MENDHAM TOWNSHIP SCHOOLS

SCIENCE CURRICULUM

Grade 1

Revised: June 2021

Curriculum Committee:
Julianne Kotcho- Principal
Carolyn Allen- Kindergarten
Brianna Boland- Gr. 2 Teacher
Cara Dawes- Gr. 3 Teacher
Erica Parke- Gr. 3 Teacher
Diane Barlow- Gr. 4 Teacher

Mendham Township School District

Updated June 2021
Aligned NJSLS 2020

Science Curriculum
Grade One

Grade 1 Unit 1: Plant & Animal Superpowers (Life Science Unit)
Sources: Heredity- Inheritance and Variation of Traits & From Molecules to Organisms- Structure and Processes

Stage 1: Unit Summary

This unit will help students develop the idea that, like a superhero has special powers, every animal and plant has special parts and behaviors that help them to grow and meet their needs. Students develop an understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs, as well as how the behaviors of parents and offspring help offspring survive. The understanding that young plants and animals are like, but not exactly the same as, their parents is developed, as well.

Crosscutting Concepts:

- ➢ Students consider the relationship between the shape of a bird's beak (structure), and the food it eats (function). They begin to observe the pattern that all animals have structures that help them accomplish unique functions.
- ➢ Students consider the patterns in behavior of parents and offspring that help offspring survive.
- ➢ Students consider the relationship between the color of an animal's fur, feathers, or skin (structure), and how this helps it survive in its habitat (function).They begin to observe the pattern that all animals have structures that help them survive.
- ➢ Students consider shared characteristics between parents and their offspring as a pattern.
- ➢ Students observe the relationship between a tree's roots and leaves (structure) and how they help the tree stand in the wind (function). They apply this relationship in a natural object to a designed object.
- ➢ Students observe the relationship between a sunflower's flower and stem (structure) and how the flower parts bend to get as much sun as possible throughout the day (function). This response to the environment helps sunflowers grow.

Evidence Statements: NJSLS Science Unit Standards: (1-LS3-1, 1-LS1-1, 1-LS1-2)

- **Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.** [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.] **(1-LS3-1)**
- **Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.*** [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.] **(1-LS1-1)**
- **Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.** [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).] **(1-LS1-2)**

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 Questions:

1. How are young plants and animals alike and different from their parents?
2. How can humans mimic how plants and animals use their external parts to help them survive and grow?

Interdisciplinary Connections:

Connections to NJSLS – English Language Arts

- W.1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. (1-PS4-2)
- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-1), (1-PS4-2), (1-PS4-3), (1-PS4- 4)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1), (1-PS4-2), (1-PS4-3)
- SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-1), (1-PS4-2), (1-PS4-3)
- RL.1.1 Ask and answer questions about key details in a text. (1-LS1-2)
- RL.1.2 Identify the main topic and retell key details of a text. (1-LS1-2)
- RL.1.10 With prompting and support, read and comprehend stories and poetry at grade level text complexity or above. (1-LS1-2)

Connections to NJSLS – Mathematics

- MP.5 Use appropriate tools strategically. (1-PS4-4)
- 1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1- PS4-4)
- 1.MD.A.2 Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. (1-PS4-4)
- 1.NBT.B.3 Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols >, =, and <. (1-LS1-2)
- 1.NBT.C.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning uses. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2)
- 1.NBT.C.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2)
- 1.NBT.C.6 Subtract multiples of 10 in the range 10–90 from multiples of 10 in the range 10–90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2)

Stage 2: Assessment

Essential Question 1: How are young plants and animals alike and different from their parents?

Concepts:

- Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.

- Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents.

Formative Assessment:

Students who understand the concepts are able to:

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.
- Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
    - Examples of patterns could include features plants or animals share.
    - Examples of observations could include that leaves from the same kind of plant are the same shape but can differ in size and that a particular breed of puppy looks like its parents but is not exactly the same.

Essential Question 2: How can humans mimic how plants and animals use their external parts to help them survive and grow?

Concepts:

- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world.
- The shape and stability of structures of natural and designed objects are related to their function(s).
- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.
- Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs.
- 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.

