going to be to spot as many different types of animal body coverings as possible
2. Look at each picture of the Body coverings flipchart
3. For each slide, ask volunteers to explain what type of body covering is pictured
4. Record each type of body covering as you come across it (there will be 5: scales, skin, shells, feathers, and fur)
5. Ask students to explain how they think each body covering is useful to the animal (fur to keep warm, feathers are lightweight for flying, scales are smooth for water to glide over, shells for protection)

Explain:

1. Guide student answers to ensure that they end of listing all 5 body coverings
2. Emphasize and explain that body coverings are another example of body parts that animals use for protection to help survive, similar to camouflage, movements, communication, and vertebrates or invertebrates

Elaborate:

1. In partners or individually, distribute the Skin Features Animals Share cut and paste activity
2. Instruct students to color their animals as realistically as possible to show off the body coverings
3. Have students cut out the animal pictures and sort them into the appropriate body covering

Evaluate:

1. As students sort their animals, circulate the room and ask students questions about each body covering
2. Push students to explain how animal bodies have different coverings depending on what that animal needs
3. Assess student worksheet

Differentiation:

General Accommodations/Modifications:

- 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 II:

Engage	Explore/Explain	Elaborate	Evaluate
● Discuss how animals protect themselves in the wild.	● Complete animal hunt mentioned above. Use visual to show what students are looking for.	● Complete sort, modified version if necessary.	● Use animal sort and teacher observation for assessment.

	• Categorize these animals based on their different coverings.		

Tier III:

Engage	Explore/Explain	Elaborate	Evaluate
• Show picture of animals and how they protect themselves.	• Complete animal hunt mentioned above. Use visual to show what students are looking for. • Teacher says what each animal has for coverings.	• Pre-cut sort, have students glue animals to the correct covering. Modified amount.	• Use animal sort and teacher observation for assessment.

In the Classroom: Unit 2, Part B

Part B Guiding Question:

- What patterns of behavior do parents and offspring do that help with growth and survival?

Part B Teaching Points:

- Patterns occur in the natural world and we can observe them as scientists
- Animals and plants can have offspring
- Parents and offspring have certain behaviors that help the family grow and survive

Part B Assessment Objectives:

- Read texts and use media to determine patterns of parent and offspring behavior
- Observe and analyze patterns in the natural world

Unit 2, Part B, Lesson 1: Parents, Offspring, and Survival

Materials:
Comparison Flipchart (https://drive.google.com/open?id=0B5e_0qncfnkBbUkxS0kySUpQeVU)
Animals and Their Young sheet (https://drive.google.com/open?id=0B5e_0qncfnkBaDltUmhjbUFobjQ)
Elephant Animal Info Cards and sheet (https://drive.google.com/open?id=0B5e_0qncfnkBdUtyRzVsVllENk0)
Orangutan Animal Info Cards and sheet (https://drive.google.com/open?id=0B5e_0qncfnkBVWJ6UTVHMGc5LWs)
Penguin Animal Info Cards and sheet (https://drive.google.com/open?id=0B5e_0qncfnkBeF9vYy1qY1ZzREE)

Engage:
1. Watch the following video: https://www.youtube.com/watch?v=ahWlfnche6g
2. Ask students to think about what they see the animal parents doing in the video
3. Turn and talk, then share out guiding students to focus on how animal parents were protecting and teaching their offspring
4. Introduce the word offspring to mean baby and explain that this week, we will be studying how animal parents protect their offspring, as well as how animal parents are offspring are similar and different

Explore:
1. Look at the Comparison Flipchart of butterflies, frogs, and swan
2. Discuss the answers to the questions on the slide as a class
3. Emphasize that animal parents and offspring are alike, but not exactly the same
4. Using the Animals and Their Young sheet, have students use observations from the flipchart pictures to complete the chart

Explain:
1. Watch the following song with students: https://www.youtube.com/watch?v=p8JJIUxE6ns

2. Discuss the examples of plants growing from “baby” plants into full grown plants and animal babies growing into adult animals
3. When talking about the similarities and differences, encourage students to emphasize the evidence from the song or pictures to back up their answers

Elaborate:

1. Give each group one of the three sets of Animal Information Cards - doubling up as needed
2. Provide each group with the matching Animal Information Sheets
3. Allow groups time to read the Animal Information Cards and record the information on their matching sheet
4. After completing the information sheet, have students illustrate one way animal parents protect their young on the back of their sheet

Evaluate:

1. Have each group take a turn sharing their information and illustrations with the class
2. Emphasize how animal parents use different ways to protect their babies, and how animal parents and offspring are similar, but not exactly alike

Differentiation:

General Accommodations/Modifications:

- 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 II:

Engage	Explore/Explain	Elaborate	Evaluate
● Watch video above.	● Follow slideshow and	● Read information	● Have students share their

Guide students to talk about how parents care for their young.	have students circle similarities between young and their parents. ● Guide students to identify differences.	card.(pick one and project onto computer) Circle information in the card as a class.	work and turn in as assessment.

Tier III:

Engage	Explore/Explain	Elaborate	Evaluate
● Watch video above. ● Match picture of parent animal to baby animal from video.	● Follow slideshow and have students point to similarities. Teacher or student circles what is the same.	● Reading information card an project onto computer. ● Students draw a picture to match the sentence.	● Have students share their work and turn in as assessment.

Science Grade 1	
Unit Title	Waves - Light and Sound (Waves and their Applications in Technologies for Information Transfer)
Recommended Pacing	15 days
Unit Summary	In this unit of study, students develop an understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. The idea that light travels from place to place can be understood by students at this level by placing objects made with different materials in the path of a beam of light

	and determining the effect of the different materials. The crosscutting concept of *cause and effect* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations*, *constructing explanations*, and *designing solutions*. Students are also expected to use these practices to demonstrate understanding of the core ideas
Career Readiness, Life Literacies, and Key Skills	*There are actions an individual can take to help make this world a better place.* 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)	*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	Texts, presentations, and lesson materials are strategically chosen with equity in mind. Students will recognize a variety of identities, cultures, and abilities in the characters used to display and explain scientific concepts.
Climate Change	2-LS2-1: Plan and conduct an investigation to determine if plants need sunlight and

	water to grow. 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-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. K-2-ETS1-3: Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
Core/Supplemental Class Resources	Generation Genius BrainpopJr. Seesaw Mystery Science Peekaboo Kidz Science Lessons (YouTube)
District/School Formative Assessment Plan	● Teacher Observation ● Presentations ● Quizzes/Test ● Portfolios ● Group Projects/Discussions ● Performance Tasks ● Summative Assessment ● Constructed Response

NJSLS-Science Unit 3 :
Performance Expectation:

