Science Department
Grade 5 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: Web of Life (6-12 weeks) *Climate Change Connection	Unit 2: Watery Planet (4-8 weeks) *Climate Change Connection	Unit 3: Spaceship Earth (8-16 weeks) *Climate Change Connection	Unit 4: Chemical Magic (5-10 weeks)
Mystery 1: Why would a hawk move to New York City? ***(5-LS2-1)***	Mystery 1: How much water is in the world? (***5-ESS2-2)***	Mystery 1: Why does the sun rise and set? (***5-ESS1-2)***	Mystery 1: Are magic potions real? (***5-PS1-1, 5-PS1-2)***
Mystery 2: What do plants eat? ***(5-LS1-1, 5-LS2-1)***	Mystery 2: When you turn on the faucet, where does the water come from? ***(5-ESS2-2 and 5-ESS3-1)***	Mystery 2: Who set the first clock? (***5-ESS1-2)***	Mystery 2: Could you transform something worthless into gold? (***5-PS1-1, 5-PS1-2)***
Mystery 3: Where do fallen leaves go? ***(5-LS2-1)***	Mystery 3: Can we make it rain? ***(5-ESS2-1)***	Mystery 3: How can the sun tell you the season? (***5-ESS1-2)***	Mystery 3: What would happen if you drank a glass of acid? (***5-PS1-3)***
Mystery 4: Do worms really eat dirt? ***(5-LS2-1, 5-LS1-1)***	Mystery 4: How can you save a town from a hurricane? ***(5-ESS2-1, 3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3)***	Mystery 4: Why do the stars change with the seasons? (***5-ESS1-2)***	Mystery 4: What do fireworks, rubber, and silly putty have in common? (***5-PS1-4)***
Mystery 5: Why do you have to clean a fish tank but not a pond? ***(5-LS2-1)***		Mystery 5: Why does the moon change shape? (***5-ESS1-2)***	Mystery 5: Why do some things explode? (***5-PS1-1)***
Mystery 6: Why did the dinosaurs go extinct? ***(5-PS3-1)***		Mystery 6: What are the wandering stars? (***5-ESS1-2)***	
		Mystery 7: Why is gravity different on other planets? (***5-PS2-1)***	
		Mystery 8: Could there be life on other planets? (***5-ESS1-1)***	

Web of Life (6-12 weeks)

Ecosystems and the Food Web

Profound Perspective: The food materials and energy that our bodies use for growth ultimately come from plants. Plants in turn derive their materials from air, water, and soil and their energy from the sun. Thus in a very real way, our bodies come from the earth and the sun. And when we die, decomposers return our materials and energy to the earth, to be used again by future organisms. The whole of nature forms a great system--the ecosystem.

Climate Change Connection: Grade-level appropriate discussion of how climate change impacts the web of life. Best focus is in Mystery 1, speaking in terms of food chains and migration of animals; specifically, how climate change impacts those things. Questioning Example: How would animals respond if climate change destroyed or changed their needed habitat? What are their options? How does this affect the other animals and plants in that ecosystem?

Grade 5 Life Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 1 Why would a hawk move to New York City?	5-LS2-1	Food Chains, Predators, Herbivores & Carnivores	Animals are all around us--even in cities. We can learn to spot them by bearing in mind of one of the most basic relationships that all animals have with each other: some of them are predators and others are prey. (Where there are prey, there are predators, and vice versa.) **DCIs: LS2.A, Foundational for LS1.C**	Students **construct models** of different food chains by linking cards representing different organisms. The chains are used to explain the relationship between predators and prey. Students **argue using evidence and reasoning** about which organisms can be linked together and in what order.	This Mystery begins to lay the foundation for thinking about **systems and energy/matter flow.** By constructing chains of relationships between organisms, students are exposed to an example of a system. Food chains set students up for considering energy & matter flow in future Mysteries in this unit.
Mystery 2 What do plants eat?	5-LS1-1 5-LS2-1	Matter Cycle, Food Chain	Because predators depend on prey, all animals ultimately depend on plants--even carnivores that do not eat plants. Plants in turn derive their growth material primarily from water and air. **DCIs: LS1.C, Foundational for LS2.B**	Students **plan an investigation** to determine whether or not air has weight. As a whole class, students **conduct an investigation** to compare the weights of balloons with and without air. Students **analyze and interpret data** from the investigation to **explain** what happened and how the evidence may **explain** how plants gain weight.	Students observe that deflating a balloon **causes** the balloon to weigh less, leading to the conclusion that air has weight. This Mystery also lays the foundation for an understanding of **conservation of matter** by considering how plants gain weight as they grow due to the air they absorb.
Mystery 3 Where do fallen leaves go?	5-LS2-1	Decomposers & Matter Cycle	Decomposers are yet another category of living thing, which consume dead plant and animal material and produce soil. Fungi--of which mushrooms and mold are types--is a conspicuous decomposer found everywhere, even in your home. **DCIs: LS2.A, Foundational for LS2.B**	Students **ask questions** about what conditions they think will induce and prevent the growth of mold. Students **plan and conduct an investigation** to test different conditions. Students **analyze and interpret data** that they record from their experiments to **explain** how different conditions impact mold growth.	Students observe **patterns i**n the rates of **change** in the mold terrariums. They note similarities and differences to analyze how mold grows on different foods under different conditions.

