Science Department
Grade 2 Curriculum

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Last Updated: July 2019, Revised July 2021 Climate Change

Standards in Action: Climate Change Earth's climate is now changing faster than at any point in the history of modern civilization, primarily as a result of human activities. Global climate change has already resulted in a wide range of impacts across New Jersey and in many sectors of its economy. The addition of academic standards that focus on climate change is important so that all students will have a basic understanding of the climate system, including the natural and human-caused factors that affect it. The underpinnings of climate change span across physical, life, as well as Earth and space sciences. The goal is for students to understand climate science as a way to inform decisions that improve quality of life for themselves, their community, and globally and to know how engineering solutions can allow us to mitigate impacts, adapt practices, and build resilient systems. The topic of climate change can easily be integrated into science classes. At each grade level in which systems thinking, managing uncertainty, and building arguments based on multiple lines of data are included, there are opportunities for students to develop essential knowledge and skills that will help them understand the impacts of climate change on humans, animals, and the environment. For example, in the earlier grades, students can use data from first hand investigations of the school-yard habitat to justify recommendations for design improvements to the school-yard habitat for plants, animals, and humans. In the middle grades, students use resources from New Jersey Department of Environmental Protection, the National Oceanic and Atmospheric Administration (NOAA), and National Aeronautics and Space Administration (NASA), to inform their actions as they engage in designing, testing, and modifying an engineered solution to mitigate the impact of climate change on their community. In high school, students can construct models they develop of a proposed solution to mitigate the negative health effects of unusually high summer temperatures resulting from heat islands in cities across the globe and share in the appropriate setting. (NJDOE, Standards Draft Approval, 2020)

Scope and Sequence

Throughout the unit, Mystery Science will direct that some units are "optional" or for "extension purposes". For our curriculum programming and pacing, all activities, even those indicated as "optional" are mandated parts of the curriculum for coverage. In the event of an emergency situation, where a long period of curricular time is lost due to unforeseen circumstances, the activities noted by Mystery Science as "optional" would be the first activities to eliminate from coverage.

Unit 1:Animal Adventures (3-6 weeks) *Climate Change Connection	Unit 2: Material Magic (5-10 weeks) *Climate Change Connection	Unit 3: Work of Water (4-8 weeks) *Climate Change Connection	Unit 4: Plant Adventures (5-10 weeks) *Climate Change Connection
Mystery 1: Why do birds have beaks? **(1-LS1-1)**	Mystery 1: Why do we wear clothes **(2-PS1-1, 2-PS1-2, K-2-ETS1-2, and K-2-ETS1-3)**	Mystery 1: If you floated down a river, where would you end up? **(2-ESS2-2 and 2-ESS2-3)**	Mystery 1: How did a tree travel halfway around the world? **(2-LS2-2)**
Mystery 2: Why do frogs say "ribbit"? **(2-LS4-1)**	Mystery 2: Can you really fry an egg on a hot sidewalk? **(2-PS1-1 and 2-PS1-2)**	Mystery 2: Why is there sand at the beach? **(2-ESS2-2)**	Mystery 2: Do plants eat dirt? **(2-LS2-1 and 2-LS4-1)**
Mystery 3: How could you get more birds to visit a bird feeder? **(2-LS4-1, K-2-ETS1-1, K-2-ETS1-2, K-2-ETS1-3)**	Mystery 3: Why are so many toys made out of plastic? **(2-PS1-1, 2-PS1-2 and 2-PS1-4)**	Mystery 3: What's strong enough to make a canyon? **(2-ESS1-1, 2-ESS2-1 and 2-ESS2-2)**	Mystery 3: Why do trees grow so tall? **(2-LS2-1)**
	Mystery 4: What materials might be invented in the future? **(2-PS1-1, 2-PS1-2, K-2-ETS1-2, K-2-ETS1-3)**	Mystery 4: How can you stop a landslide? **(2-ESS2-1, K-2-ETS1-1, K-2-ETS1-2, K-2-ETS1-3)**	Mystery 4: Should you water a cactus? **(2-LS2-1 and 2-LS4-1)**
	*Mystery 5: Could you build a house out of paper? (**2-PS1-1, 2-PS1-3, K-2-ETS1-2, K-2-ETS1-3)***		*Mystery 5: Where do plants grow best? **(2-LS2-1 and 2-LS4-1)***

Animal Adventures (3-6 weeks)

Biodiversity

Profound Perspective: This unit helps students develop a sense of wonder for biodiversity: the sheer range and variety of animals found on earth. Students gain practical experience in identifying animals and sorting them into scientific groups, and apply their knowledge in an engineering design challenge. This unit introduces two critically important concepts in biology: "habitat" and "species," foundational concepts which will be revisited and refined at higher grade levels.

Climate Change Connection: Grade-level appropriate discussion regarding the necessary adaptations of animals to a changing environment that has been impacted by climate change. Questioning Example: Would birds still need their beaks as they are if the habitat changed and they didn't have the same places and ways to find food? If there were less places for birds to get food naturally, how would that impact your bird feeder activity at home?