Formative Assessment:

Students who understand the concepts are able to:

- Observe and describe how the shape and stability of structures of natural and designed objects are related to their functions.
- Use materials to design a device that solves a specific problem or [design] a solution to a specific problem.
- Use materials to design a solution to a human problem that mimics how plants and/or animals use their external parts to help them survive, grow, and meet their needs: Examples of human problems that can be solved by mimicking plant or animal solutions could include:
    - Designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales.
    - Stabilizing structures by mimicking animal tails and roots on plants.
    - Keeping out intruders by mimicking thorns on branches and animal quills.
    - Detecting intruders by mimicking eyes and ears.
- 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.

Stage 3: Learning Plan

Mystery Science: Plant & Animal Superpowers

- ➔ Follow lessons in order & see Mystery Science extensions for each lesson.
    - **1- Why do birds have beaks?** Students model how different bird beaks are well suited for eating different kinds of foods. Students investigate how much food (straw pieces) they can pick up using each beak. Students discuss which beak would help the birds survive in different environments. (DCI: LS1.A)
    - **2- Read-Along: Why do baby ducks follow their mother?** Students gather information about different animal mothers engaging in behavior to help their offspring survive. They discuss why each animal mother does each behavior for her offspring. (DCI: LS1.B)
    - **3- Why are polar bears white?** Students model how camouflage helps moths survive by investigating different patterned paper moths and trees. They see how many moths they can find in the paper forest. They also choose a place in the classroom and design their own moth that will camouflage into the area. (DCI: LS1.A)
    - **4- Read-Along: Why do family members look alike?** Students use observations of animal parents and their offspring to explain about young animals and plants being similar, but not identical, to their parents. They play the game MatchUp, between mother and baby animals, using their knowledge of similar characteristics. (DCI: LS3.A & LS3.B)
    - **5- Why don't trees blow down in the wind?** Students develop a model of an umbrella and investigate to test wind's effect on it. Students design a solution to solve the problem of needing a shade structure that won't blow over in the wind, by mimicking a tree's external part. (DCI: LS1.A, ETS1.A, ETS1.B, & ETS1.C)
    - **6- Read-Along: What do sunflowers do when you're not looking?** Students investigate to test how plants respond to light. They observe how the direction a plant grows depends on the position of the light. (DCI: LS1.A & LS1.D)

At home & in class projects:

- ➔ After Mystery Science lessons, students can spend a day researching each animal below. Discuss features/structures that help animals survive. Set up days/times in the library or on chromebooks in the classroom to research animals on Epic or Pebble Go. Students may use a graphic organizer to take notes.
    - Giraffe (mammals)
    - Peacock/flamingo (birds)
    - Salmon (fish)
    - Frogs
    - Turtle (reptiles)

- **At home animal project:** After learning about five animal groups, each student creates a poster at home, focusing on one particular animal and the features/structures that help the animal survive. They will present their poster to the class and posters will be on display in school.

- **End project in class:** Design a device to solve a human problem.
    - Mimic a need that is relevant to children and model scenarios. (Example: getting to the bottom of the jar of peanut butter)
    - Evaluate, select, and record materials in student notebooks
    - Students draw a plan and create a prototype.

- Students will explain the device and how it works.
- Students evaluate which device did the best job and why. Glows/grows conversation/inventor award.

Connections to STEM/Makerspace:

- Students will create a book that shows how animal parents take care of their young.
- "Cool Body Coverings" lesson- Students make three mittens using fur, feathers, and hair to see which keeps their hand the warmest (betterlesson.com)

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

- 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

List of Core Instructional and Supplemental Materials:
Mystery Science: Plant & Animal Superpowers
Websites: Brain Pop Jr, World Almanac Kids, PebbleGo, live zoo streaming, etc.
Other: Graphic organizers, Scholastic News magazines, student science notebooks, etc.
Read Aloud List that pairs with each standard:
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, 1, 11

Integration of the Technology Standard:
NJSLS.8.1

Grade 1 Unit 2: Lights & Sounds (Physical Science Unit)
Source: Waves and Their Applications in Technologies for Information Transfer

Stage 1: Unit Summary

This unit will develop the idea that by exploring the properties of light and sound, human beings create fun and useful things. Students develop an understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. The idea that light travels from place to place can be understood by students at this level by placing objects made with different materials in the path of a beam of light and determining the effect of the different materials.