Grade 5 Life Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 4 Do worms really eat dirt?	5-LS2-1 5-LS1-1	Decomposers, Nutrients, & Matter Cycle	Earthworms aren't pests, they are decomposers! They eat dead and decaying matter, bacteria, and animal waste that is in soil. Worm castings (their excretions) release the nutrients from their food back into the soil. In addition to water and carbon dioxide from the air, plants need these nutrients to grow. Worms help gardens, not hurt them. **DCIs: LS2.A, LS2.B, *Supplementary* LS1.C**	Students observe worm behavior to help them determine a worm's role in a garden. Then, they **conduct an investigation** to test if worms prefer damp or dry places. They **create an argument** using the investigations results as **evidence** to support a claim about the worm's preferences. Lastly, students **plan and carry out an investigation** to answer a question they have about worms.	Students recognize that earthworms are part of a **system,** a food chain, with other organisms. Earthworms help **matter** flow back into the food chain.
Mystery 5 Why do you have to clean a fish tank	5-LS2-1	Ecosystems & Matter Cycle	All living things in an ecosystem depend on one another. In a pond, fish depend on plants as food and as a source of oxygen. Decomposers break down dead plant and animal matter, releasing micronutrients into the	Students **develop a model** to show the flow of energy and matter within an ecosystem. Then, students **develop a model** of a pond ecosystem. They add different living things to the pond, considering what each organism	Students recognize the living organisms in a habitat as a **system**, an ecosystem. If one organism were to disappear, the whole ecosystem would break down.

but not a pond?			water. They also give off carbon dioxide. Plants take in carbon dioxide and give off oxygen. If one part is removed, the ecosystem would not function. **DCIs: LS2.A, LS2.B**	needs to eat and how much carbon dioxide each organism adds or removes from the ecosystem.	
Mystery 6 Why did the dinosaurs go extinct?	5-PS3-1	Flow of Energy	It is believed that an asteroid impact *could* have caused the dinosaurs to go extinct. When the asteroid hit the earth it filled the sky with dust, ash and debris which blocked sunlight. Plants all over the world couldn't get the sun's energy they needed to grow. When plants died out, the herbivores would eventually die as well, followed by the carnivores. Ultimately, the asteroid collapsed the dinosaur's food web causing a mass extinction. **DCIs: PS3.D, LS1.C**	Students **develop a model** of a dinosaur food web to show how all animals get their energy. They use the model to help **construct an explanation** about how an asteroid killed all of the dinosaurs.	Students identify the sun as the ultimate source of **energy** in an ecosystem. The sun's energy is used by plants to grow and transferred through an ecosystem in the form of food.

Watery Planet (4-8 weeks)

Water Cycle, Resources, & Systems

Profound Perspective: This unit helps students develop the idea that water is a profoundly important natural resource, but one which requires surprising ingenuity to find and maintain.

Climate Change Connection: Grade-level appropriate discussion of water as a resource that is altered by climate change. Discussion most appropriate within Mysteries 1 and 2. Questioning Example: Water is essential to life for all living things. What happens to ecosystems, plants, animals, humans,etc. when that water is either over abundant or lessened to the point of being unavailable?