Science & 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 investigations collaboratively to produce data to serve as the basis for evidence to answer a question. (1-PS4-1), (1- PS4-3) *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. (1-PS4-2) ● Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4)
Articulation of DCI's Across Grade-Levels	• K.ETS1.A (1-PS4-4) • 2.PS1.A (1-PS4-3) • 2.ETS1.B (1-PS4-4) • 4.PS4.C (1-PS4-4) • 4.PS4.B (1-PS4-2) • 4.ETS1.A (1-PS4-4)
Crosscutting Concepts	*Cause and Effect* Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1), (1-PS4-2), (1-PS4-3) *Connections to Engineering, Technology, and Applications of Science* *Influence of Engineering, Technology, and Science, on Society and the Natural World* People depend on various technologies in their lives;

	human life would be very different without technology. (1-PS4-4)

Math Student Learning Objectives Covered in this Unit
• MP.5 Use appropriate tools strategically. (1-PS4-4) • 1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1- PS4-4) • 1.MD.A.2 Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. (1-PS4-4)

ELA Student Learning Objectives Covered in this Unit
• W.1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. (1-PS4-2) • W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-1), (1-PS4-2), (1-PS4-3), (1-PS4- 4) • W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1), (1-PS4-2), (1-PS4-3) • SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-1), (1-PS4-2), (1-PS4-3)

Modifications
Unit 3 Modifications: ***See lesson plans for tier II and tier III modifications.** SPED: Provide visuals for students throughout the lesson on promethean board and the focus wall; allow extra time for activities to be completed; dictated responses in lieu of written work; hands on activities instead of pencil and paper ESL/ELL: Describing pictures or classroom objects; Providing information in graphic organizers; Identifying real life objects based on descriptive oral phrases or short sentences;

504 Students: Provide a checklist of the steps needed to complete the problem; Provide lots of white-space to make it less busy; If still struggling, reteach and retest

At-Risk Students: Reduce the number of problems given; Give extra time

Gifted and Talented: Added detail to written work; find connecting stories from classroom library and compare to the lessons;

Lesson	Differentiation Option::
Lesson 1	-Verbally explain or draw pictures of the sounds they are hearing in lieu of writing about it
Part B: Lesson 1	-Bilingual Vocabulary cards for the focus wall: *translucent, light, opaque, illumination, transparent, and reflective

Unit Three: Waves - Light and Sound (Waves and their Applications in Technologies for Information Transfer)	
NJ Student Learning Standards: Science Grade 1 **1 - PS4 - 1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate** - Tuning forks - Plucking a stretched string - Holding a piece of paper near a speaker - Holding an object near a vibrating tuning fork	**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

"I can plan and conduct investigations to show that vibrating materials can make sound and that sound can make materials vibrate." **1 - PS4 - 2. Make observations to construct an evidence-based account that objects can be seen only when illuminated.** - Observations in a dark room, pinhole box, and a video of a cave explorer with a flashlight - Illumination could be from an external light source or by an object giving off its own light ***"I can make observations to understand that objects can be seen only when they are lit up."*** **1 - PS4 - 3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.** - Transparent (clear plastic), translucent (wax paper), opaque (cardboard), and reflective (mirror). - The idea that light can travel from place to place is developed through experiences with light sources, mirrors, and shadows (no discussion of the speed of light). ***"I can plan and conduct an investigation to find out what happens when objects made with different materials are placed in the path of a beam of light."***	Implement Innovations Reason effectively Use Systems Thinking Make Judgments and Decisions Solve Problems Communicate Clearly Collaborate with Others **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

1 - PS4 - 4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a long distance - Light source to send signals - Paper cup and string telephones - Pattern of drum beats ***"I can use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a long distance."***	

Unit Focus and Targets:

"Act like Scientists" (Science and Engineering Practices)	**"Think like Scientists" (Disciplinary Core Ideas/Content)**	**"See the World like Scientists" (Crosscutting Concepts)**
Planning and Carrying Out Investigations - Planning and carrying out investigations to answer questions or test solutions to problems in K-2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.	**PS4.A: Wave Properties** - Sound can make matter vibrate, and vibrating matter can make sound(1-PS4-1) **PS4.B: Electromagnetic Radiation** - Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2)	**Cause and Effect** - Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1), (1-PS4-2), (1-PS4-3). ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Engineering, Technology, and Science on Society and the Natural World**

- Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. (1-PS4-1), (1-PS4-3) **Construction 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.(1-PS4-2) -Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4).	- Some materials allow light to pass through them, others allow only some light through and others block all light and create a shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (1-PS4-3) **PS4.C: Information Technologies and Instrumentation** - People use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)	- People depend on various technologies in their lives; human lives would be very different without technology. (1-PS4-4) **Scientific Investigations Use a Variety of Methods** - Science investigations begin with a question. (1-PS4-1) - Scientists use different ways to study the world. (1-PS4-1)

In the Classroom: Unit 3, Part A

Part A Guiding Question:

- How can you prove that sound can make vibrations and vibrations can make sounds?

Part A Teaching Points:

- Sound can make things vibrate
- Vibrations can make sound
- Tests can be designed to gather evidence to prove an idea

Part A Assessment Objectives:

- With guidance, plan and conduct an investigation to prove that sound causes vibrations and vibrations cause sound
- Observe and determine how sound and vibrations are connected

Unit 3, Part A, Lesson 1: What is Sound?

Materials:

Do You Hear What I Hear? Mystery Sounds sheet (https://drive.google.com/open?id=0B5e_0qncfnkBc2sxSlVwbnpBOG8)
Objects to make 6 different sounds
Sound Walk sheet (https://drive.google.com/open?id=0B5e_0qncfnkBWTZjSHRmWm04QWM)
Sound Waves drawing sheet (https://drive.google.com/open?id=0B5e_0qncfnkBd2tSQVlvbEUxemM)
Rubber band
Balloon
Plastic bowl
Plastic wrap
Salt

Engage:

1. Explain to students that we are going to be learning about two types of waves - but not ones that are made by the ocean. Light and sound are both made of waves that move between things, around things, and even through things!
2. Conduct the Do You Hear What I Hear? Mystery Sounds challenge with your class to get them thinking about different types of sound
    a. Have students put their heads down and close their eyes while you make 6 different sounds
    b. Have students record what they think the sound is on their recording sheet then discuss and reveal

Explore:

1. Watch the BrainPopJr. On sound: https://jr.brainpop.com/science/energy/sound/
    a. Watch from beginning to 2:00 then skip to 3:23 to end
2. After the video, discuss and emphasize how sound is all about vibrations and vibrations move in waves
3. Let students feel their throats while they talk and feel their vocal chords vibrate.
4. Take Sound Walk around the building and outside to look for examples of sounds
5. As students record their sounds, encourage them to think about

Explain:

1. Do a few simple demonstrations of these vibrations: Put a rubber band between two fingers and pluck - what do you observe? pull the rubber band tighter - what happened? What did you hear? Let a few students try this and see what they feel when you pluck the rubber band
2. Blow up a balloon but do not tie it shut. Pinch the top of the balloon with two fingers on each side and stretch the top of the balloon out as you release the air. What do you hear? What do you feel?
3. Put your hand on your throat. Talk or make noise at different volumes. What do you feel? Put your lips together and hum. What do you feel?

