

MENDHAM TOWNSHIP SCHOOLS

SCIENCE CURRICULUM

Kindergarten

Revised: June 2021

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Mendham Township School District Science Curriculum

KDGN

Grade KDGN - Unit 1: Plant & Animal Secrets

Source - NJSLS Earth Systems/Earth and Human Activity/Molecules to Organisms

Stage 1 Unit Summary

This unit helps students develop the concept that animals and plants need things in order to survive, and their lives are all about meeting those needs... it's the secret to why they do the many strange and wonderful things that they do! Knowing how they meet their needs can even help students find plants and animals near them.

Crosscutting Concepts:

*Students study animal behaviors to identify the pattern that all animals have behaviors that include seeking out food to survive

*Students identify the pattern that all living things live where their needs are met. They recognize that plants, animals, and their surroundings make up a system as parts that work together.

*Students study animal behaviors to identify the pattern that all animals have the behavior seeking out safety to survive.

*Students begin to recognize that plants, animals, and their surroundings make up a system as parts that work together.

*Students study plant growth to identify the pattern that all plants need water. They also observe the pattern that plants lean towards the light.

This unit is based on K-LS1-1, K-ESS3-1, and K-ESS2-2.

Evidence Statements: [NJSLS Science Unit Standards](#): K-LS1-1, K-ESS3-1, K-ESS2-2

Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. *[Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.] (K-ESS2-2)*

Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live. *[Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.] (K-ESS3-1)*

Use observations to describe patterns of what plants and animals (including humans) need to survive. *[Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.] (K-LS1-1)*

Engineering Design K-2-ETS1:

- K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.

- K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

- K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Essential Question: *Where do plants and animals live and why do they live there?*

Interdisciplinary Connections:

English/Language Arts

W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-LS1-1)

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)

RI.K.1 With prompting and support, ask and answer questions about key details in a text. (K-ESS3-2)

Math

K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has “more of”/”less of” the attribute, and describe the difference. (K-LS1-1)

MP.2 Reason abstractly and quantitatively. (K-ESS3-1)

MP.4 Model with mathematics. (K-ESS3-1)

K.CC Counting and Cardinality (K-ESS3-1)

Stage 2-Assessment

Assessment:

Formative - observations, discussions, participation, performance-based tasks

Summative Assessment - written responses, written explanations, science notebooks, inquiry-Based Activities, portfolios

Benchmark Assessment - unit lesson assessments

Stage 3- Learning Plan

What it looks like in the classroom

Mystery Science- Plant & Animal Secrets Activities

Follow lessons in order and see Mystery Science Extension Activities for each lesson

Lesson 1 - Why do woodpeckers peck wood? Students obtain information through observations of different animal behaviors. They use evidence from their observations to argue for their explanation of why animals are acting in these ways. Students act out the behaviors of different animals. DCIs:LS1.C

Lesson 2 - Read Along - Where do Animals live? Students obtain information through media about how different animal homes are built. They communicate this information in order to identify patterns in the natural world. DCIs:ESS3.A

Lesson 3 - How can you find animals in the woods? Students obtain information through observations of different animal behaviors. They use evidence from their observations to argue for why animals are acting in these ways. Students act out the behaviors of different animals. DCIs: Extends LS1.C

Lesson 4 - Read-Along: How do animals make their home in the forest? Students take a nature walk to carry out an investigation exploring which types of animals live around them and what their homes are like. They analyze and interpret data by using their observations to describe the patterns they see. DCIs: ESS2.E

Lesson 5 - How do plants and trees grow? Students carry out an investigation to determine what plants need to grow. They grow radish seeds and make observations of their plants. Students analyze and interpret their observations of what the plants need, but also how they respond to light. DCIs: LS1.C

Lesson 5 Part 2 - How do plants and trees grow? Students carry out an investigation to determine what plants need to grow. They grow radish seeds and make observations of their plants. Students analyze and interpret their observations of what the plants need, but also how they respond to light. DCIs: LS1.C

More Sample of Open Education Resources:

[Read-Aloud Lesson: Where Do Polar Bears Live?](#) Students identify and recall characteristics that allow polar bears to survive in the extremely cold Arctic environment.

["Good Night" & Where Do Polar Bears Live?](#) This is a Paired Text activity that uses the "Where Do Polar Bears Live" read aloud and the non-fiction text "Good Night" which addresses hibernation.