Grade 2 Life Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 1 How many different kinds of animals are there?	2-LS4-1	Biodiversity, Classification & Patterns	There are *so many* different kinds of animals--even today, we haven't discovered all of them! Before it was easy to travel and visit each other's continents, people only knew about the types of animals from where they grew up. Early scientists eventually started exploring different places and learning about new animals. They discovered the wide variety of living things in habitats, called biodiversity. Scientists organized the animals they discovered into groups based on their shared characteristics. **DCI: LS4.D**	Students **evaluate and communicate information** by sorting animals based on their traits and explaining their choices. Then, students sort the animals based on the traits scientists use to classify the animals as mammals, birds, reptiles, and invertebrates. Students determine which group 'challenge animals' belong to, based on their characteristics.	Students identify **patterns** in animal's characteristics in order to group them.
Mystery 2 Why do frogs say "ribbit"?	2-LS4-1	Biodiversity, Species, & Habitats	Frogs are a really neat example of the biodiversity in North America! In just one habitat, there can be many different frog species. Scientists study frog biodiversity by analyzing the different frog sounds they hear in a habitat--each frog species has a unique call. The variety of frog species in a habitat, depends on the amount of resources a habitat has. The more resources, the more types of frogs! **DCI: LS4.D**	Students listen to a variety of frog calls, then **analyze** the sounds from two different habitats to determine which frogs are there. They then construct an **argument from evidence** about which habitat is more biodiverse based on the amount of different frog calls.	Students identify **patterns** in frog calls in order to determine how biodiverse a habitat is.
Mystery 3 How could you get more birds to visit a bird feeder?	2-LS4-1 K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	Biodiversity & Engineering	Not all bird feeders are created equally! Bird feeders come in all shapes, sizes, and colors--they even hold different types of food. Different bird feeders attract different bird species. People like to see different birds up close, so engineers designed bird feeders to help solve this problem. There are so many different bird feeders and each one has strengths and weaknesses, depending on what type of bird you want to attract! **DCI: LS4.D**	Students **define a problem** by stating which type of bird they want to design a bird feeder for, and what its needs are. Each student **designs a solution** by comparing multiple sketches and **developing a model** of a bird feeder that best meets the needs of the bird they want to attract. Students reflect on how to improve their prototype.	Students explore the **cause and effect** relationship between bird feeder design and the type of food in it and the types of birds that visit it.

Material Magic (5-10 weeks)

Properties & Phases of Matter

Profound Perspective: This unit develops the idea that by taking advantage of the properties of materials, we can solve many problems in our lives. Students will develop an appreciation for the manmade materials of everyday objects, and learn to recognize that those materials are chosen based on their properties. Through hands-on investigation, students will explore the material properties involved in meeting basic needs (such as clothing and cooking). They'll consider the solid and liquid states of matter to understand why plastic was invented. The unit ends with a brainstorming activity about futuristic inventions that might be possible using new materials.

Climate Change Connection: Grade-level appropriate discussion about plastics in the environment. Questioning Example: Many of your toys, tech and household items are plastic but we have found that too much plastic is not good for our environment. Choose one or two things in your house (toys, tech, kitchen items, etc.) and indicate what

material you have changed to or could change to instead of using plastic. If it is a toy or tech, what materials do you think the company who makes it could use instead of plastic?

Grade 2 Physical Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 1 Why do we wear clothes?	2-PS1-1 2-PS1-2 K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	Material Properties & Engineering	Materials have a set of unique properties that determine their use. Clothes are made of material, and we wear them to protect us. We choose clothing based on its properties. For example, if it was hot outside we would wear something light and opaque to protect us from the sun. **DCIs: PS1.A, ETS1.A, ETS1.B**	Students **define the problem** that a hat is needed to shade the sun. They **carry out an investigation** of the properties of the provided materials. Next, each student **designs a solution** by selecting materials to create a hat that blocks the sun.	Students consider the **pattern** that different materials share similar properties. Students test the **effect** a material's properties have on its function.
Mystery 2 Can you really fry an egg on a hot sidewalk?	2-PS1-1 2-PS1-2	Material Properties, Classifying Materials	One interesting property of materials is whether they are an insulator (a material that does not allow the movement of heat) or a conductor (a material that moves heat easily). If you know which property a material has, you can choose the best one for your purpose! **DCIs: PS1.A**	Students **carry out an investigation** to test if a material is an insulator. **Analyzing the data**, they determine which material they would use to pick up something hot.	Students consider the **pattern** that different materials share similar properties. Students test the **effect** a material's properties have on its function.
Mystery 3 Why are so many toys made out of plastic?	2-PS1-1 2-PS1-2 2-PS1-4	Material Changes & Phases of Matter	Another property of materials is if they are meltable or not. If a material is meltable, it melts into a liquid when you heat it up! All meltable material melts at different temperatures. Some may melt in your hands, while others need fire. This property is useful because you can heat a substance, melt it, pour the liquid into any mold, let it cool and harden again to make different shapes. **DCIs: PS1.A, PS1.B**	Students **conduct an investigation** to determine which type of candy will melt in hot water. **Analyzing the data**, students compare their predictions to what actually occurred. Students **engage in an argument** as to which candy to mail using **evidence** from the investigation to support their claim.	Students observe the **pattern** that different materials share similar properties. Students consider the **cause and effect** of heat being added to meltable substances. They observe that when heat (**energy**) is applied to a meltable substance (**matter**) it changes shape.