Elaborate:

1. Done in small groups or as a demonstration: Ask students “How can you make salt jump without touching it at all?
2. Turn and talk, then share out answers prompting for students to think about using sound waves/vibrations to make the salt move
3. Distribute supplies to groups or prepare materials for demonstration
    a. Tightly wrap plastic wrap around a small plastic bowl and secure with a rubber band - the tighter wrapped the better
    b. Sprinkle salt on top of the plastic wrap
4. Ask students to give you ideas of how to make the salt move or allow students to make attempts in their small group
5. The salt will move when someone speaks directly over the bowl as the vibrations move through the air, hit the plastic wrap, and cause the salt to move up and down

a. What will work: talking directly over the salt, clapping directly over the salt, banging two metal objects directly over the salt
b. What won't work: anything not directly over the salt, wooden and plastic things do not create enough sound waves to move the salt

Evaluate:

1. Distribute the Sound Waves drawing sheet
2. Students will draw in the sound waves moving between noise sources
3. As students work, circulate to assess their understanding of sound waves

Differentiation:

General Accommodations/Modifications:

- 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 II:

Engage	Explore	Elaborate	Evaluate
● Modify the number of sounds to explore.	● Watch first 2 minutes of the video. ● Talk about different things in the classroom that make sound. ● Go on sound walk.	● Conduct demonstration with class together. Create the bowl for students and show different ways to make the sand move.	● Demonstrate to students how to draw sound waves. ● Complete first example together.

Tier III:

Engage	Explore	Elaborate	Evaluate
• Modify the number of sounds to explore.	• Watch first 2 minutes of the video. • Show different items in the classroom that make sound. Have students make the sound. • Go on sound walk.	• Conduct demonstration with class together. Create the bowl for students and show different ways to make the sand move.	• Demonstrate to students how to draw sound waves. • Identify sound waves together as a class. • Students draw/trace sound waves.

Unit 3, Part A, Lesson 3: Instruments and Sound

Materials:
Demonstration building materials
Weather Instrument Planning sheet (https://drive.google.com/open?id=1M4DpeGb2CSTg_X630BWeV3Gu7mOi4YwLOyxHqXeKNh4)

Engage:
1. Show students the following clip: https://www.youtube.com/watch?v=RBL_CbDtzbQ - feel free to change year to year with a newly popular animated movie
2. Pause after the first few scenes and ask students: What types of sounds are you hearing in this video?
    a. Prompt students to think about three types of sounds - talking, music, sound effects
3. Focus for a few scenes on the unique sound effects you hear (splashing, whooshing, cracking, necklace opening, hair hitting face, falling on boat)
4. Ask students to explain what these sounds are - we know this is a cartoon so where do the sounds come from?

Explore:

1. Show students the following clip: https://www.youtube.com/watch?v=UO3N_PRIgX0&t=298s
    a. There are parts of this video that will get dry for the kids but the demonstrations are great - feel free to skip around
    b. Pause periodically throughout the video and ask students to describe what vibrations are taking place to create the sounds
2. Have a discussion about the possibilities to turn just about anything into a sound as long as a vibration is created
3. Instruct students to start thinking about how a weather sound could be created as they do the next activity
4. Lead students in making rain sounds with their hands. Use this link for yourself or share with students: https://www.youtube.com/watch?v=5pkSQqPpNAY
5. Use the link as the backdrop for your activity: https://www.youtube.com/watch?v=FzyffEamKh0 to create a "rainstorm" with your bodies - once students practice, you can put a rainy scene muted on the board for students to make students feel like they are providing the sound effect for the scene

Explain:

1. Ask students to explain how vibrations were used to create the rainstorm sound effect
2. Explain to students that their next challenge will be to create an instrument that makes a weather sound
3. As a group, brainstorm a list of weather sounds so that students have a list to reference

Elaborate:

1. Review the building materials
2. Allow students time to look at and ask questions about the building materials
3. Students can touch the materials but do not allow them to build, attach, cut, etc - this really should just give them a chance to become familiar with the building materials
4. Provide students with the Weather Instrument Planning sheet
5. Students will draw and write about the weather instrument that they will be building.
    a. Encourage students to color and label
6. Students will build their instrument to create different weather sound.

Evaluate:

1. While students are drawing their weather instrument, circulate the room and ask students to show you their instrument
2. Ask students questions about where the vibration will be created in their instrument - students can mark this on their papers
3. Students should be able to describe that sound is made by vibrations

Differentiation:

General Accommodations/Modifications:

- 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 II:

Engage	Explore	Explain	Elaborate	Evaluate
• Watch video, pause every few moments or so to ask to students to identify different sounds.	• Identify the different actions in the fim and then have students identify whats making the sound. • Pause the video at each new scene. • Make rain sounds to go with video.	• Identify different weather that makes different sounds. Brainstorm as a class. (rain, thunder, snow crunching, wind. etc.)	• Use different material to make different weather sounds. • Give students choice between materials.	• Teacher observation and student demonstration as evaluation.

Tier III:

Engage	Explore	Explain	Elaborate	Evaluate
● Watch video, pause every few moments or so to ask to students to identify different sounds. ● Use picture cards and have students hold up the sound they hear.	● Show a picture of an animal or object. Have students create the sounds that go with the picture. ● Pause the video at each new scene. ● Make rain sounds to go with video.	● Identify different weather that makes different sounds. Brainstorm as a class. ● Use pictures to support brainstorm. (rain, thunder, snow crunching, wind. etc.)	● Limit choice for materials to guide students to make a specific sound (watering can for rain, blocks for thunder etc.)	● Teacher observation and student demonstration as evaluation.

In the Classroom: Unit 3, Part B

Part B Guiding Question:

- How are we able to see things?
- How could you test to see what happens when you put different materials in front of a beam of light?

Part B Teaching Points:

- Humans are unable to see objects if they are not illuminated
- Some objects give off their own light, while others can be seen when light shines on it
- There are different types of materials (transparent, translucent, opaque, and reflective) that effect a beam of light differently
- Tests can be designed to gather evidence to support an idea

Part B Assessment Objectives:

- With guidance, plan and conduct an investigation to see how different materials appear in a beam of light
- Make observations to explain how light is needed to see objects

Unit 3, Part B, Lesson 1: Light and Illumination

Materials:

Source of Light flipchart (https://drive.google.com/open?id=0B5e_0qncfnkBZl9zUU1WS1Z1bjQ)
Flashlight/cell phone light (borrow from Cicchino if needed)
Light Sources sort (https://drive.google.com/open?id=0B5e_0qncfnkBRjJicHlNV2hBeDg)

Engage:

1. Watch the following short pixar film: https://www.youtube.com/watch?v=CCQ9v6XMC6c
2. Use this film as a point to think about where light comes from
3. Ask and discuss: What is real in this film and what is make believe?