[The Needs of Living Things](#) This lesson plan has one level for Grades K-2 and another level for Grades 3-5. Students will learn about what plants and animals need to survive and how habitats support those needs. They will also learn about how organisms can change their environment.

[Living Things and Their Needs:](#) This is an excellent resource that provides a Teacher Guide, videos, reading resources, and student activity sheets. The objective of the lessons is for students to learn about living organisms and what they need to survive. These lessons can easily be taught as an interdisciplinary set of learning experiences.

[How do living things Interact:](#) This unit plan is about unit plan about living things and environmental interactions

[5E Science Lesson Plan:](#) This Prezi presentation describes lesson ideas that support students' understanding of living organisms. Lessons also provide an opportunity for students to identify patterns that help them determine similarities and differences between plants and animals.

Connections to STEM/Makerspace

Build a bird feeder - Extension activity

Integrated accommodations and modifications for students with IEP's 504s, ELLs, and gifted and talented students:

(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: [All Standards, All Students/Case Studies for vignettes and explanations of the modifications.](#))

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tools such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understanding.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.

- Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)

List of Core Instructional and Supplemental Materials:

Mystery Science:

[Epic | The Leading Digital Library for Kids ...](#)

www.brainpopjr.com

www.pebblego.com

<https://www.youtube.com/watch?v=7oYTfNFvqO0> - video - Need of Living Things

https://bogglesworldesl.com/kids_worksheets/animalsneed.htm Animal Needs sheets & text

<http://exchange.smarttech.com/search.html?q=Animal%20Needs> Animal & Plant Needs Smart Exchange Activity

<https://www.youtube.com/watch?v=tzN299RpJHA> - Song - Jack Hartman about Living Things

<http://www.sciencekids.co.nz/gamesactivities/plantsanimals.html> - Plants and Animals - Living things - Game

<http://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf>

Games

<http://www.pbslearningmedia.org/resource/plum14.sci.life.feedingo/feed-the-dingo-an-ecosystem-game/>

<http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm>

Integration of 21st Century Skills and Life and Career Standard

CRP 1, 2, 4, 6, 8, 11

Integration of the Technology Standard

NJSLS.8.1

Grade K DGN Unit 2: Plant & Animal Secrets (Humans)

Source - NJSL Earth & Human Activity

Stage 1: Unit Summary

This unit helps students develop the concept that animals and plants need things in order to survive, and their lives are all about meeting those needs... it's the secret to why they do the many strange and wonderful things that they do! Knowing how they meet their needs can even help students find plants and animals near them.

Crosscutting Concept:

*Students consider the cause and effect relationship between the changes people make to their environment and the impact it has on other living things that share their habitat.

This unit is based on K-ESS3-3 and K-2 ETS1-1.

Evidence Statements: [NJSLA Science Unit Standards: K-ESS3-3, K-2 ETS1-1](#)

Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.* *[Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]* (K-ESS3-3)

K-2-ETS1: Engineering Design:

- K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.
- K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

English Language Arts

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)

Essential Question:

How do people impact the environment as they gather and use what they need to live and grow?

Stage 2-Assessment

Assessment:

Unit Sequence

Part A: *How can humans reduce their impact on the land, water, air, and other living things in the local environment?*

Concepts

- Events have causes that generate observable patterns.
- Things that people do to live comfortably can affect the world around them.
- People can make choices that reduce their impacts on the land, water, air, and other living things.
- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.
- A situation that people want to change or create can be approached as a problem to be solved through engineering.
- Asking questions, making observations, and gathering information are helpful in thinking about problems.
- Before beginning to design a solution, it is important to clearly understand the problem.

Formative Assessment

Students who understand the concepts are able to:

- Observe patterns in events generated due to cause-and-effect relationships.
- Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas.
- Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.
- Ask questions based on observations to find more information about the natural and/or designed world.
- Define a simple problem that can be solved through the development of a new or improved object or tool.
- Ask questions, make observations, and gather information about a situation that people want to change in order to define a simple problem that can be solved through the development of a new or improved object or tool.

Stage 3- Learning Plan

What it looks like in the classroom:

Mystery Science - Plant & Animal Secret Activity

Follow lessons in order and see Mystery Science Extension Activities for each lesson

Lesson 6 - Read Along: Why would you want an old log in your backyard? Students obtain and evaluate information by virtually keeping watch on a log and reporting about the living things that visit it. They communicate information by drawing a log and the animals that would use it as their habitat. DCIs: ESS3.C

More Sample of Open Education Resources

[Humans on Earth](#): This is a 3.5 minute narrated video explaining the use of natural resources to supply the needs of humans, and solutions for preserving them.