Grade 2 Physical Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 4 What materials might be invented in the future?	2-PS1-1 2-PS1-2 K-2-ETS1-1 K-2-ETS1-2	Material Inventions, Engineering	Over time, inventions of materials with new properties have helped solve problems. New materials are constantly being invented and made into products that could be available in the future. **DCIs: PS1.A, ETS1.A, ETS1.B, *Foundational* ETS1.C**	Students use a new material to **design solutions** to solve a real life problem. Students **engage in an argument** for the merits of their design.	Students observe the **pattern** that different materials share similar properties. Some materials have properties that **cause** them to be better suited to a purpose. They begin to explore how the **structure** of a designed object relates to its **function**.
Mystery 5 Could you build a house out of paper?	2-PS1-1 2-PS1-3 K-2-ETS1-2 K-2-ETS1-3	Materials, Properties, & Engineering	Building materials--like wood, concrete, and steel-- all share an important property, strength. They are easy to build with because you can combine many small pieces and make a bigger structure. But those aren't the only materials you can use to build! Paper doesn't seem like it has the right properties for building--it's flexible and isn't strong. Surprisingly, you can change	Students **design a solution** to building a tall tower and a strong tower out of paper. They change the properties of paper by folding, bending and cutting paper.. Students **model** the building process by assembling small pieces in order to build an object.	Students consider that **matter**, in this case paper, can be broken into smaller pieces or change shapes. Students consider the **cause and effect** relationship between a material's properties and its

			the properties of paper to make it stronger and a better building material. **DCIs: PS1.A, ETS1.B, ETS1.C**		uses.

Work of Water (4-8 weeks)

Earth's Surface Processes

Profound Perspective: This unit helps students develop the idea that water is a powerful force that reshapes the earth's surface. Students see that water isn't just something we drink. It carries sand to create beaches, carves out canyons and valleys and, as ice, scrapes entire areas flat.

Climate Change Connection: Grade-level appropriate discussion of the value of water and how its availability as a resource is changing as a result of climate change. Questioning Example: If our rivers and lakes were to dry up, how would that change the environment? What if they became bigger and flooded more often? Think about the people, animals and plants that live near these bodies of water and what they use them for.

Grade 2 Earth Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 1 If you floated down a river, where would you end up?	2-ESS2-2 2-ESS2-3	Mapping, Earth's Surface, & Landforms	Rivers are bodies of water that are moving! When we look at a map of the earth's surface, we see that big rivers empty into the ocean. Earth's surface looks flat on a map, but we know that it is actually *quite* hilly. If we looked at a map with texture we'd see that rivers begin at points of high land, flow to points of low land and then into the ocean. **DCIs: ESS2.B, ESS2.C**	Students **develop a model** of the earth's surface and **carry out an investigation** to discover how rivers flow. They **construct an explanation** about where on the earth's surface rivers start and end.	Students identify **patterns** about where rivers start and end on earth's surface.
Mystery 2 Why is there sand at the beach?	2-ESS1-1 2-ESS2-1 2-ESS2-2	Erosion, Earth's Surface, & Landforms	In the last Mystery, we explored how rivers flow from high points of the earth's surface to low points and into the ocean. Oceans are usually next to sandy beaches - but how did all of that sand get there? As the rivers flow toward the ocean, rocks collide into one another causing them to break into smaller pieces. By the time those rocks reach the end of the river, they are *tiny* rocks - or sand! **DCIs: ESS1.C, *Foundational for* ESS2.A, ESS2.B**	Students **conduct an investigation by modeling** how rocks tumble through a river and break. Students **construct an explanation** for why there is sand at the beach.	Students reason about the **cause and effect** of rocks tumbling in a river (cause) and turning into sand (effect). Students begin to explore that **changes** to the earth's surface can happen slowly through the process of erosion.
Mystery 3 What's strong enough to make a canyon?	2-ESS1-1 2-ESS2-1 2-ESS2-2	Erosion, Earth's Surface, & Landforms	Water is incredibly powerful - even powerful enough to move the earth's surface! Heavy rains wash away dirt and rocks, creating canyons - this process is called erosion. Most canyons have rivers flowing from them, and as time passes the water continues to carry away dirt, rocks, and sand. Because of this, canyons continue to grow deeper and wider over time. **DCIs: ESS1.C, ESS2.A, ESS2.B, ESS2.C**	Students **conduct an investigation** by **modeling** what happens to land when it rains over and over. Students **construct an explanation** for how the water changed the land.	Students consider the **cause and effect** of how heavy rains (cause) create canyons on earth's surface (effect). Students begin to explore that **changes** to the earth's surface can happen slowly through the process of erosion.

Grade 2 Earth Science	Performance	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)

	Expectations				
Mystery 4 How can you stop a landslide?	2-ESS1-1 2-ESS2-1 K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	Erosion & Engineering	Landslides - when the earth loosens and is washed away down a hill - is more likely to happen after a wildfire! The fire burns the plants, which soak up rainwater and stabilize the soil with their roots. After a heavy rain, the water loosens the soil and washes the soil away, causing a landslide. Landslides pose many dangers for people! **DCIs: ESS1.C, ESS2.A, ETS1.A, ETS1.B, ETS1.C**	Students **define the problem** that landslides create. They **design solutions** to stabilize soil and prevent landslides. Students compare their solutions and engage in argument from this evidence to determine which designs are most effective.	Students apply the concept that **changes** to earth's surface can happen rapidly during a landslide. Students mimic natural **structures** and their **functions** to create a design solution that lessens the impact of landslides.