Explore:

1. Pose a problem to the class: You are in a dark room with a friend. There are no windows and the power went out
2. Ask students to think about what they could use to see their friend in the dark room
4. Brainstorm a list of things you could use to see your friend
    a. Think about artificial light-sources or natural light sources like fireflies
5. Discuss what these items have in common to emphasize that light is required to see things in the dark
6. Show students the Source of Light flipchart and have students describe what they are observing in each scene
7. Discuss and question: What is illuminated? What is causing the illumination? Would objects be seen without the illumination?
8. Really focus and emphasize the question of: Would objects are seen without illumination? Guide students to the fact that we cannot see without light to illuminate the world

Explain:

1. Make your classroom as dark as possible
2. Allow students to come forward and use the flashlight to illuminate an item in your room
3. Ask the class to explain how the light works and how it is allowing you to only see the one area that the flashlight is shining on
4. Emphasize that the illuminated area is what we can see best since we need illumination to see

Elaborate:

1. Watch the Light BrainpopJr.: https://jr.brainpop.com/science/energy/light/ from the beginning to 2:30
2. Discuss the difference between natural light and artificial light
3. Have students complete the Light Sources sort to categories of producing light and not producing light

Evaluate:

1. As students work on their light sources sort, check for accuracy
2. Prompt students to correct their mistakes by thinking about if that object would help them see at night time
3. Challenge students to think of other items that could fit into the categories

Differentiation:

General Accommodations/Modifications:

- 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 II:

Explore	Explain	Elaborate	Evaluate

• Brainstorm ideas of items to use in a dark room. Point out objects in the classroom.	• Have items prepared in front for easy access.	• Complete sort as a class.	• Modify sort to support student understanding.

Tier III:

Explore	Explain	Elaborate	Evaluate
• Brainstorm ideas of items to use in a dark room. Point out objects in the classroom. • Utilize pictures or have students grab items in the room.	• Have items prepared in front for easy access.	• Complete source as a class or one on one.	• Modify sort to support student understanding. • Have students identify a light source in the room.

Unit 3, Part B, Lesson 3: Transparent, Translucent, Opaque

Materials:
Flashlight or cell phone light
Newspaper
Book
Eyeglasses/window/clear water bottle
Transparent, Translucent, Opaque Poster (https://drive.google.com/open?id=0B5e_0qncfnkBLTNqNW5jaFlpY28)

Can You See Me Now? Plan sheet DO NOT copy this double sided (https://drive.google.com/open?id=1pqV6F5y8AC6YCpF75C17REM8O1MogmaqklFSYC5To94)
Transparent, Translucent, Opaque Sentences (https://drive.google.com/open?id=0B5e_0qncfnkBQ21ZV25fdkYzU0k)

Engage:

1. Show students some of the following video:https://www.youtube.com/watch?v=OAeSv4TJGwM
2. Ask students to think about what the animals in the video had in common
3. Guide the discussion so that students are making a connection between the word transparent and how we can see through the animal
4. Turn and talk, then share out: what is happening to the light when it hits the animal - goes through it

Explore:

1. Remind students that light travels in waves similar to how sound travels with waves and that now we will be exploring what happens when those light waves hit things
2. Show students whatever you are using as your clear item (water bottle, eyeglasses, window)
3. Ask students to observe and share their observations of the clear item
4. Ask students to predict what will happen when light is shined through the clear item
5. Shine the light source through the clear item and discuss what is happening
6. Identify this as being transparent
7. Repeat this cycle with the newspaper as translucent and the book as opaque

Explain:

1. Watch the Light BrainPopJr.: **https://jr.brainpop.com/science/energy/light/** from 2:30 through 3:45
2. Using the Transparent, Translucent, Opaque Poster to discuss and clarify the three terms
3. Explain that they are now going to plan an experiment of their own to investigate what items around them are transparent, translucent, and opaque

Elaborate:

1. In pairs, distribute the Can You See Me Now? plan sheet
2. Explain to the class that today they would be acting like scientists to plan out an experiment to test if different objects are transparent, translucent, or opaque
3. Tell students that in their next class, students would be acting like scientists to carry out their plan
4. Give students time to work through the planning sheet
    a. Draw their tester picture (this can be any small little drawing - nothing in particular - students just need an image to look for)
    b. Select one item from the Test Box that they predict will be transparent, translucent, and opaque
    c. Draw predictions based on their selections (using the poster from earlier will help with this step)

Evaluate:

1. Review student plan sheets to ensure completion
2. Assess by having students complete the Transparent, Translucent, and Opaque sentences
3. Students will conduct their experiment to determine if their hypothesis was correct.

Differentiation:

General Accommodations/Modifications:

- 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 II:

Engage	Explore	Explain	Elaborate	Evaluate

• Shorted video length to only first few animals.	• Create visual for vocabulary • Use different items to demonstrate if light goes through the object.	• Chunk video into portions based on vocabulary word. • Create anchor chart for each word.	• Create example for picture design for students to use as a guide. • Complete one of the words together.	• Scaffold support for sentence writing.

Tier III:

Engage	Explore	Explain	Elaborate	Evaluate
• Shorted video length to only first few animals	• Create visual for vocabulary • Use different items to demonstrate if light goes through the object.	• Chunk video into portions based on vocabulary word. • Create anchor chart for each word. • For each vocabulary term, provide example using the flashlight.	• Create anchor chart/flipchart and make predictions as a class. • Conduct experiment as a class.	• Teacher observations for evaluation.

Unit 3, Part B, Lesson 5: Shadows and Reflections

Materials:

- White drawing paper
- Manipulatives, unifix cubes, etc
- Flashlights (borrow if needed)
- Scrap paper
- Popsicle sticks (borrow if needed)

Engage:

1. Make a shadow with your hand in front of the Promethean board
2. Ask students to turn and talk then share out: What is this called? How is this happening?
3. Discuss with students their answers
4. Guide to the point that shadows are created when light shine on an opaque object
5. Ask students to think about it a transparent or translucent object could have a shadow

Explore:

1. Watch the following Sid the Science Kid video: https://nj.pbslearningmedia.org/resource/0206b279-e19f-4f1d-876f-671258a581a7/shadow-smile-part-1-sid-the-science-kid/#.WYJ-icaZNV8
2. Pause at :57 seconds to allow students to discuss and explain why we cannot see details like smiles in our shadows
3. Continue to pause and discuss throughout the clip to clear up any questions about shadows that the class may bring up through the clip

Explain:

4. Explain to students that now they are going to be experimenting with shadows with a partner
5. Discuss with students how they will be using their manipulatives, cubes, boxes, etc to test how shadows work

Elaborate:

1. If it is sunny, go outside/use flashlight and give students different challenges with their object to make shadows
    a. Make your shadow still

b. Make your shadow larger
c. Make your shadow smaller
d. Make your shadow upside-down
e. Trace your shadow
f. Make a letter/number with the shadow

Evaluate:

1. On scrap paper or construction paper, have students try to create shadow puppets
2. Challenge them to make a letter, word, or numbers so that they test out their shadow
3. Tape the paper puppet to popsicles or pencils
4. Allow students to show their puppet to the class in the Promethean Board light

Differentiation:

General Accommodations/Modifications:

- 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 II:

Explore	Elaborate	Evaluate
● Rewatch video as needed for support.	● Model example	● Provide tracer if necessary to complete assignment.