Grade 5 Earth Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 1 How much water is in the world?	5-ESS2-2	Water on Earth's Surface	Water is our most basic human need. Despite the fact that Earth is a watery planet, Earth's water is mostly salt water--a form not fit to drink. Easily accessible fresh water is a surprisingly small amount by comparison. Of that fresh water, much of it is frozen in glaciers and ice caps. **DCIs: ESS2.C**	Students **analyze and interpret data** from world maps to determine the relative amounts of fresh, salt and frozen water. Students **use mathematics and computational thinking** to calculate areas on a map and graph values to compare and graph quantities of fresh, salt and frozen water on Earth.	Students use standardized units of area to compare the **quantity** of fresh, salt and frozen water on Earth. Students use **proportional reasoning** to represent **quantities** in their graph comparing different types of water.
Mystery 2 When you turn on the faucet, where does the water come	5-ESS2-2 5-ESS3-1	Water as a Natural Resource	Most people get their drinking water from water that's located underground, where there turns out to be a surprisingly large amount within structures called "aquifers." People use science ideas about the location of aquifers to make decisions about where to build communities.	Students are asked to determine where is the best place to settle a new town by considering features of the landscape and what they know about where to find water. Students **obtain, evaluate and communicate** information from different sources about topography, plants and soil to inform their decision. Students **argue using evidence** to justify where their town	Students reason about information they get about natural patterns to determine where underground water is most likely to be found. These **patterns** involve correlations between elevation and water depth as well as how plant and soil **patterns** can give clues about where drinkable water may be found.

from?			**DCIs: ESS2.C, Foundational for ESS3.C & ESS2.A**	should be built.	
Mystery 3 Can we make it rain?	5-ESS2-1	Water Cycle	Evaporation of ocean water is the ultimate source of rain, and thus all our easily accessible fresh water. (All water on Earth's surface is part of an interconnected system, the hydrosphere.) **DCIs: Foundational for ESS2.A**	Students create a **model** of the ocean and sky (hydrosphere and atmosphere). Students use the model to **plan and carry out an investigation** to determine how temperature influences evaporation and condensation.	Students reason about how the hydrosphere and atmosphere **systems** interact to produce rain. Students model the systems to explain how rain is created.
Mystery 4 How can you save a town from a hurricane?	5-ESS2-1 3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	Natural Disasters & Engineering	Hurricanes start out as small storms over the ocean. As they move across the ocean, warm water evaporates into the storm cloud, making the hurricane grow bigger and bigger. Hurricanes bring tons of rain, flooding entire cities. Engineers design solutions to protect towns from extreme flooding. **DCIs: ESS2.A, ETS1.A, ETS1.B, ETS1.C**	Students **define the problem** that a town needs protection from flooding. They **obtain and communicate information** about different types of engineers and work as a team to design solutions using their different types of flood protection. Students use **mathematics and computational thinking** design a solution under budget.	Students reason about how the hydrosphere and atmosphere **systems** interact to produce hurricanes and extreme flooding. They also consider the impact of hurricanes on the biosphere and geosphere system.

Spaceship Earth (8-16 weeks)

Sun, Moon, Stars & Planets

Profound Perspective: This astronomy unit helps students develop a new perspective on the world they're standing on. They will be given evidence that the Earth beneath our feet is actually moving through space, both spinning on its axis, and traveling in a great orbit around the Sun. They will see how these movements account for the patterns we see in our sky (the paths of our Sun across the sky, the changing seasons, and the changing constellations). Accompanying us on this journey are the Moon and planets, which the students will observe have their own patterns of movement in the sky.

Grade 5 Space Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 1 Why does the Sun rise and set?	5-ESS1-2	Sun, Daily Patterns, Earth's Rotation	The Sun appears to move across the sky each day, creating an observable pattern. It rises in the morning, and sets in the evening. It is natural for us to assume that the Sun is moving--this is what we believed for most of human history. But to much surprise, scientists eventually figured out that this is not the case; it's actually the Earth that is spinning. There is no simple way to demonstrate this from the ground without using advanced knowledge of physics and math. But now that we've been to space and can film it, we have direct proof. **DCIs: ESS1.B**	Students **carry out an investigation** to explore the phenomena of the Sun appearing to move across the sky. They investigate **using two models,** one of the Sun rotating around the Earth and another of the Earth rotating around the Sun. Students create an **argument using the evidence** they gathered in the investigation to explain why the Sun rises and sets.	Students observe the **pattern** of the rising and setting Sun. In this Mystery, they notice the similar **patterns** between two different models. They recognize that the sun moving across the sky is a **pattern** that can be explained by either model. With additional data, students come to understand which model is accurate.
Mystery 2 Who set the first	5-ESS1-2	Sun, Daily Patterns, Earth's Rotation	A long time ago, our ancestors divided the day into 24 hours. Clocks measure the Sun's apparent	Students create a shadow clock, to observe how shadows change throughout the day.	Students observe **patterns** in the **change** of shadow length and position throughout the