Plant Adventures (6-12 weeks)

Structure, Function & Adaptations

Profound Perspective: This unit develops the idea that plants are truly alive and face challenges every bit as dramatic as those of animals. Students will learn that plants have needs, and will reason from evidence to understand how plants meet their needs.

Climate Change Connection: Grade-level appropriate discussion about the role of water in its relationship to the lives of plants. Questioning Example: Would we be able to grow plants here on Earth if climate change made us have less water?

Grade 2 Life Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 1 How did a tree travel halfway around the world?	2-LS2-2	Seed Dispersal	Many plants start as seeds! There are a lot of different types of seeds, all with unique shapes. In order for more plants to grow, seeds need to move away from the parent plant and grow into a new plant. Plants depend on wind, water, and animals to disperse their seeds. **DCIs: LS2.A**	Students **model** seed dispersal by creating three different seed flyers. They **investigate** how each seed flyers' structure helps the seed disperse.	Students explore how the **structure** of a seed helps it disperse (**function**).
Mystery 2 Do plants eat dirt?	2-LS2-1 2-LS4-1	Roots, Water, & Minerals	When a seed is in dirt, the first thing to grow are its roots. The plant actually doesn't need the dirt to grow but it does need the water and minerals often found in the dirt. Roots carry these nutrients from the environment to the plant. As long as plants are getting minerals, water, and sunlight, they can grow! There are many types of plants living in different habitats that get their minerals in unique ways. **DCIs: LS2.A, LS4.D**	Students **conduct an investigation** using a root viewer to observe how roots grow. Students record what the seed looks like for 2 days, turn the root viewer to the side on Day 3, and record the growth until Day 4.	Students evaluate the **effect** minerals have on plant growth. Students consider how the **structure** of plants helps them get the water and minerals they need to survive (**function**).
Mystery 3 Why do trees grow so tall?	2-LS2-1	Light, Leaves, & Competition	We've learned that plants need water and minerals to survive, but they also need light! It's possible to watch plants grow *toward* light following the sun throughout the day. The leaves of a plant soak up the sun and deliver it to the rest of the plant. Trees compete for sunlight, so their leaves are at the top of the tree and they grow as tall as possible. **DCIs: LS2.A**	Students make a Grass Head and **conduct an investigation** to determine the sun's impact on the direction plants grow. **Analyzing data** from Mystery 1, students predict growth patterns of plants.	Students consider the **effect** sunlight has on plant growth. Students analyze the role of the leaves (**structure**) in helping the plant capture sunlight (**function**).
Mystery 4	2-LS2-1	Adaptation	All plants need sunlight and water to	Students **analyze the data** from	Students consider the

Should you water a cactus?	2-LS4-1	s & Habitat	survive, but they don't need the *same* amount of them. There are plants that like shade, and live on the forest floor. There are even plants that need small amounts of water and can survive in the hot and dry desert. **DCIs: LS2.A, LS4.D**	their Grass Head in Mystery 3. They compare their growth pattern prediction with the actual results to determine if the grass grew in the direction of the sunlight.	**cause and effect** relationship between a plant's needs and the habitat it survives best in. Students consider how plants have **structures** that help them survive in their environment (**function**).

Grade 2 Life Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 5 Where do plants grow best?	2-LS2-1 2-LS4-1	Adaptations & Habitat	In order to grow a plant successfully, it's important to know its needs! We've learned that plants need different amounts of sunlight and water. If you planted a cactus in an area that got a lot of rain, it probably wouldn't survive. Knowing a plant's needs helps gardeners and farmers grow plants. **DCIs: LS2.A, LS4.D**	Students engage in a **model** simulation of a farm with different growing conditions in different areas of the farm. Students consider the needs of a plant in order to determine where it will grow best.	Students consider the **cause and effect** relationship between a plant's needs and the habitat it survives best in.

Unit 1	
Animal Adventures	
Summary and Rationale	
This unit helps students develop a sense of wonder for biodiversity: the sheer range and variety of animals found on earth. Students gain practical experience in identifying animals and sorting them into scientific groups, and apply their knowledge in an engineering design challenge. This unit introduces two critically important concepts in biology: "habitat" and "species," foundational concepts which will be revisited and refined at higher grade levels.	
Recommended Pacing	
3-6 weeks	
Standards	
2-LS2-1	Plan and conduct an investigation to determine if plants need sunlight and water to grow.
2-LS2-2.	Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants
2-LS4-1	Make observations of plants and animals to compare the diversity of life in different habitats.

K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
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.
Interdisciplinary Connections	
W.2.7	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).
W.2.8	Recall information from experiences or gather information from provided sources to answer a question.
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.
MP.2	Reason abstractly and quantitatively. (2-LS2-1) MP.4 Model with mathematics.
MP.5	Use appropriate tools strategically.
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.
Integration of Technology	
8.1.2.A.1	Identify the basic features of a digital device and explain its purpose.
8.1.2.A.4	Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
Career Readiness, Life Literacies and Key Skills	
9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
9.4.2.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.IML.3	Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).