Tier III:

Explore	Elaborate	Evaluate
● Rewatch video as needed for support. ● Have students draw a picture of the shadow in the video	● Model example ● Utilize flashlight to model how to make a shadow. Explore making shadows as a class.	● Pre-cut different shadows and have students glue their favorite to a popsicle stick.Display on promethean board.

In the Classroom: Unit 3, Part C

Part C Guiding Question:

- How can we communicate over long distances using light and/or sound?

Part C Teaching Points:

- People depend on various technologies in our lives to communicate
- Engineers can apply science to develop new devices and ideas about communication
- Designs can be conveyed through sketches, drawings, and models

Part C Assessment Objectives:

- Describe how the parts of their device impact the function of the device
- Define a simple problem that can be solved through the development of a new tool
- Develop a simple model to represent a new tool
- Use tools and materials provided to design and build a device

Science **Grade 1**	
Unit Title	Engineering Design
Recommended Pacing	15 days
Unit Summary	For this unit, students will 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. Students will also develop a simple model based on evidence to represent a proposed object or tool.
Career Readiness, Life Literacies, and Key Skills	*There are actions an individual can take to help make this world a better place.* 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)	*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	Texts, presentations, and lesson materials are strategically chosen with equity in mind. Students will recognize a variety of identities, cultures, and abilities in the characters used to display and explain scientific concepts.
Climate Change	● 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-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. ● K-2-ETS1-3: Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
Core/Supplemental Class Resources	Generation Genius BrainpopJr. Seesaw Mystery Science Peekaboo Kidz Science Lessons (YouTube)
District/School Formative Assessment Plan	● Teacher Observation ● Presentations ● Quizzes/Test ● Portfolios ● Group Projects/Discussions ● Performance Tasks ● Summative Assessment ● Constructed Response

NJSLS-Science: Unit 4:
Performance Expectation:

Science & Engineering Practices	*Asking Questions and Defining Problems* ● Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions. ● Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1) ● Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1) *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. (K-2-ETS1-2) *Analyzing and Interpreting Data* Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

Articulation of DCI's Across Grade-Levels	*ETS1.A: Defining and Delimiting Engineering Problems* ● A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) ● Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1) ● Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1) *ETS1.B: Developing Possible Solutions* ● Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2) *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. (K2-ETS1-3)
Crosscutting Concepts	*Structure and Function* ● The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1- 2)

Math Student Learning Objectives Covered in this Unit
• MP.2 Reason abstractly and quantitatively. (K-2-ETS1-1), (K-2-ETS1-3) • MP.4 Model with mathematics. (K-2-ETS1-1), (K-2-ETS1-3) • MP.5 Use appropriate tools strategically. (K-2-ETS1-1), (K-2-ETS1-3) • 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. (K-2-ETS1-1), (K-2-ETS1-3)

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. (K-2-ETS1-1) • 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. (K-2-ETS1-1), (K-2-ETS1-3) • W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1), (K-2-ETS1-3) • 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. (K-2-ETS1-2)

Modifications
Unit 4 Modifications: ***See lesson plans for tier II and tier III modifications.** SPED: Provide visuals for students throughout the lesson on promethean board and the focus wall; allow extra time for activities to be completed; dictated responses in lieu of written work; hands on activities instead of pencil and paper ESL/ELL: Describing pictures or classroom objects; Providing information in graphic organizers; Identifying real life objects based on descriptive oral phrases or short sentences; 504 Students: Provide a checklist of the steps needed to complete the problem; Provide lots of white-space to make it less busy; If still struggling, reteach and retest At-Risk Students: Reduce the number of problems given; Give extra time Gifted and Talented: Added detail to written work; find connecting stories from classroom library and compare to the lessons;

Unit Four: Engineering Design

NJ Student Learning Standards: Science Grade 1	15 days
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. ***"I can ask questions, make observations, and gather information about a problem or situation that many people want to try to solve using a new object or tool."*** **K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.** ***"I can make a sketch, model, or drawing to describe how an object's shape helps it to function to solve a given problem."*** **K-2-ETS1-2 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.** ***"I can analyze data and compare and contrast the performance of two objects designed to solve the same problem."***	**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 **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:	

“Act like Scientists” (Science and Engineering Practices)	**“Think like Scientists” (Disciplinary Core Ideas/Content)**	**“See the World like Scientists” (Crosscutting Concepts)**
Asking Questions and Defining Problems Asking questions and defining problems in K-2 builds on prior experiences and progresses to simple descriptive questions. -Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1) -Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1) **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. (K-2-ETS1-2)	**ETS1.A:Defining and Delimiting Engineering Problems** - A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) - Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1) - Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1) **ETS1,B: Developing Possible Solutions**	**Structure and Function** - The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

Analyzing and Interpreting Data Analyzing data in K-2 builds on prior experiences and progresses to collecting, recording, and sharing observations.	- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2) **ETS1.C: Optimizing the Design Solution** - Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)	

Unit 4, Part A: Engineering Design

Part A Guiding Question: What are natural resources and how are they used?

Part A Teaching Points:

- Natural resources are found in our environment, such as air, water, plants, rocks, and minerals.
- A person's need for natural resources and their activities affect the environment.
- People are using up natural resources very rapidly, and natural resources often take a long time to replace.
- Some energy sources are renewable (wind power), while others are non-renewable (fossil fuels).
- Because people depend on natural resources to survive, it is necessary to conserve natural resources or utilize alternative sources of energy.

Part A Assessment Objectives:

- Use observations to answer scientific questions

Unit 4, Lesson 1: What Are Natural Resources? (Introduction)

Materials:
Chart Paper/Markers
Promethean Board

Engage:
Today, the teacher will gain more information about what students already know about Natural Resources by completing a concept map or web.
1. Teacher writes "Natural Resources" on chart paper. Teacher will ask, “What are some things that nature provides for us to use?”
2. Students have an opportunity to share what they know about natural resources in small groups or with another student .
3. Teacher will place student responses on chart paper and may categorize student responses under these driving questions to help focus the conversation:
   a. How do we care for Natural Resources?
   b. Where are they found?
   c. How are they used?
   d. What are Natural Resources
   e. Who uses Natural Resources?
4. Teacher will ask students to share what they know about Natural Resources to be recorded on the concept map/web. As students share, teacher will add to the web.