clock?			movement. But before clocks existed, the change in shadows helped us measure the Sun's movement. The sun's position causes the length and direction of an object's shadow. Since the Sun moves across the sky each day in a pattern, shadow clocks (sundials) can be used to tell the time of day. **DCIs: ESS1.B**	Students **carry out an investigation** to determine how the position of the sun changes the direction of the shadow at different times of day. Then, they go outside and **interpret data** from their shadow clock to determine what time of day it is.	day. They use shadow **patterns** to determine what time of day it is, without the use of a clock.
Mystery 3 How can the Sun tell you the season?	5-ESS1-2	Sun, Earth's Orbit, Annual Patterns	The sun's path changes with the seasons. Summer days are longer and warmer, because the Sun follows a higher path across the sky. Winter days are shorter and colder, because the Sun follows a low path across the sky. In the summer, shadows are shorter because the Sun is high. In the winter, they are longer because the Sun is low. **DCIs: ESS1.B**	Students **analyze and interpret data** from photographs taken during different seasons and times of day, to determine how the sun's path affects Earth's surface. Students use **evidence** from the photos-- such as weather, shadow length, and sunrise/sunset time-- to **construct an argument** as to which season it is.	Students observe the **pattern** of seasons **caused** by the sun's path. The unique characteristics of each season are **caused** by the sun's position in the sky. Each season repeats each year.

Spaceship Earth (8-16 weeks)

Sun, Moon, Stars & Planets
(continued)

Grade 5 Space Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 4 Why do the stars change with the seasons?	5-ESS1-2	Stars & Constellations, Earth's Orbit, Annual Patterns	The night sky is full of stars that are grouped into constellations. The stars are seasonal, which means we only see certain stars depending on the season. As the Earth orbits around the sun, its position in the universe changes and we see different parts of the night sky. The seasonal patterns of the constellations repeat each year. **DCIs: ESS1.B**	Students **develop a model** of the universe, in order to **construct an explanation** for why we see different stars during different seasons. Using **evidence** from their **model**, students make an **argument** that supports the claim that the Earth orbits around the sun.	Students observe the seasonal **pattern** of stars. They note the **change** of constellations that are visible in the night sky, based on the season. This pattern is used as evidence to argue that Earth is orbiting the Sun, and we only see a part of the night sky at a time.
Mystery 5 How does the Moon change shape?	5-ESS1-2	Moon, Moon's Orbit, Lunar Cycle	If you look up at the night sky and see the Moon, then do it again a week later- it will be a different shape! But the Moon isn't actually changing shape, it's always a sphere. The Moon orbits Earth. When the sun is shining on the side of the Moon that faces Earth, it's a bright, round, full moon. When the sun is shining on the side of the Moon that faces away from Earth, the Moon looks dark--it's a new moon. The Moon's phases are a pattern that go in a very certain order. Just like other sky patterns we've learned about, the cycle of the Moon is used to measure time. A full cycle takes about 28 days, or about a month, to repeat! **DCIs: ESS1.B**	Students **develop a model** of the sun and moon to **carry out an investigation** of the Moon's orbit and the different moon phases. Through this investigation, they **obtain information** about how the Moon goes through each phase. Then, they **communicate this information** by constructing an explanation about what causes the Moon's phases for someone who doesn't already know.	Students consider the phases of the Moon as a **pattern**. They learn that the orbit of the Moon around Earth **causes** each different phase. The phases repeat in the same order every 14 days, and then reverse in the same order for another 14 days. The total orbit of the Moon around the Earth takes 28 days, and then the **pattern** repeats.