[The Clean Water Book: Choices for Resource Water Protection](#): This book is available from the New Jersey Department of Environmental Protection

[Recycling Manual for New Jersey Schools](#): This [manual](#) will guide school personnel through a step-by-step process of setting up a recycling program in the school. It provides all the necessary tools for designing and implementing a viable and comprehensive program in private, public and parochial institutions.

[Speakers Program](#): The New Jersey Department of Environmental Protection (DEP) fields requests for public speakers, classroom presentations and exhibitors regarding the various environmental topics, programs and services that are administered by the agency.

[Practice the 5 R's](#) – Poster

[The USGS Water Science School](#): Welcome to the [U.S. Geological Survey's](#) (USGS) Water Science School. We offer information on many aspects of water, along with pictures, data, maps, and an interactive center where you can give opinions and test your water knowledge.

Connections to STEM/Makerspace:

Flip the log activity - MTES green day <https://www.youtube.com/watch?v=COsXWxK4R0A>
and craft project <https://sites.google.com/mendhamtwp.org/mtes-green-day/nj-forests>

Integrated accommodations and modifications for students with IEP's 504s, ELLs, and gifted and talented students:

- *Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: [All Standards, All Students/Case Studies](#) for vignettes and explanations of the modifications.)*
- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA).

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[Epic | The Leading Digital Library for Kids ...](#)

www.brainpopjr.com

www.pebblego.com

<https://www.youtube.com/watch?v=Okczqyr5TII> - Human wants and needs video

<https://jr.brainpop.com/socialstudies/economics/needsandwants/?panel=login&refer=/socialstudies/economics/needsandwants/search/>- Brainpop jr. video - Human wants vs. needs

<https://www.youtube.com/watch?v=QnGdINoo5eE> - brainpop jr. Wants vs Needs

<http://sharingkindergarten.com/wants-and-needs-with-freebie/> - Wants & Needs sorting activity

<http://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf>

Integration of 21st Century Skills and Life and Career Standard

CRP1, 2, 4, 6, 8, 11

Integration of the Technology Standard NJSL.8.1

Grade K DGN Unit 3: Force Olympics

Source - Science NJSLA Motion & Stability: Forces & Interactions

Stage 1: Unit Summary

This unit will help students develop their first concept of “force,” and the idea that by playing with forces and thinking about them, we can accomplish surprisingly big things.

Crosscutting Concepts

- * Students consider the effects that machines can have when completing a task.
- * Students consider the cause and effect relationships between the movement of a machine and the work it can do.
- * Students analyse the effect of changing the strength and direction of a wrecking ball’s push. They experiment with different heights to determine how to push, or force, is changed
- * Students analyze the cause and effect relationship between the size of the force on an object and the direction or speed it goes.
- * Students consider the cause and effect relationship between a force and an object’s speed or direction.
- * Students consider the structure and function of existing materials and tools in order to create new uses for them in order to solve a problem.

This unit is based on K-PS2-1, K-PS2-2, and K-2 ETS1-3.

Evidence Statements: [NJSLA Science Unit Standards](#) K-PS2-1, K-PS2-2

Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. *[Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.] [Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]* (K-PS2-1)

Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull. *[Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.] [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]* (K-PS2-2)

K-2-ETS1: Engineering Design

- K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.
- K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Essential Question: *What happens if you push or pull an object harder?*

Interdisciplinary Connections:

English/Language Arts

With prompting and support, ask and answer questions about key details in a text. (K-PS2-2) **RI.K.1**

Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS2-1) **W.K.7**

Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-PS2-2) **SL.K.3**

Math

Reason abstractly and quantitatively. (K-PS2-1), (K-2-ETS1-1), (K-2-ETS1-3) **MP.2**

Model with mathematics. (K-2-ETS1-1), (K-2-ETS1-3) **MP.4**

Use appropriate tools strategically. (K-2-ETS1-1), (K-2-ETS1-3) **MP.5**

Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-PS2-1) **K.MD.A.1**

Directly compare two objects with a measurable attribute in common, to see which object has “more of”/”less of” the attribute, and describe the difference. (K-PS2-1) **K.MD.A.2**

Stage 2-Assessment

Part A: Why do scientists like to play soccer?