Objectives (SLO)	
Students will know: There are so many different kinds of animals--even today, we haven't discovered all of them! Before it was easy to travel and visit each other's continents, people only knew about the types of animals from where they grew up. Early scientists eventually started exploring different places and learning about new animals. They discovered the wide variety of living things in habitats, called biodiversity. Scientists organized the animals they discovered into groups based on their shared characteristics. Frogs are a really neat example of the biodiversity in North America! In just one habitat, there can be many different frog species. Scientists study frog biodiversity by analyzing the different frog sounds they hear in a habitat--each frog species has a unique call. The variety of frog species in a habitat, depends on the amount of resources a habitat has. The more resources, the more types of frogs! Not all bird feeders are created equally! Bird feeders come in all shapes, sizes, and colors--they even hold different types of food. Different bird feeders attract different bird species. People like to see different birds up close, so engineers designed bird feeders to help solve this problem. There are so many different bird feeders and each one has strengths and weaknesses, depending on what type of bird you want to attract!	Students will be able to: Sort animals based on their traits. Classify the animals as mammals, birds, reptiles, and invertebrates Identify patterns in frog calls to determine how biodiverse a habitat is. Design a bird feeder for a specific bird and its needs. Reflect and improve their prototype.
Suggested Resources/Technology Tools	
https://www.sustainablejerseyschools.com/resources/resource-library/climate-change-curriculum/ https://mysteryscience.com/secrets/plant-animal-needs/activity-prep Mystery 1 Mystery 2 Mystery 3 Mystery 6 https://www.teachengineering.org/lessons/view/duk_sunflower_mary_less https://jr.brainpop.com/ Epic! Plants Make Their Own Food Living Things Woodpeckers Raccoons	

Tier 1 Modifications and Accommodations

Including special education students, Multilingual Language Learners (MLLs), students at risk of school failure, gifted and talented students, and students with 504 plans;

Teachers can choose from any of the suggested modifications that follow based upon teaching style, instructional method and needs of individual students.

General Modifications for students struggling to learn -

- Focus on building relationships in the classroom.
- Control the stressors for the student and manage alternate pathways for completion of assignments.
- Provide feedback utilizing a growth mindset and praise what is done correctly based upon effort, attitude and strategy.
- Boost engagement with material by providing opportunities of differentiation, group work and alternative assignments/assessments where appropriate.

MLL -

- Provide additional wait time for student responses to questions to allow students the ability to undergo the process of translation between languages, composition of response and attempted response.
- Simplification of sentence structure and repetition of questions/sentences exactly as stated before trying to rephrase to allow MLL students to hear the sentence and try to comprehend it.
- Rephrase idioms and teach their meanings as when learning a new language, translations are often very literal. IE "Take a stab at it." Ensure students understand what is meant.
- Use directed reading activities. Ensure preview of text before assigned/read, provide pre-reading questions about the main idea and offer help utilizing key words.
- Allow the use of Google Translate where appropriate.
- Utilize bilingual reading texts provided by the STC program.

Gifted and Talented -

Utilize differentiation in the areas of acceleration, enrichment, and grouping. Examples include, but are not limited to:

- interdisciplinary and problem-based assignments with planned scope and sequence
- advance, accelerated, or compacted content
- abstract and advanced higher-level thinking
- allowance for individual student interests
- assignments geared to development in areas of affect, creativity, cognition, and research skills
- complex, in-depth assignments
- diverse enrichment that broadens learning
- variety in types of resources
- internships, mentorships and independent study where applicable

504/IEP -

Modifications and accommodations must be aligned to stated plan and uphold expectations of the plan lawfully. Every student requires a different set of accommodations based upon need. Examples specific to science practice include, but are not limited to:

- Note taker or lab assistant
- Group lab assignments
- Use of scribe
- Adjustable tables and lab equipment within reach
- Classrooms, labs and field trips in accessible locations
- Additional time and separate room for test taking
- Additional time for in-class assignments
- Additional time in lab
- Visual and tactile instructional demonstrations
- Computer with voice output, spelling and grammar checker
- Seating in the front of the class
- Tactile drawings and graphs, and three-dimensional models
- Assignments in electronic format
- Large-print handouts, lab signs and equipment labels

- TV monitor connected to microscope to enlarge images
- Computer equipped to enlarge screen characters and images
- Auditory lab warning signals
- Adaptive lab equipment (talking calculators, talking thermometers, light probes, tactile timers)
- Staples on sticks to indicate units of measurement
- Visual warning system for lab emergencies

Career Readiness, Life Literacies, and Key Skills NJSLS

Please select all standards that apply to this unit of study:

- ❑ Act as a responsible and contributing citizen and employee.
- ❑ Apply appropriate academic and technical skills.
- ❑ Attend to personal health and financial well being.
- ❑ Communicate clearly and effectively and with reason.
- ❑ Consider the environmental social and economic impacts of decisions.
- ❑ Demonstrate creativity and innovation.
- ❑ Employ valid and reliable research strategies.
- ❑ Utilize critical thinking to make sense of problems and persevere in solving them.
- ❑ Model integrity, ethical leadership, and effective management.
- ❑ Plan education and career paths aligned to personal goals.
- ❑ Use technology to enhance productivity.
- ❑ Work productively in teams while using cultural global competence.