Mystery 6 What are the wandering stars?	5-ESS1-2	Planets & Solar System	We've already learned that the sky is full of stars. If you look closely, some of those stars appear to be wandering-or moving- across the night sky! The ancient Greeks gave these wandering stars a special name, "planetes." Look familiar? That's right-these wandering stars are actually planets. We'll take a tour through the solar system and learn about some interesting discoveries of each planet.	Students **use a model** of the solar system to learn the order of the planets and their relative distance from the sun, and each other. Using sidewalk chalk, they draw the sun and the planets at their relative distances from one another. Then, they play "Running to Neptune," where they run to different planets in the model in order to help them learn their order in the solar system.	Students use a **system model** of the solar system to understand the parts (the planets and sun) that make up the whole (the solar system). By creating a **scaled model**, they are able to observe an immensely large system of natural objects. They learn that by creating **scaled models**, people can interact with **systems** they wouldn't otherwise be able to.

Grade 5 Space Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 7 Why is gravity different on other planets?	5-PS2-1	Gravity	When we walk on the Earth, we know gravity is the invisible force that pulls us down. Humans have also walked on the Moon so we know the Moon has gravity too. But the Moon has less gravity than the Earth. Gravity is a property of every planet and moon in our Solar System. Students discover that the amount of gravity depends on how massive a planet is. Unlike magnetism, gravity is a force that pulls on all objects. It always pulls them "down", meaning towards the center of the planet. **DCIs: PS2.B**	Students **use mathematics and computational thinking** to calculate how high they could jump on planets and moons in our Solar System. They **analyze and interpret this data** to construct an explanation for why the amount of gravity is different on other planets.	Students observe the **pattern** that the more massive a planet is, the more gravity it has. Students figure out that the amount of gravity a planet has (**cause**) will impact the height that they are able to jump (**effect**).
Mystery 8 Could there be life on other planets?	5-ESS1-1	Star Brightness & Habitable Planets	Earth is the only planet in our Solar System in the "Goldilocks Zone" -- a distance from the Sun with the right amount of light and heat for life to exist. But we have discovered thousands of exoplanets - planets outside our Solar System. These exoplanets, and the stars they orbit, range greatly in their distances from Earth. Could any of these exoplanets be in the "Goldilocks Zone"? Students evaluate star brightness, temperature, and distance from our Solar System to plan an exoplanet space mission. As they imagine looking back at Earth from the surface of the exoplanet, they will come to realize that our Sun only appears larger and brighter than other stars because it is so close to Earth. **DCIs: ESS1.A**	Students **obtain, evaluate, and communicate** information about temperature and light conditions that a planet must have for humans to survive. Students then **use this evidence to engage in an argument** and justify their choice for an exoplanet space mission. Students consider what our Sun looks like when viewed from the surface of the far-away exoplanet.	Students consider how the conditions of the Sun and planets in our Solar System can be extended to learn about other similar, but separate **systems** (other solar systems). Through this, students start to build an understanding of the **scale** of our Solar System and beyond.

Chemical Magic (5-10 weeks)

Chemical Reactions & Properties of Matter

Profound Perspective: This unit helps students develop the concepts of "substances" and "chemical reactions." Students see that chemical reactions enable us to make new materials by transforming the ones we have. The results of these reactions are interesting and

sometimes profoundly useful.

Grade 5 Life Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 1 Are magic potions real?	5-PS1-1 5-PS1-2	Introduction to Chemistry	The alchemists were a historic group of people who experimented with mixing different substances together to make a potion. They wondered if their potions could transform materials. **DCIs: *Foundational PS1.A and PS1.B***	Students **plan and carry out an investigation** to see which solution will turn a dull penny into a shiny penny. Students **develop a conceptual model** in order to **construct an explanation** for their test results. They revise their conceptual **model** as they develop a more sophisticated understanding of particles.	Students observe the **effect** of solutions on a dull penny. Students explore that substances undergo **change**.
Mystery 2 Could you transform something worthless into gold?	5-PS1-1 5-PS1-2	Particulate Nature of Matter	The alchemists were on a quest to transform ordinary metal into gold, so that they could become rich. To do this, the alchemists observed and investigated the many materials around them--the substances which things are made of. They discovered that substances are able to change form, and that some substances may even *appear* to vanish, almost like magic. **DCIs: *Foundational PS1.A and PS1.B***	Students **carry out an investigation** to determine what happens when they place a steel object in the same solution that turned their pennies shiny in Mystery 1. Students **construct an explanation** by **developing a conceptual model** to show how the solution affects the steel nail.	This Mystery lays the foundation for an understanding of **conservation of matter** by considering that the copper from the penny did not disappear, but only dissolved into the solution. Students consider the variety of **scale** within natural objects. They understand that there are extremely small, to small to see, copper particles dissolved in their solution.
Mystery 3 What would happen if you drank a glass of acid?	5-PS1-3	Acids, Reactions & Properties of Matter	The alchemists discovered acids--a set of substances that is extremely *reactive* (undergoes chemical changes easily). A chemical *reaction* happens when different substances are mixed and it causes some kind of change. We can tell a chemical change is happening by observing indications such as fizzing, a color change, or dissolving. **DCIs: PS1.A**	Students **conduct an investigation** to discover if a reaction occurs when mixing two substances. **Analyzing the data**, students determine which substances react with acid. Next, students decide how to test unknown liquids to see if they are acids.	Students consider the **cause and effect** relationship when combining chemicals to produce reactions. Students consider that combining two chemicals may result in a **change** in the substance.