Crosscutting Concepts:

- ➢ Students consider the relationship between vibrations (cause) and sound (effect).
- ➢ Students reason about the cause and effect relationship between the type of material (cause) and the amount of light that can pass through it (effect).
- ➢ Students consider the cause and effect relationship between light (cause) and being able to see objects (effect).
- ➢ Students consider light signals and their understood meaning as a pattern.
- ➢ Students consider that different light and sound signals form a pattern used for communication.

Evidence Statements: **NJSLS Science Unit Standards:** (1-PS4-1, 1-PS4-2, 1-PS4-3, 1-PS4-4)

- **Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.** [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.] (1-PS4-2)
- **Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.** [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).] [Assessment Boundary: Assessment does not include the speed of light.] (1-PS4-3)
- **Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.** [Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.] (1-PS4-1)
- **Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.** [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.] [Assessment Boundary: Assessment does not include technological details for how communication devices work.] (1-PS4-4)

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 Questions:

1. How can you prove that you can only see something when someone shines a light on it or if the object gives off its own light?
2. What happens to a beam of light when you put different kinds of things in front of it? How would you design an experiment to prove your thinking?

3. How do instruments make sound?

Interdisciplinary Connections:

Connections to NJSLS – English Language Arts

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

Connections to NJSLS – Mathematics

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

Stage 2: Assessment

Essential Question 1: How can you prove that you can only see something when someone shines a light on it or if the object gives off its own light?

Concepts:

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.
- Objects can be seen if light is available to illuminate them or if they give off their own light.

Formative Assessment:

Students who understand the concepts can:

- Design simple tests to gather evidence to support or refute ideas about cause and effect relationships.
- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.
- Make observations (e.g., in a completely dark room, using a pinhole box, using video of a cave explorer with a flashlight) to construct an evidence-based account that objects can be seen only when illuminated (from an external light source or by an object giving off its own light).

Essential Question 2: What happens to a beam of light when you put different kinds of things in front of it? How would you design an experiment to prove your thinking?

Concepts:

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.
- Some materials allow light to pass through them, others allow only some light through, and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach.

Formative Assessment:

Students who understand the concepts can:

- Design simple tests to gather evidence to support or refute ideas about cause and effect relationships.

- Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question.
- Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. Materials can be:

− Transparent (clear plastic, glass)

− Translucent (wax paper, thin cloth)

− Opaque (cardboard, construction paper)

Essential Question 3: How do instruments make sound?

Concepts:

- Sound can make matter vibrate and vibrating matter can make sound.
- Simple tests can be designed to gather evidence to support or refute student ideas about causes.

Formative Assessment:

Students who understand the concepts can:

- Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
- Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string.
- Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.

Stage 3: Learning Plan

Mystery Science: Lights & Sounds

- Follow lessons in order & see Mystery Science extensions for each lesson.
    - **1- How do they make silly sounds in cartoons?** Students investigate how to make different sounds. They use their hands and feet to make the sounds of a rain storm. They use the vibration of a ruler to create a 'boing' sound as the soundtrack to a bouncing ball animation. Students then explain that objects vibrate when they make a sound, and if the vibration stops, the sound stops as well. (DCI: PS4.A)
    - **2- Read-Along: Where do sounds come from?** Students explore different sounds and how they are created. They create three different sound makers and explain where the vibrations are happening in each sound experiment. (DCI: PS4.A)
    - **3- What if there were no windows?** Students investigate the difference between transparent, translucent, and opaque materials by sorting them. Students create a stained glass window using tissue paper. They answer what happens to tissue paper when it is layered. (DCI: PS4.B)
    - **4- Read-Along: Can you see in the dark?** Students investigate using a Mystery Box. They look inside the completely dark box to see if they can see the shape of the object inside. They allow more light through peepholes to illuminate the object and allow them to see it. They explain that objects need light to be seen. (DCI: PS4.B)
    - **5- How could you send a secret message to someone far away?** Students are presented with the problem that they need to send a message at night, without using noise. They design a solution with a partner by correlating light colors to a specific message. Using their secret code, partners take turns communicating information across the room with light signals. (DCI: PS4.C & ETS1.B)
    - **6- Read-Along: How do boats find their way in the fog?** Students obtain information about light and sound signals. They play red light/green light to practice responding to common signals. Students

investigate different sounds. They find their 'sound partner'- the student who has the same sound object in their cup. Students then analyze different sounds with their eyes closed. They determine which type of sound they heard. (DCI: PS4.C)

Standard 1-PS4-2 (pairs with Mystery Science- Lesson 4)

This standard is about the misconception that our eyes can adjust to see something in the dark. But, in the absence of light, we cannot see. If we can see something, there has to be a little bit of light.