Concepts

**People use different ways to study the world.*

**Simple tests can be designed to gather evidence to support or refute student ideas about causes.*

**Pushes and pulls can have different strengths and directions.*

**Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.*

**When objects touch or collide, they push on one another and can change motion.*

**A bigger push or pull makes things speed up or slow down more quickly.*

Formative Assessment

Students who understand the concepts are able to:

**With guidance, design simple tests to gather evidence to support or refute ideas about cause-and-effect relationships.*

**With guidance, plan and conduct an investigation in collaboration with peers.*

**With guidance, collaboratively plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. (Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include noncontact pushes or pulls such as those produced by magnets.) Some examples of pushes and pulls on the motion of an object could include:*

**A string attached to an object being pulled.*

**A person pushing an object.*

*A person stopping a rolling ball.

*Two objects colliding and pushing on each other.

Part B: How can you design a simple way to change the speed or direction of an object using a push or pull from another object?

Concepts:

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.
- Pushes and pulls can have different strengths and directions.
- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.
- A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions.
- Because there is always more than one possible solution to a problem, it is useful to compare and test designs.

Formative Assessment:

Students who understand the concepts are able to:

- * With guidance, design simple tests to gather evidence to support or refute ideas about cause-and-effect relationships.
- Analyze data from tests of an object or tool to determine if it works as intended.
- Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
- Analyze data to determine whether a design solution works as intended to change the speed or direction of an object with a push or a pull.
- Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects.
- Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn. (*Assessment does not include friction as a mechanism for change in speed.*)

Stage 3- Learning Plan

What it looks like in the classroom:

Mystery Science -Force Olympics Activities

Follow lessons in order and see Mystery Science Extension Activities for each lesson

Lesson 1- What's the biggest excavator? Students obtain information through observations of different machines. They use evidence from their observations to argue for their explanation of why machines make work easier. Students act out the “work words” of different machines. DCIs: Foundational for PS2.A, PS2.B, PS2.C

Lesson 2 - Read -Along: Why do builders need so many big machines? Students obtain information through footage of different construction equipment being used in different ways. Student communicate about the information by discussing what each machine does using “work words”. DCIs: Foundational for PSA.A, PSA.B, PS2.C

Lesson 3 - How can you knock down a wall made of concrete? Students carry out an investigation to determine how far back they should pull their model wrecking ball to knock down a wall, but not the houses behind it. They analyze the data collected in their investigation to discuss how the force of the wrecking ball changes when you change the strength and direction of its push. DCIs: PS2.A, PS2.B, Foundational PS3.C and ETS1.A

Lesson 4 - Read-Along: How can you knock down the most bowling pins? Students carry out an investigation by ‘bowling’ with solo cups (pins), a tennis ball (bowling ball), and pool noodles (bumpers). They explore the forces at work when one thing hits another, and how changing the size of the force affects the motion of an object. DCIs: PS2.A, PS2.B, Foundational PS3.C

Lesson 5 - How can we protect a mountain town from falling rocks? Students use a model of a mountain town, Tiny Town, to conduct an investigation of how to protect the town from a falling boulder. They design a solution to safely guide a boulder down the hill so it doesn’t hit the town and rolls into a dump truck. Using pushpin poles, students change the direction the boulder is rolling. DCIs: PS2.A, PS2.B, PS3.C, ETS1.B, ETS1.C

Lesson 6 - Read-Along: How could you invent a trap? Students design a solution to help the book characters solve a problem. Then, they define a problem by choosing a chore they don’t like doing. Next, they design solution by sketching a machine that could help them. They compare their solutions with a partner. DCIs: PS2.A, ETS1.B, ETS1.C

More Sample of Open Education Resources:

Push Pull-Changing Direction: Students investigate the interactions between colliding objects using pushes and pulls. Students play a game of kickball and observe how the ball is pushed, pulled, started, stopped, or collided with other objects and how it changed position and speed. As a group, students will then brainstorm about other objects being pushed, pulled or colliding and then choose one of those objects to investigate.

Marble Roll: This is an assessment probe from the book *Uncovering Student Ideas in Primary Science Vol. 1* that is used to elicit children's descriptions of motion. The probe is designed to reveal how students describe the path of a moving object as it leaves a winding track.