Chemical Magic (5-10 weeks)
Chemical Reactions & Properties of Matter
(continued)

Grade 5 Physical Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)

Mystery 4 What do fireworks, rubber, and silly putty have in common?	5-PS1-4	Chemical Reactions	The alchemists were not successful in finding an easy way to make gold, but all of their observations and experimenting with substances turned out to be hugely important. For example, when acids react with other substances, they form entirely new substances. The new substance will have different properties from the original substances. Some of these properties are useful. Chemical reactions are how we get new substances and discover new properties! **DCIs: PS1.B**	Students **conduct an investigation** to see which chemicals, when combined, result in a chemical reaction. They **construct an explanation** to share which chemicals reacted and formed a new substance with a goo consistency. In Part 2 of the activity, students make their own goo by mixing the two chemicals which formed a goo-like substance in Part 1.	Students consider the **cause and effect** relationship between chemicals that are combined to form new substances. Students consider that combining two chemicals may result in a **change** when a substance with unique properties is created.
Mystery 5 Why do some things explode?	5-PS1-1	Gases & Particulate Nature of Matter	Not all explosions are big and fiery, they can be small too! The alchemists were the first to discover these small explosions. They noticed small bubbles forming when some substances and objects were placed in an acid. The substance, gas, was hard to capture--it would escape the container, or make it burst. Gases can be visible or invisible and are made up of many tiny particles that you can't see. All explosions are caused by a buildup of gas moving outward that bursts the container they are in. **DCIs: PS1.A**	Students **conduct an investigation** to see what happens when baking soda and vinegar react inside a closed ziplock bag. They **develop a particle model** to explain their results--that gas particles are created and move outward, causing the ziplock bag to expand or even burst.	Students consider that combining two chemicals may result in a **change** when a substance with unique properties is created. Students understand that particles are very small, to small to see, compared to other natural objects.

Unit 1

Web of Life

Summary and Rationale

The food materials and energy that our bodies use for growth ultimately come from plants. Plants in turn derive their materials from air, water, and soil and their energy from the sun. Thus in a very real way, our bodies come from the earth and the sun. And when we die, decomposers return our materials and energy to the earth, to be used again by future organisms. The whole of nature forms a great system--the ecosystem.

Recommended Pacing

6-8 weeks

Standards	
5-LS1-1	Support an argument that plants get the materials they need for growth chiefly from air and water
5-LS2-1	Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment
5-PS3-1	Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.
Interdisciplinary Connections	
RI.5.1	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
RI.5.9	Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-LS1-1)
W.5.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
MP.2	Reason abstractly and quantitatively.
MP.4	Model with mathematics.
MP.5	Use appropriate tools strategically.
5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
Integration of Technology	
8.1	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	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.

Career Readiness, Life Literacies and Key Skills	
9.1.5.CR.1	Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
9.4.5.CI.2	Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7).
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
9.4.5.CT.2	Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
9.4.5.CT.3	Describe how digital tools and technology may be used to solve problems.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.Civics CM.3).

Suggested Resources/Technology Tools

sustainablejerseyschools.com/resources/resource-library/climate-change-curriculum/
www.mysteryscience.com
https://www.natgeokids.com/za/category/discover/science/
https://www.ducksters.com/science/
https://www.getepic.com/app/sign-in

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.

G/T

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

21ST CENTURY LIFE AND CAREER STANDARDS

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 economics 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://www.botany.org/bsa/careers/
https://www.seedyourfuture.org/careers

Unit 2

Watery Planet

Summary and Rationale

This unit helps students develop the idea that water is a profoundly important natural resource, but one which requires surprising ingenuity to find and maintain.