Suggestions on integrating these standards can be found at: https://www.nj.gov/education/standards/clicks/

LINKS TO CAREERS:
https://kids.britannica.com/kids/article/zoology/399648

Unit 2

Material Magic

Summary and Rationale

This unit develops the idea that by taking advantage of the properties of materials, we can solve many problems in our lives. Students will develop an appreciation for the manmade materials of everyday objects, and learn to recognize that those materials are chosen based on their properties. Through hands-on investigation, students will explore the material properties involved in meeting basic needs (such as clothing and cooking). They'll consider the solid and liquid states of matter to understand why plastic was invented. The unit ends with a brainstorming activity about futuristic inventions that might be possible using new materials.

Recommended Pacing

5-10 weeks	
Standards	
2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
2-PS1-2	Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.
2-PS1-3	Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
2-PS1-4	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
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.
Interdisciplinary Connections	
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.
RI.2.3	Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
RI.2.8	Describe how reasons support specific points the author makes in a text.
W.2.1	Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section.
W.2.7	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).
W.2.8	Recall information from experiences or gather information from provided sources to answer a question.
MP.2	Reason abstractly and quantitatively.
MP.4	Model with mathematics.
MP.5	Use appropriate tools strategically.

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.
Integration of Technology	
8.1.2.A.1	Identify the basic features of a digital device and explain its purpose.
8.1.2.A.4	Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
Career Readiness, Life Literacies and Key Skills	
9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
9.4.2.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.IML.3	Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).

Objectives (SLO)

Students will know: Materials have a set of unique properties that determine their use. Clothes are made of material, and we wear them to protect us. We choose clothing based on its properties. For example, if it was hot outside we would wear something light and opaque to protect us from the sun. One interesting property of materials is whether they are an insulator (a material that does not allow the movement of heat) or a conductor (a material that moves heat easily). If you know which property a material has, you can choose the best one for your purpose! Another property of materials is if they are meltable or not. If a material is meltable, it melts into a liquid when you heat it up! All meltable material melts at different temperatures. Some may melt in your hands, while others need fire. This property is useful because you can heat a substance, melt it, pour the	Students will be able to: Choose the best materials to serve a specific function. Differentiate between an insulator and a conductor. Understand that heat can change the shape of matter. Compare their predictions to the collected data. Use materials to solve real life problems. Explain how structure relates to function. Understand the relationship between a material's properties and its uses. Understand that properties of matter can change.

liquid into any mold, let it cool and harden again to make different shapes.
Over time, inventions of materials with new properties have helped solve problems. New materials are constantly being invented and made into products that could be available in the future. Building materials--like wood, concrete, and steel--all share an important property, strength. They are easy to build with because you can combine many small pieces and make a bigger structure. But those aren't the only materials you can use to build! Paper doesn't seem like it has the right properties for building--it's flexible and isn't strong. Surprisingly, you can change the properties of paper to make it stronger and a better building material.

Suggested Resources/Technology Tools

https://www.sustainablejerseyschools.com/resources/resource-library/climate-change-curriculum/
https://mysteryscience.com/secrets/plant-animal-needs/activity-prep
Mystery 1
Mystery 2
Mystery 3
Mystery 6
https://www.teachengineering.org/lessons/view/duk_sunflower_mary_less
https://jr.brainpop.com/
Epic!
Plants Make Their Own Food
Living Things
Woodpeckers
Raccoons

Tier 1 Modifications and Accommodations

Including special education students, Multilingual Language Learners (MLLs), students at risk of school failure, gifted and talented students, and students with 504 plans;

Teachers can choose from any of the suggested modifications that follow based upon teaching style, instructional method and needs of individual students.

General Modifications for students struggling to learn -

- Focus on building relationships in the classroom.
- Control the stressors for the student and manage alternate pathways for completion of assignments.
- Provide feedback utilizing a growth mindset and praise what is done correctly based upon effort, attitude and strategy.
- Boost engagement with material by providing opportunities of differentiation, group work and alternative assignments/assessments where appropriate.

MLL -

- Provide additional wait time for student responses to questions to allow students the ability to undergo the process of translation between languages, composition of response and attempted response.
- Simplification of sentence structure and repetition of questions/sentences exactly as stated before trying to rephrase to allow MLL students to hear the sentence and try to comprehend it.

- Rephrase idioms and teach their meanings as when learning a new language, translations are often very literal. IE "Take a stab at it." Ensure students understand what is meant.
- Use directed reading activities. Ensure preview of text before assigned/read, provide pre-reading questions about the main idea and offer help utilizing key words.
- Allow the use of Google Translate where appropriate.
- Utilize bilingual reading texts provided by the STC program.