Roller Coaster: There are two parts to this lesson from the book *More Picture Perfect Science Lessons*. In the first part learners explore ways to change the speed and direction of a rolling object by building roller coasters out of pipe insulation after reading the book, *Roller Coaster* by Marla Frazee. In the second part students read *I Fall Down* by Vicki Cobb and then investigate the idea that gravity affects all objects equally by conducting dropping races with everyday items.

Ramps 2: Ramp Builder: This is a multi-day lesson plan that has students design, build, and test their own ramps. Students are introduced to a variety of materials and explore putting them together. Students engage in an inquiry-based learning experience to reinforce math, science, and technology. They create plans for ramps by evaluating a variety of materials provided to them.

Connections to STEM/Makerspace:

***Marble Maze:** Students will create a maze where they will need to know how the marble can safely get to the other side using their prior knowledge of forces.

*The activity, **Don't Crush That House**, is a game in which students experiment with the force of a paper wrecking ball in order to knock down a wall of cups. The challenge is: they can't knock down the paper houses! - Extension Activity

Integrated accommodations and modifications for students with IEP's, 504s, ELLs, and gifted and talented students:

(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: [All Standards, All Students/Case Studies](#) for vignettes and explanations of the modifications.)

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- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA).

List of Core Instructional and Supplemental Materials

Mystery Science:

Toy cars, balls, magnetic Thomas Trains, ramps, Gym Class Scooters, marbles

[Epic | The Leading Digital Library for Kids ...](#)

www.brainpopjr.com

www.pebblego.com

<https://www.generationgenius.com/videolessons/pushes-and-pulls/> - video about push/pull force

https://www.youtube.com/watch?v=E-SnC_WKsCg - Jack Hartmann song about forces

https://www.youtube.com/watch?v=0ZuYUCdWT_s - Kindergarten Push and Pull scooter lesson

<https://www.learningliftoff.com/kindergarten-science-learning-game-push-pull/> - Tic Tac Toe Science Game - Push or Pull

<https://jr.brainpop.com/science/forces/pushesandpulls/> - Brainpop Jr. video about Push and Pull

<http://www.kbs.msu.edu/wp-content/uploads/2017/02/>

[NGSS-Interactive-Read-Alouds.pdf](#)

Integration of 21st Century Skills and Life and Career Standard

CRP1, 2, 4, 6, 8, 11

Integration of the Technology Standard

NJSLS.8.1

Grade K DGN Unit 4 - Weather Watching (sunlight)

Source - NJSLS Energy

Stage 1: Unit Summary

This unit helps students develop the habit of becoming weather watchers who take pleasure in noticing weather patterns and predicting changes.

Crosscutting Concepts:

*Students consider the cause and effect relationship between sunlight exposure and the temperature on Earth's surface.

*Students consider the cause and effect relationship between the amount of sunlight an area gets and its temperature.

This unit is based on K-PS3-1, K-PS3-2, K-2-ETS1-1, K-2-ETS1-2, and K-2-ETS1-3.

Evidence Statements: [NJSLS Science Unit Standards](#) K-PS3-1, K-PS3-2, K-2-ETS1-1, K-2-ETS1-2, K-2-ETS1-3

Make observations to determine the effect of sunlight on Earth's surface. *[Clarification Statement: Examples of Earth's surface could include sand, soil, rocks, and water.] [Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.] (K- PS3-1)*

Use tools and materials provided to design and build a structure that will reduce the warming effect of sunlight on Earth's surface. * *[Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.] (K- PS3-2)*

K-2-ETS1: Engineering Design

- K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.
- K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Interdisciplinary Connections:

English Language Art

***W.K.7** Participate in shared research and writing projects (e.g., explore a number of books by a favorite author to express opinions about them). (K-PS3-1),(K-PS3-2)

Math

***K.MD.A.2** Directly compare two objects with a measurable attribute in common, to see which object has " more of /less of " the attribute, and describe the difference. (K-PS3-1), (K-PS3-2)

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.

Essential Question:

How can we use science to keep a playground cool in the summertime?

Stage 2-Assessment

Unit Sequence

Part A: How does sunlight affect the playground?