Explore:
5.Once Natural Resources concept web has reached a point where students feel that they've shared all they know about Natural Resources, students will watch the following YouTube video to learn more about natural resources:

https://www.youtube.com/watch?v=tCqj9jKQaSs

Explain:
6. Explain to students that they are going to be learning about the various natural resources in this unit.
7. Some of our natural resources are non-renewable sources, which means that once they are used up, they will be gone. During this unit, students will problem solve and discuss ways they can conserve non-renewable resources.

Elaborate:
8 Ask students to discuss the ways in which they use natural resources on a daily basis.
9. What are some items that we use at home that come from natural resources? (i.e. water to drink, bathe, etc). What are some items that we use at school that come from natural resources? (trees provide paper, wood for pencils, desks, etc).

Evaluate:
10. With guidance from the teacher, students can identify and draw four examples of natural resources and describe what is obtained from each natural resource.
http://cleverlearner.com/science/images/natural-resources-printables-for-kindergartens-05u.pdf

Differentiation:
General Accommodations/Modifications:
- 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 II:

Engage	Explain	Elaborate	Evaluate

● Use pictures of natural resources to activate prior knowledge.	● Teach “renewable” and non-renewable with Show a video of waterfall, it is renewable because it never stops. Then complete demonstration of pouring a cup of soda (can be any liquid) and pour it out. That is non-renewable because it cannot be used again. Have students help with demonstration.	● Utilize visuals to support student understanding.	● Draw picture or picture sort.

Tier III:

Engage	Explain	Elaborate	Evaluate
● Pre-teach vocabulary ● Use pictures of natural resources to activate prior knowledge.	● Teach “renewable” and non-renewable with Show a video of waterfall, it is renewable because it never stops. Then complete demonstration of pouring a cup of soda (can be any liquid) and pour it out. That is non-renewable because it cannot be used again	● Sensory bin of with different pictures of renewable and nonrenewable energy sources. Have students look through and pull out different resources.	● Picture sort.

Unit 4, Lesson 2: How Do We Use Natural Resources?

Materials:
Promethean board or chart paper
Paper/pencils
Natural Resources Bingo Cards Link:
https://www.calacademy.org/sites/default/files/assets/docs/pdf/145_bingocardsforstudents.pdf
Manipulatives/Bingo chips to use as bingo markers for game
Bingo Game activity found on **https://www.calacademy.org/educators/lesson-plans/natural-resources-bingo**

Engage: The teacher will review what "natural resources" with the class. In addition, the teacher will review the difference between "renewable" and "non-renewable" resources.

Explore:
Explain to the students what natural resources are and that humans depend on them to make the things we need. Ask the students to list what the Earth's natural resources are and list their responses on the board. Teacher can bring in some examples (a potted plant, rocks, soil, a stuffed animal, molasses (to represent crude oil)) to help them come up with all of them. It may also be helpful to go outside to get more ideas. Teacher should end up with a list that includes the following items: plants, animals, rocks and minerals, fossil fuels, water, and air. Make sure you take extra time in explaining what fossil fuels are. Explain that there is oil under the ground that we extract and use to make things like gasoline and plastic. Now ask the students to list things that you throw into the trash (or recycling or compost bins) like used paper, aluminum cans, plastic bottles, and food scraps. After you've listed these items, ask the students to think about which natural resources were used to make these things. They should say trees for paper, rocks for aluminum and glass, fossil fuels for plastic, and animals and plants for food. For younger students, the teacher can make a list on the board of all the specific objects that appear on the Bingo cards (see below). This way, students are fully prepared and the Natural Resources Bingo game can serve as a review for them. (Items on Bingo cards: cotton t-shirt, leather baseball, bricks, coal,carrot, hamburger,concrete,plastic bottle, paper towels, wool sweater, glass window,

gasoline, book, leather shoe, aluminum soda can,plastic milk jug, banana, beeswax candles, tin soup can, plastic bag, envelope, feather pillow, glass, plastic straw,newspaper, ice cream, metal nuts and bolts, balloon).

Explain:

1. Divide students into groups of four to six. Although each student will have his/her own Bingo card, the students will be able to help each other and check each other's answers in groups.

2. Explain the rules of Bingo to the class.

3. Each student has a unique bingo card with pictures of everyday objects. Each of these things is made from a natural resource. These pictures are arranged in columns headed by a letter in the word "Bingo."

4. Explain that you (the teacher) will randomly pull a letter card and a Natural Resources card. For example: "B, Fossil Fuels," or "N, Plants," or "I, Animals." Make sure you write the combination that you call on the board, so you can double-check a winning card. Return the cards to their receptacles after you have finished calling it and writing it on the board.

5. Each student can cover or mark with a pen or pencil one item on their card that is made from that resource and is in the correct letter column. (Note that it is possible for a student to have two boxes that match the combination called. However, on any one turn, the student can only mark one item.)

6. Also, note that some of the objects are made of many natural resources. For example, paper is made from trees, but water and fossil fuels are also used in the paper-making process. For this game, we will focus on the primary natural resources used to make the object. For example, although the paper-making process involves other natural resources, paper is primarily made from plants.

7. Before drawing another combination of cards, tell students that they need to check the work of the other students in their group. They have the opportunity to challenge another student if they don't think they have made a correct choice. If there is a challenge, use this as an opportunity to discuss that object and the natural resources used to make it. Once all challenges have been discussed, continue with another card combination.

8. Tell students that you will continue to draw cards and they will continue to play until someone gets five in a row and yells, "bingo!"

9. When someone yells, "bingo," check their card to make sure that they have identified the correct natural resource for each item used to make a bingo. If they have not, tell them which one(s) is incorrect and resume the game.

Elaborate:
Lead a discussion with your students about waste. Prompt them to think about where their trash goes when it is thrown away, and how this affects the Earth. Ask the following questions for discussion:
» What are the natural resources that they throw in the trash the most?
» Which resources do they use the most?
» Why is it important to conserve natural resources? *Because we need resources for food, transportation and everything else. If we use them up, we will not have the things we need, or the next generations will not have the things they need.*
» What would happen to the earth if we used more resources than it could make? *We would run out of the things we need to live.*
» How can we conserve natural resources in our daily lives? *Reducing, reusing, recycling, and composting.*

Evaluate:
As an independent follow up activity, students can complete the following natural resources worksheet to review what they have learned about natural resources:
http://cleverlearner.com/science/images/natural-resources-printables-for-kindergartens-06r.pdf

Differentiation:
General Accommodations/Modifications:
- 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 II:

Explore	Explain	Elaborate	Evaluate

• Picture sort of different resource.	• Differentiated bingo board.	• Encourage vocabulary use	• Modified worksheet

Tier III:

Explore	Explain	Elaborate	Evaluate
• Hands on material sort. Teacher can have different items that students can identify as something that comes from nature.	• Differentiated bingo board.	• Use same materials from explore and have students identify which items go in the trash.	• Teacher observation

Unit 4, Lesson 3: Why Should We Try to Conserve Natural Resources?