Recommended Pacing

4-8 weeks

Standards

3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
5-ESS2-1	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

5-ESS2-2	Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.
5-ESS3-1	Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
Interdisciplinary Connections	
RI.5.1	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
RI.5.9	Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeable.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
MP.2	Reason abstractly and quantitatively.
MP.4	Model with mathematics.
2.1.5.CHSS.2	Describe how business, non-profit organizations, and individuals can work cooperatively to address health problems that are affected by global issues, including climate change.
Integration of Technology	
8.1	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	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.
Career Readiness, Life Literacies and Key Skills	
9.1.5.CR.1	Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
9.4.5.CI.2	Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7).

9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
9.4.5.CT.2	Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
9.4.5.CT.3	Describe how digital tools and technology may be used to solve problems.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.Civics CM.3).

Tier 1 Modifications and Accommodations

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- 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.

G/T

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

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- 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

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- Group lab assignments
- Use of scribe
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- 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
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- Computer equipped to enlarge screen characters and images
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- 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 economics 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://www.thebalancecareers.com/hydrologist-525671

Unit 3

Spaceship Earth

Summary and Rationale

This astronomy unit helps students develop a new perspective on the world they're standing on. They will be given evidence that the Earth beneath our feet is actually moving through space, both spinning on its axis, and traveling in a great orbit around the Sun. They will see how these movements account for the patterns we see in our sky (the paths of our Sun across the sky, the changing seasons, and the changing constellations). Accompanying us on this journey are the Moon and planets, which the students will observe have their own patterns of movement in the sky.

Recommended Pacing

8-16 weeks

Standards

5-ESS1-1	Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.
5-ESS1-2	Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.
5-PS2-1	Support an argument that the gravitational force exerted by Earth on objects is directed down

Interdisciplinary Connections

RI.5.1	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
RI.5.8	Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).
RI.5.9	Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.
W.5.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or the

MP.2	Reason abstractly and quantitatively.
MP.4	Model with mathematics.
5.NBT.A.1	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
Integration of Technology	
8.1	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	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.
Career Readiness, Life Literacies and Key Skills	
9.1.5.CR.1	Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
9.4.5.CI.2	Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7).
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
9.4.5.CT.2	Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
9.4.5.CT.3	Describe how digital tools and technology may be used to solve problems.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.Civics CM.3).

Suggested Resources/Technology Tools

www.mysteryscience.com
https://www.natgeokids.com/za/category/discover/science/
https://www.ducksters.com/science/
https://www.getepic.com/app/sign-in

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;

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- 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.

G/T

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
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504/IEP

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- 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
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- Adaptive lab equipment (talking calculators, talking thermometers, light probes, tactile timers)
- Staples on sticks to indicate units of measurement
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Career Readiness, Life Literacies, and Key Skills NJSLS

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

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- ❑ 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://www.fit.edu/your-college-decision/careers-in-space-science/
www.nasa.gov

Unit 4

Chemical Magic

Summary and Rationale

This unit helps students develop the concepts of “substances” and “chemical reactions.” Students see that chemical reactions enable us to make new materials by transforming the ones we have. The results of these reactions are interesting and sometimes profoundly useful.

Recommended Pacing

5-10 weeks

Standards

5-PS1-1	Develop a model to describe that matter is made of particles too small to be seen.
5-PS1-2	Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.
5-PS1-3	Make observations and measurements to identify materials based on their properties.
5-PS1-4	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
Interdisciplinary Connections	
RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.7	Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
MP.2	Reason abstractly and quantitatively.
MP.4	Model with mathematics.
MP.5	Use appropriate tools strategically.
5.NBT.A.1	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of

	10. Use whole-number exponents to denote powers of 10.
5.NF.B.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
5.MD.C.3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
5.MD.C.4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
Technology Integration	
8.1	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	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.
Career Readiness, Life Literacies and Key Skills	
9.1.5.CR.1	Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
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9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
9.4.5.CT.2	Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
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Suggested Resources/Technology Tools

www.mysteryscience.com
https://www.natgeokids.com/za/category/discover/science/
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MLL

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G/T

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- Additional time in lab

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- ❑ 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://www.acs.org/content/acs/en/careers/college-to-career/chemistry-careers/chemical-engineering.html

http://www.ift.org/knowledge-center/learn-about-food-science.aspx