Concepts

- Scientists use different ways to study the world.
- Events have causes that generate observable patterns.
- Sunlight warms the Earth's surface

Formative Assessment

Students who understand the concepts are able to:

- Observe patterns in events generated by cause-and-effect relationships.
- Make observations (firsthand or from media) to collect data that can be used to make comparisons.
- Make observations to determine the effect of sunlight on Earth’s surface. (Assessment of temperature is limited to relative measures such as warmer/cooler.)
- Examples of Earth’s surface could include:
 - ✓ Sand
 - ✓ Soil
 - ✓ Rocks
 - ✓ Water

Unit Sequence:

Part B: Imagine that we have been asked to design a new playground. How would we keep the sand, soil, rocks, and water found on the playground cool during the summer?

Concepts:

- Events have causes that generate observable patterns.
- The shape and stability of structures of natural and designed objects are related to their function(s).
- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people.
- Because there is always more than one possible solution to a problem, it is useful to compare and test designs.
- Sunlight warms the Earth’s surface.

Formative Assessment:

Students who understand the concepts are able to:

- Observe patterns in events generated by cause-and-effect relationships.
- Describe how the shape and stability of structures are related to their function.
- Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem.
- Use tools and materials to design and build a structure (e.g., umbrellas, canopies, tents) that will reduce the warming effect of sunlight on an area.
- Develop a simple model based on evidence to represent a proposed object or tool.
- 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.
- Analyze data from tests of an object or tool to determine if it works as intended.
- Analyze data from tests of two objects designed to solve the same problem to compare the strengths

Stage 3- Learning Plan

What it looks like in the classroom:

Mystery Science - Weather Watching Activities

Follow lessons in order and see Mystery Science Extension Activities for each lesson

Lesson 5 - How could you warm up a frozen playground? Students define the problem that Chill City, a valley town surrounded by mountains, does not get enough sunlight in the winter. Using various materials, they carry out an investigation to test which materials can redirect sunlight. Using this information, they design a solution to help bring sunlight to various locations in Chill City. DCIs: PS3.B, ETS1.B,ETS1.C

Lesson 6 - Read Along: How could you walk barefoot across hot pavement without burning your feet?Students obtain and evaluate information from a map of the pool. Analyzing the hot and cool surfaces, they design a solution to get a person across the pool without burning their feet. Students analyze an image of a playground and construct an explanation about what areas would be coolest and hottest. Students conduct an investigation to determine the warmest and coldest spots outside on a sunny day. DCIs: PS3.B

More Sample of Open Education Resources:

Casting Shadows Across Literacy and Science: This lesson introduces shadows by taking students on a shadow walk. Ideally this should be done on a sunny day in the schoolyard or neighborhood, but it can be a simple walk around the classroom.

A Big Star: This reading passage that explains what the sun is and that it provides heat to the Earth. This activity comes with comprehension and critical thinking questions.

The Warmth of the Sun: This lesson helps students broaden their understanding of the sun, particularly its critical role in warming the land, air, and water around us.

The Sun Lesson Plan: This lesson plan is adaptable to several grade band levels. The adjustments are included in the lesson plan along with suggestions for extension activities.

Cooler in the Shadows: This lesson includes several activities where students observe, explore, and analyze shadows. Students will make inferences about the cause of shadows, The lesson is linked to NASA's MESSENGER spacecraft in its voyage to and around Mercury. This lesson is designed to last 4 or more days. There are four different activities within the lesson. The teacher will need to gather some materials prior to beginning the lesson.

Shadow Smile! - Part 6 | Sid the Science Kid: In this song, Miss Susie teaches the class about shadows and the necessary shade they provide for people and animals in the heat! Learn how shadows are a result of an object getting in the way of the path of the sun and that the shadow it casts over the ground provides shade.

Connections to STEM/Makerspace:

Students can investigate how to make a hot place colder - "Cool Trees" Mystery Science Extension Activity

Integrated accommodations and modifications for students with IEP's, 504s, ELLs, and gifted and talented students:

(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: [All Standards, All Students/Case Studies](#) for vignettes and explanations of the modifications.)

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).

- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA).