This lesson has been adapted from the "Earth's Natural Resources" lesson on the following link:
https://www.doe.virginia.gov/testing/sol/standards_docs/science/2010/lesson_plans/grade1/earth_resources/sess_1-8a.pdf

Materials:

- Large display picture of a natural scene – the picture should include trees, flowers, animals, water, clouds, and sunlight at a minimum
- Six large zipped plastic bags
- Construction paper (colors should include red, orange, yellow, green, blue, and brown) –construction paper should be cut into approximately 2x2 inch squares. You will need enough squares of each color so that about ¾ of your class can have five squares of each color. DO NOT cut enough squares for each student to have five of each color!
- A piece of each construction paper color from above that is folded in half lengthwise to make a "label tent" of each color. Label the colored tents as follows:

  Red – Animals
  Orange – Minerals

Yellow – Sunshine
Green – Plants
Blue – Water
Brown – Soil and Land

Engage:
Have the class sit in a large circle. Tell students that we are going to explore natural resources today. Ask "What is a resource?" "What is something that is natural?" "What do you think we mean by "natural resources?" (Take any answer right now.) Tell the students that we are going to discuss the importance of natural resources and why we need to take care of them on Earth.

Explore:
Show the students the large picture of a natural area. Have students name those things in the picture that they think are natural resources. (Guide them to find plants, animals, water, clouds, sunlight, etc.) Discuss why the natural resources are important to us.
3. Discuss what would happen if we pick the flowers. (We could plant more seeds and they will grow back.)
4. Discuss what would happen if we cut down all the trees. (We could plant new trees but it will take longer for them to reach the same size as those we cut down.)
5. Discuss what would happen if we pollute the water. (We will need to remove it which means we need to know how to clean it. If we don't know how to remove the particular contaminant, we will have to add time to find a way to remove it.)
6. Continue discussing the different natural resources and what would happen if we did not have one of them. Lead the students to realize that some natural resources are easily renewable and some are what we consider nonrenewable.
7. Tell students that we are going to play a game about natural resources.

Explain:
8. Show the students the six zipped plastic bags with the small pieces of colored paper. Explain that each color represents a type of natural resource. As you discuss each color, put out the tented label. Tell students that a. Red colored paper squares represent animals b. Orange represents minerals c. Yellow represents sunshine d. Green represents plants e. Blue represents water f. Brown represents soil or land
9. Tell the students that you are going to scatter the paper squares in the middle of the circle where they are sitting. Tell the students that in order to live, each student collector will need to be able to find five squares of each color. The first time you do this, you will select five

students to collect five squares of each of the colors. (There should be enough squares for all five students and there should be colored squares left on the floor.)
10. When the five students have gathered their colored squares, discuss with the class about whether there were enough squares for all five students to have the natural resources they need. Ask the students if there were enough natural resources? Ask them if any of the natural resources are what we would consider nonrenewable? (yes)
11. Collect all of the squares and rescatter them on the floor.
12. This time have approximately 2/3 of your students collect squares. (Again there should be enough, but there will be very few left on the floor.)
13. Discuss with the students what seems to be happening. (There are enough resources for the collectors, but not much is left.) Ask the students what the number left means for the renewable resources? For the nonrenewable resources?
14. Collect all of the squares and re-scatter them on the floor.
15. This time have the entire class collect squares. (There will not be enough squares for everyone to get five of each.)
16. Discuss with the class what it means for those students who were unable to collect enough squares of each color. Talk about the students who were unable to collect enough of the red or green squares. (Many of these are considered renewable.) Talk about the students who were unable to collect enough orange or brown squares. (These would be considered non-renewable.)
17. Collect all the squares. (Student helpers can later sort the colors for you.)
18. Talk with the students about ways we can be good stewards of our natural resources. (Things that a first grader can do could include: turn off the water while they brush their teeth, switch off lights when they leave a room, when something is broken, try to fix it instead of putting it in the trash, recycle, write on both sides of paper, use a washable cup instead of a paper cup, etc.)

Elaborate:
Explain to students that we are going to go outside to identify natural resources.
20. Give each student a copy of the Sense Matrix to use outside (pg 6 of document).
https://www.doe.virginia.gov/testing/sol/standards_docs/science/2010/lesson_plans/grade1/earth_resources/sess_1-8a.pdf
Divide the students into two-person teams.
21. Go outside and define an area on the school grounds where students can look for the natural resources. Tell them that their goal is for each team to fill in their Sense Matrix. They are to work as a team.

22. Have the students use their senses of sight, touch, hearing, and smell to find examples of natural resources (do not include taste for this activity.) On the matrix grid, have students find one or more examples and draw or write the name of an item in a corresponding box. (e.g., a bird may go in the sight box or hearing box if it is singing.)
23. Allow children several minutes to explore and record, making sure they all stay within the boundaries and guidelines given for completing activity.
24. Return to classroom to review each resource discovered. Students may see animals and land, hear the wind or water running in a fountain or creek, feel the warmth of the sunshine on their faces, or smell the soil in a garden. Share examples of each resource students located.

Evaluate:
Class Discussion Questions:

- What are natural resources and why are they important?
- How can natural resources be conserved)? Give examples for each resource.
- Can people help or hurt our environment? Explain to support your answer with details.
- Journal/writing prompts - The Sense Matrix helped us find natural resources in our own schoolyard. Draw and tell about this activity in your journal.

Differentiation:
General Accommodations/Modifications:

- 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 II:

Engage	Explain	Elaborate	Evaluate
● Review vocabulary from previous lesson	● Modify amount of paper for small group instruction.	● Students will walk around school grounds with the teacher to identify different resources. Draw pictures of different resources on worksheet.	● Teacher observation

Tier III:

Engage	Explain	Elaborate	Evaluate
● Review vocabulary from previous lesson ● Utilize picture sort of natural resources.	● Modify amount of paper for small group instruction.. If not paper, use pictures of different resources to complete the same activity.	● Students will walk around the school and verbalize or point to different resources that they see on paper.	● Teacher observation

Unit 4, Lesson 4: What Can I Do to Conserve Natural Resources?

Materials:
Promethean board
Various recycleable objects made from paper, glass, cardboard, or plastic (i.e. milk jug, cardboard box, glass jar, etc)
Brain Pop video

Seesaw lesson
https://app.seesaw.me/pages/shared_activity?prompt_id=prompt.5b88f9d5-d4e1-4e46-bca9-9894a2809eac&share_token=sAfWmgLURjyTRFGQ8WwzSg

Engage:
Review with the students what they have learned in previous lessons about natural resources, and the difference between renewable and non-renewable resources. What would happen if people used all of the natural resources on Earth? Discuss waste and pollution (land (e.g., garbage), air (e.g., smog from cars, smoke from cigarettes), and water (e.g., oil spills from boats).