Gifted and Talented -
Utilize differentiation in the areas of acceleration, enrichment, and grouping. Examples include, but are not limited to:

- interdisciplinary and problem-based assignments with planned scope and sequence
- advance, accelerated, or compacted content
- abstract and advanced higher-level thinking
- allowance for individual student interests
- assignments geared to development in areas of affect, creativity, cognition, and research skills
- complex, in-depth assignments
- diverse enrichment that broadens learning
- variety in types of resources
- internships, mentorships and independent study where applicable

504/IEP -
Modifications and accommodations must be aligned to stated plan and uphold expectations of the plan lawfully. Every student requires a different set of accommodations based upon need. Examples specific to science practice include, but are not limited to:

- Note taker or lab assistant
- Group lab assignments
- Use of scribe
- Adjustable tables and lab equipment within reach
- Classrooms, labs and field trips in accessible locations
- Additional time and separate room for test taking
- Additional time for in-class assignments
- Additional time in lab
- Visual and tactile instructional demonstrations
- Computer with voice output, spelling and grammar checker
- Seating in the front of the class
- Tactile drawings and graphs, and three-dimensional models
- Assignments in electronic format
- Large-print handouts, lab signs and equipment labels
- TV monitor connected to microscope to enlarge images
- Computer equipped to enlarge screen characters and images
- Auditory lab warning signals
- Adaptive lab equipment (talking calculators, talking thermometers, light probes, tactile timers)
- Staples on sticks to indicate units of measurement
- Visual warning system for lab emergencies

Career Readiness, Life Literacies, and Key Skills NJSLS

Please select all standards that apply to this unit of study:

- ❑ Act as a responsible and contributing citizen and employee.
- ❑ Apply appropriate academic and technical skills.
- ❑ Attend to personal health and financial well being.
- ❑ Communicate clearly and effectively and with reason.
- ❑ Consider the environmental social and economic impacts of decisions.

- ❑ Demonstrate creativity and innovation.
- ❑ Employ valid and reliable research strategies.
- ❑ Utilize critical thinking to make sense of problems and persevere in solving them.
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- ❑ Use technology to enhance productivity.
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LINKS TO CAREERS:
https://kids.britannica.com/kids/article/chemistry/352943

Unit 3	
Work of Water	
Summary and Rationale	
This unit helps students develop the idea that water is a powerful force that reshapes the earth's surface. Students see that water isn't just something we drink. It carries sand to create beaches, carves out canyons and valleys and, as ice, scrapes entire areas flat.	
Recommended Pacing	
4-8 weeks	
Standards	
2-ESS1-1	Use information from several sources to provide evidence that Earth events can occur quickly or slowly.
2-ESS2-1	Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.
2-ESS2-2	Develop a model to represent the shapes and kinds of land and bodies of water in an area.
2-ESS2-3	Obtain information to identify where water is found on Earth and that it can be solid or liquid.
K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

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.
Interdisciplinary Connections	
RI.K.1	With prompting and support, ask and answer questions about key details in a text. (K-ESS3-2)
W.K.2	Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS3-3)
SL.K.3	Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-ESS3-2)
SL.K.5	Add drawings or other visual displays to descriptions as desired to provide additional detail. (K-ESS3-1)
MP.2	Reason abstractly and quantitatively. (K-ESS3-1)
MP.4	Model with mathematics. (K-ESS3-1),(K-ESS3-2)
K.CC	Counting and Cardinality (K-ESS3-1),(K-ESS3-2)
Integration of Technology	
8.1.2.A.1	Identify the basic features of a digital device and explain its purpose.
8.1.2.A.4	Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
Career Readiness, Life Literacies and Key Skills	
9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
9.4.2.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.IML.3	Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).
Objectives (SLO)	

Students will know: Rivers are bodies of water that are moving! When we look at a map of the earth's surface, we see that big rivers empty into the ocean. Earth's surface looks flat on a map, but we know that it is actually quite hilly. If we looked at a map with texture we'd see that rivers begin at points of high land, flow to points of low land and then into the ocean. In the last Mystery, we explored how rivers flow from high points of the earth's surface to low points and into the ocean. Oceans are usually next to sandy beaches - but how did all of that sand get there? As the rivers flow toward the ocean, rocks collide into one another causing them to break into smaller pieces. By the time those rocks reach the end of the river, they are tiny rocks - or sand! Water is incredibly powerful - even powerful enough to move the earth's surface! Heavy rains wash away dirt and rocks, creating canyons - this process is called erosion. Most canyons have rivers flowing from them, and as time passes the water continues to carry away dirt, rocks, and sand. Because of this, canyons continue to grow deeper and wider over time. Landslides - when the earth loosens and is washed away down a hill - is more likely to happen after a wildfire! The fire burns the plants, which soak up rainwater and stabilize the soil with their roots. After a heavy rain, the water loosens the soil and washes the soil away, causing a landslide. Landslides pose many dangers for people!	Students will be able to: Identify patterns about where rivers start and end on the Earth's surface. Explain the cause and effect between rocks tumbling and the creation of sand. Understand that the Earth's surface changes due to erosion. Explain the cause and effect between heavy rain and the creation of canyons. Design a solution that lessens the impact of landslides.