List of Core Instructional and Supplemental Materials:

Mystery Science:

[Epic | The Leading Digital Library for Kids ...](#)

www.brainpopjr.com

www.pebblego.com

https://www.youtube.com/watch?v=6FB0rDsR_rc - video about the sun and heat from it- cause and effect

<https://www.youtube.com/watch?v=1SN1B0pLZAs> - video about the sun and shadows

<https://www.youtube.com/watch?v=3ydqMIvAWz4> - video about the sun/lightg and shadows

<https://nj.pbslearningmedia.org/resource/ab608973-106b-40d7-922f-db1e9ccdefc9/shadow-smile-part-6-sid-the-science-kid/> - sid the science kid -light and shadow

<http://education.abc.net.au/res/i/L756/index.html> - Sun and shadows step by step

<https://www.pre-kpages.com/science-for-kids-body-shadows/> - Making Body Shadows Activity

<http://www.sciencekids.co.nz/gamesactivities/lightshadows.html> - Sun, Light and Shadows game

<http://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf>

Integration of 21st Century Skills and Life and Career Standard

CRP1, 2, 4, 6, 8, 11

Integration of the Technology Standard - NJSL.8.1

Grade K DGN Unit 5 Weather Watching

Source NJSLS Earth Systems

Stage 1: Unit Summary

This unit helps students develop the habit of becoming weather watchers who take pleasure in noticing weather patterns and predicting changes.

Crosscutting Concepts:

*Students observe weather patterns. They understand weather as a pattern in the natural world.

*Students observe weather patterns. They understand weather as a pattern in the natural world. Students explore the cause and effect relationship between weather tracking and hazard preparation.

*Students use their observations of the weather in each season to identify patterns. They determine the order of the seasons, and notice the pattern that all four seasons repeat each year.

*Students observe weather patterns. They understand temperature changes throughout the day as a pattern in the natural world.

This unit is based on K-ESS2-1, K-ESS3-2, and K-2-ETS1-1.

Evidence Statements: [NJSLS Science Unit Standards](#) K-ESS2-1, K-ESS3-2, K-2-ETS1-1

Use and share observations of local weather conditions to describe patterns over time. *[Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.] [Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.] (K-ESS2-1)*

Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs *[Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide food and tree roots can break concrete] (K-ESS2-2)*

K-2-ETS1: Engineering Design:

- K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.
- K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Essential Question

What is the weather like today and how is it different from yesterday?

Interdisciplinary Connections

English Language Art

*W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-ESS2-1)

*RL.K.1 With prompting and support, ask and answer questions about key details in a text. (K-ESS3-2)

- W.K.1 Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book. (K-ESS2-2)
- 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-ESS2- 2)

Mathematics

MP.2 Reason abstractly and quantitatively. (K-ESS2-1)

MP.4 Model with mathematics. (K-ESS2-1)

K.CC.A Know number names and the count sequence. (K-ESS2-1)

K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-ESS2-1)

K.MD.B.3 Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1)

Stage 2-Assessment

Part A: How can someone predict what the weather will be tomorrow?

- Weather is the combination of sunlight, wind, snow, or rain and temperature in a particular region at a particular time.
- People measure these conditions to describe and record the weather and to notice patterns over time.
- People look for patterns in the weather data when they organize and order when making observations about the world.
- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.

Formative Assessment:

Students who understand the concepts are able to:

What patterns do you observe in our Weather Chart?

- Have we had more sunny days or cloudy days? What is your evidence?
- When was it warmest this week? What is your evidence?
- Is this week sunnier or cloudier than last week? What is your evidence?
- Has the weather gotten warmer or cooler over the past two weeks? What is your evidence?

(Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.)

Unit Sequence:

Part B: *How does weather forecasting help us to prepare for dangerous weather?*

Concepts:

- Some kinds of severe weather are more likely than others in a given region.
- Weather scientists forecast severe weather so that communities can prepare for and respond to these events.
- Events have causes that generate observable patterns.
- People encounter questions about the natural world every day.
- People depend on various technologies in their lives; human life would be very different without technology.

- Before beginning to design a solution, it is important to clearly understand the problem.
- Asking questions, making observations, and gathering information are helpful in thinking about problems.
- A situation that people want to change or create can be approached as a problem to be solved through engineering

Formative Assessment:

Students who understand the concepts are able to:

- Observe patterns in events generated by cause-and-effect relationships.
- Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world.
- Ask questions based on observations to find more information about the designed world.
- Ask questions to obtain information about the purpose of weather forecasting to prepare for and respond to severe weather. (Emphasis is on local forms of severe weather.)
- Define a simple problem that can be solved through the development of a new or improved object or tool.
- Ask questions, make observations, and gather information about a situation people want to change in order to define a simple problem that can be solved through the development of a new or improved object or tool.