Explore:
Show the students the following video about how humans' use and misuse of natural resources affects the Earth:
BrainPop "Humans and Enviroment" https://www.youtube.com/watch?v=knVWaSnSXtA

Explain:
Discuss the terms "reuse", "reduce" and "recycle". Discuss what each word means and provide examples.
Reuse: Explain that some things can be reused over and over again instead of just using it once and throwing it out. Examples of things that can be reused: plastic bags, plastic containers, glass jars, etc. Explain that this helps the earth by not putting so many things into landfills. We are keeping our earth clean by reusing items that can be reused.
Reduce: Explain that reducing means to use less of. It means that we are going to use less of a resource so that it will last longer. These are resources that we can't stop using because we need them, but they either are not renewable or don't renew as fast as we are using them. We need to stop using so much of something. We can reduce using things like gas by carpooling, or driving together places. We can reduce plastic waste by reusing plastic cups,or using glass/metal straws instead of plastic ones.
Recycle: Explain that in addition to reusing and reducing, we can also recycle things that we can't reduce or reuse anymore. Recycling means that we are going to take something old and make it into something new. There are lots of things that can be recycled but usually people recycle things like glass, plastic, and cardboard. If you go grocery shopping, a lot of stores have places you can recycle the old plastic bags. Some cities let you recycle cardboard and glass which then gets picked up by the city.

Elaborate:

Show the students the video about recycling https://www.youtube.com/watch?v=VlRVPum9cp4
Discuss how items that are recycled are classified (glass, metal, paper).

Evaluate:
With guidance from teacher or independently, students can complete the following Seesaw activity where pictures of common items can be sorted into recycling bins based on paper, metal, plastic, glass, etc.
https://app.seesaw.me/pages/shared_activity?prompt_id=prompt.5b88f9d5-d4e1-4e46-bca9-9894a2809eac&share_token=sAfWmgLURjyTRFGQ8WwzSg

Differentiation:
General Accommodations/Modifications:

- 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 II:

Engage	Explore	Explain	Evaluate
• Review previous skills.	• Rewatch video as needed.	• Give examples of the 3 Rs in the classroom.	• Modified seesaw activity.

Tier III:

Engage	Explore	Explain	Evaluate

• Review previous skills	• Rewatch video as needed. • Review examples of conservation, cleaning up and chiming in in the classroom. Ex: Show trash on the floor - discuss what to do with trash.	• Create anchor chart of 3 Rs. • Give examples to write or use pictures for anchor chart.	• Student uses picture sort on how to reduce, reuse, recycle • Teacher observation

Unit 4, Lesson 5: How Can We Use Renewable Energy Sources?

Materials:
Promethean board
Seesaw Lesson
https://app.seesaw.me/pages/shared_activity?prompt_id=prompt.5c39882b-de5c-4c4d-8235-89b54e759e79&share_token=hd5eAh5YSO-SAkPpeTYl5w

Engage:
Teacher will review what students have learned about natural resources in this unit thus far.Students have learned about two types of natural resources: renewable resources (sun, plants, water, air), and non-renewable resources (oil, natural gas, coal). What happens if people use all of the non-renewable resources? How will we be able to power our homes and cars?
Teacher will introduce examples of renewable sources of energy and how they are used.

Explore:

Teacher will show video to students that will introduce examples of renewable energy sources and the way they are used to provide green energy: “Renewable Energy Sources-Learning Videos for Kids” https://www.youtube.com/watch?v=rK5f8KEKrwc

Explain: Teacher will review the energy sources that were discussed in the video. Why do we need renewable energy sources? Why is renewable energy sources such as wind and solar power better for the Earth than using coal and oil? How can renewable energy sources help the Earth “cleaner” and provide sustainable sources of energy for people?

Elaborate:
With guidance from the teacher or working independently, students can complete the following Seesaw activity about renewable energy sources:
https://app.seesaw.me/pages/shared_activity?prompt_id=prompt.5c39882b-de5c-4c4d-8235-89b54e759e79&share_token=hd5eAh5YSO-SAkPpeTYl5w

Evaluate:
Students can choose one of the renewable sources of energy that was discussed in this lesson (air, water, solar, wind), and write/draw an example of how the source of energy is used (i.e sun’s energy is used to provide solar power for solar panels, which is turned into electricity.

Differentiation

General Accommodations/Modifications:

- 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 II:

Engage	Elaborate	Evaluate
• Review previous vocabulary.	• Modified seesaw activity. • Teacher support for seesaw activity.	• Draw a picture of newable energy source from the video.

Tier III:

Engage	Elaborate	Evaluate
• Review previous vocabulary.	• Complete activity as a class	• Picture sort • Teacher observations

Unit 4, Lesson 6–Using Renewable Resources

Materials:

Promethean board
Corrugated cardboard
Construction paper or cardstock
Wooden skewers (3)
Plastic straws (2)
Plastic bottle caps (4)
Tape
Scissors
Hobby knife (optional)

Fan

Engage:
Review renewable natural resources with students. Why do we need renewable natural resources to provide clean energy sources?

Explore:
Discuss wind power as an example of renewable energy sources. How do wind turbines work?
Show students this video about wind turbines and how they work: https://www.youtube.com/watch?v=ia1LJE9sOxQ

Explain:
Discuss with students how wind is used to provide electricity through the use of wind turbines. Have students work with a partner to brainstorm other ideas of ways that wind could be used to make energy or to make things move (ie.sailboat**)**

Elaborate:
Explain to the students that they will be utilizing wind power to make an object move .
Students will be building a wind powered car and then testing their finished project in class.
*Details for this project and complete lesson can be found on https://www.sciencebuddies.org/stem-activities/wind-powered-car

Instructions for Wind Powered Car:

1. Cut out a piece of cardboard to form the body of your car.
2. Tape two straws to the bottom of your car, one at each end to form the axles. Make sure the straws are parallel.
3. Use the hobby knife to carefully poke a "+"-shaped hole in the center of each bottle cap.
4. Push a wooden skewer through the hole in one of the bottle caps.
5. Thread the other end of the skewer through one of the straws.

6. Push a bottle cap onto the end of the skewer opposite the first bottle cap. You just made an axle with two wheels!
7. Repeat steps 4 through 6 to make the other axle.
8. Make sure the axles can spin and the car can roll smoothly without getting stuck. If needed, adjust the wheels so they are not too wobbly.
9. Use the hobby knife to poke a small hole in the middle of the cardboard.
10. Insert a wooden skewer upright into the hole to form a mast. Secure it at the base with plenty of tape. If it is still too wobbly, you can build a diagonal support out of a piece of cardboard.
11. Cut out a shape for a sail from a piece of paper.
12. Poke the upright skewer through both ends of the sail to hold it in place.
13. Students can place their car in front of a fan or simply blow on the car to see how it moves.

Evaluate:

- Students can put the fan on the floor in a hallway or a large room. Measure how far your car goes before it stops with different size and/or shape sails.
- With a stop watch, students can measure how fast their car can go over a certain distance with different size and/or shape sails.

Differentiation:

General Accommodations/Modifications:

- 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