Suggested Resources/Technology Tools

https://www.sustainablejerseyschools.com/resources/resource-library/climate-change-curriculum/
https://mysteryscience.com/secrets/plant-animal-needs/activity-prep
Mystery 1
Mystery 2
Mystery 3
Mystery 6
https://www.teachengineering.org/lessons/view/duk_sunflower_mary_less
https://jr.brainpop.com/
Epic!
Plants Make Their Own Food
Living Things
Woodpeckers
Raccoons

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MLL -

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- Rephrase idioms and teach their meanings as when learning a new language, translations are often very literal. IE "Take a stab at it." Ensure students understand what is meant.
- Use directed reading activities. Ensure preview of text before assigned/read, provide pre-reading questions about the main idea and offer help utilizing key words.
- Allow the use of Google Translate where appropriate.
- Utilize bilingual reading texts provided by the STC program.

Gifted and Talented -

Utilize differentiation in the areas of acceleration, enrichment, and grouping. Examples include, but are not limited to:

- interdisciplinary and problem-based assignments with planned scope and sequence
- advance, accelerated, or compacted content
- abstract and advanced higher-level thinking
- allowance for individual student interests
- assignments geared to development in areas of affect, creativity, cognition, and research skills
- complex, in-depth assignments
- diverse enrichment that broadens learning
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- Group lab assignments
- Use of scribe
- Adjustable tables and lab equipment within reach
- Classrooms, labs and field trips in accessible locations
- Additional time and separate room for test taking
- Additional time for in-class assignments
- Additional time in lab
- Visual and tactile instructional demonstrations
- Computer with voice output, spelling and grammar checker
- Seating in the front of the class
- Tactile drawings and graphs, and three-dimensional models
- Assignments in electronic format
- Large-print handouts, lab signs and equipment labels

- TV monitor connected to microscope to enlarge images
- Computer equipped to enlarge screen characters and images
- Auditory lab warning signals
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- Visual warning system for lab emergencies

Career Readiness, Life Literacies, and Key Skills NJSLS

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- ❑ Apply appropriate academic and technical skills.
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- ❑ Demonstrate creativity and innovation.
- ❑ Employ valid and reliable research strategies.
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- ❑ Use technology to enhance productivity.
- ❑ Work productively in teams while using cultural global competence.

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LINKS TO CAREERS:
https://kidskonnect.com/science/oceanography/

Unit 4

Plant Adventures

Summary and Rationale

This unit develops the idea that plants are truly alive and face challenges every bit as dramatic as those of animals. Students will learn that plants have needs, and will reason from evidence to understand how plants meet their needs.

Recommended Pacing

5-10 weeks

Standards	
2-LS2-1	Plan and conduct an investigation to determine if plants need sunlight and water to grow.
2-LS2-2.	Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants
2-LS4-1	Make observations of plants and animals to compare the diversity of life in different habitats.
Interdisciplinary Connections	
W.2.7	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).
W.2.8	Recall information from experiences or gather information from provided sources to answer a question.
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.
MP.2	Reason abstractly and quantitatively. (2-LS2-1) MP.4 Model with mathematics.
MP.5	Use appropriate tools strategically.
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.
Integration of Technology	
8.1.2.A.1	Identify the basic features of a digital device and explain its purpose.
8.1.2.A.4	Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).

Instructional Focus	
Enduring Understandings:	**Essential Questions:**
Students will understand that seeds must disperse in order to survive. Students will articulate that plants have structures that help them survive in their environment. Students will demonstrate knowledge that plants have specific needs to survive (water and minerals).	How do seeds disperse? How does the structure of plants helps them get water, minerals, and sunlight? How do plants survive in different environments?

Students will understand that different plants have specific needs to survive.	

Evidence of Learning (Assessments)

https://mysteryscience.com/plants/plant-adaptations/assessments

Pre-Assessment
Entrance/Exit Tickets
Formal quiz/test assessments
Inquiries/Labs

Objectives (SLO)

Students will know:	Students will be able to:
Many plants start as seeds! There are a lot of different types of seeds, all with unique shapes. In order for more plants to grow, seeds need to move away from the parent plant and grow into a new plant. Plants depend on wind, water, and animals to disperse their seeds. When a seed is in dirt, the first thing to grow are its roots. The plant actually doesn't need the dirt to grow but it does need the water and minerals often found in the dirt. Roots carry these nutrients from the environment to the plant. As long as plants are getting minerals, water, and sunlight, they can grow! There are many types of plants living in different habitats that get their minerals in unique ways. We've learned that plants need water and minerals to survive, but they also need light! It's possible to watch plants grow toward light following the sun throughout the day. The leaves of a plant soak up the sun and deliver it to the rest of the plant. Trees compete for sunlight, so their leaves are at the top of the tree and they grow as tall as possible. All plants need sunlight and water to survive, but they don't need the same amount of them. There are plants that like shade, and live on the forest floor. There are even plants that need small amounts of water and can survive in the hot and dry desert.	Investigate how the structure of a seed helps it disperse (function). Explain how the structure of plants helps them get the water and minerals they need to survive. Articulate the sun's impact on plant growth. Predict growth patterns of plants. Analyze the role of the leaves (structure) in helping the plant capture sunlight (function). Compare their predictions to results. Determine the best habitat for a plant based on its needs.

Suggested Resources/Technology Tools

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Mystery 2
Mystery 3
Mystery 6
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Gifted and Talented -

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- ❑ Employ valid and reliable research strategies.
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LINKS TO CAREERS:
http://encyclopedia.kids.net.au/page/ag/Agriculture