Stage 3- Learning Plan

What it looks like in the classroom:

Mystery Science - Weather Watching Activities

Follow lessons in order and see Mystery Science Extension Activities for each lesson

Lesson 1 - Have you ever watched a storm? Students obtain information through observations of the weather. They communicate the information by acting as a weather watcher and creating drawings of the weather conditions. DCIs: ESS2.D

Lesson 2 - Read Along: How can you get ready for a big storm? Students track the weather daily and analyze the data by collecting, recording, and sharing their observations. They act as weather reporters and ask questions based on observations of weather to find out more information about the natural world. DCIs: ESS3.B, ETS1.A

Lesson 3 - What will the weather be like on your birthday? Students obtain and evaluate information in a series of unnamed drawings of each season. They use clues in the picture to argue for the season they think the picture represents. Next, they use these clues to sequence the seasons in the correct cycle. DCIs: ESS2.D

Lesson 4 - Read Along: How do you know what to wear for the weather? Students develop and use models of weather instruments and use them to carry out an investigation. Using the instruments students determine the direction of the wind, and how much rain has fallen. Students analyze the data to determine weather trends. DCIs: ESS2.D

More Sample of Open Education Resources:

[Watching Weather](#): Students will make their own weather station consisting of actual and simplified versions of real weather equipment. The weather station will consist of a thermometer and a student-made weather vane. They will use that equipment to make observations about the local weather.

[Weather Patterns](#): This lesson is the first in a two-part series on the weather. The study of the weather in these early years is important because it can help students understand that some events in nature have a repeating pattern. It also is important for students to study the earth repeatedly because they take years to acquire the knowledge that they need to complete the picture. The full picture requires the introduction of such concepts as temperature, the water cycle, and other related concepts. In the second activity, What's the Season, students identify the seasonal patterns in temperature and precipitation.

[Weather Walks](#): Students learn about weather by taking walks during various weather conditions over the course of time. Walks take place during sunny, rainy, windy, or snowy conditions. The lesson is divided into four sections with activities assigned to each of the weather conditions being observed. Suggested activities include appropriate investigations to help students observe and describe weather phenomenon through first hand experiences.

[Science- Weather](#): This is a free interactive learning activity designed for individual students and can easily be used as a whole class interactive whiteboard activity. This particular title explores weather in relationship to season and temperature. Students learn to use a thermometer as a tool for recording temperature and identify the four seasons through measurable changes in the thermometer readings.

[About the Weather](#): This lesson is about using local weather to make observations, measure, collect, and record data to describe patterns over time. Students will count types of outdoor clothing worn by classmates and use the data to look for patterns in weather over months and seasons

Connections to STEM/Makerspace:

Vocabulary cards matching game - Extension Activity

List of Core Instructional and Supplemental Materials:

Mystery Science:

[Epic | The Leading Digital Library for Kids ...](#)

www.brainpopjr.com

www.pebblego.com

<https://www.youtube.com/watch?v=RmSKsyJ15yg> - weather song

<https://www.youtube.com/watch?v=p6ZZ5tcgRVA> - Sid the Science Kid Weather

<https://www.youtube.com/watch?v=Uo8lbeVVb4M> - weather video

<https://www.youtube.com/watch?v=bbEbF6zsbUo> - National Geographic Weather Book Read Aloud

<https://www.learninggamesforkids.com/weather-games.html> - Weather games - good for centers

https://www.abcya.com/games/dress_for_the_weather - game

<http://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf>

Integration of 21st Century Skills and Life and Career Standard

CRP1, 2, 4, 6, 8, 11

Integration of the Technology Standard

NJSLS.8.1

Pacing Guide

<u>Unit</u>	<u>NJSLS</u>	<u>Marking Period</u>	<u>Duration (weeks)</u>
Unit 1 - Plant & Animal Secrets *Earth and Human Activity/From Molecules to Organisms	K-LS1-1 K-ESS3-1 K-ESS2-2	1	4-6
Unit 2 - Plants & Animal Secrets (Humans) *Earth and Human Activity	K-ESS3-3 K-2 ETS1-1	1	2-3
Unit 3 Pushes and Pulls *Motion & Stability	K-PS2-1 K-PS2-2 K-2 ETS1-3	2-3	6-9
Unit 4 - Weather Systems (sunlight) *Energy	K-PS3-1 K-PS3-2 K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	3	4-5
Unit 5- weather systems *Energy	K-ESS2-1 K-ESS3-2 K-2-ETS1-1	4	3-4

total: 18-27