Other activities and read-alouds that align with this standard:

- Why is light important in the dark?
    - Read aloud- Flashlight and use "Finding Nemo" light fish scene
    - Use five materials (black washcloth, magazine paper, napkin, newspaper, etc) Students will look through a black plastic funnel, toward the light. Can they see light through the materials? Yes/No. Make a class tally chart to record results. (Another option- black toilet paper rolls & black construction paper)

Connections to STEM/Makerspace:

- Students bring in an object from home and use the object to make sound. They determine ways to use that object to communicate.

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

- 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 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.

List of Core Instructional and Supplemental Materials:

Mystery Science: Lights & Sounds

Websites: Brain Pop Jr, World Almanac Kids, PebbleGo, etc.

Other: Graphic organizers, Scholastic News magazines, student science notebooks,etc.

Read Aloud List that pairs with each standard:

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

Integration of 21st Century Skills and Life and Career Standards:

CRP1, 2, 4, 6, 8, 11

Integration of the Technology Standard:

NJSLS.8.1

Grade 1 Unit 3: Spinning Sky (Earth & Space Science Unit)

Source: Earth's Place in the Universe

Stage 1: Unit Summary

This unit will help students develop the idea that the sun, moon, and stars change position in the sky in ways that are fun to watch and predict. Students observe, describe, and predict some patterns in the movement of objects in the sky.

Crosscutting Concepts:

- ➢ Students consider the movement of shadows to be caused by the pattern of the sun's movement across the sky.
- ➢ Students explain changes in shadows by considering the patterns in the Sun's movement across the sky. They identify the cause and effect relationship between the height of the Sun in the sky and a shadow's length and direction.
- ➢ Students analyze the pattern of the Sun's movement across the sky each day.
- ➢ Students consider the pattern that there are more hours of daylight during the summer than there are in the winter.
- ➢ Students consider the pattern that the stars are only visible in the night sky. They explore the cause and effect relationship between the Sun's brightness and the visibility of the stars.
- ➢ Students consider the pattern that stars are in different places in the sky during different seasons. They consider the pattern that the Big Dipper help us find the North Star.

Evidence Statements: **NJSLS Science Unit Standards:** (1-ESS1-1 & 1-ESS1-2)

- **Use observations of the sun, moon, and stars to describe patterns that can be predicted.** [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.] **(1-ESS1-1)**
- **Make observations at different times of year to relate the amount of daylight to the time of year.** [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.] **(1-ESS1-2)**

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 Questions:

1. What patterns of change can be predicted when observing the sun, moon, and stars?
2. What is the relationship between the amount of daylight and the time of year?

Interdisciplinary Connections:

Connections to NJSLS – English Language Arts

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

Connections to NJSLS – Mathematics

- MP.2 Reason abstractly and quantitatively. (1-ESS1-2)

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

Stage 2: Assessment

Essential Question 1: What patterns of change can be predicted when observing the sun, moon, and stars?

Concepts:

- Science assumes natural events happen today as they happened in the past.
- Many events are repeated.
- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.
- Patterns in the motion of the sun, moon, and stars in the sky can be observed, described, and predicted.

Formative Assessment:

Students who understand the concepts can:

- Observe and use patterns in the natural world as evidence and to describe phenomena.
- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.
- Use observations of the sun, moon, and stars to describe patterns that can be predicted. Examples of patterns could include:
    - The sun and moon appear to rise in one part of the sky, move across the sky, and set.
    - Stars other than our sun are visible at night but not during the day. (Assessment of star patterns is limited to stars being seen at night and not during the day.)

Essential Question 2: What is the relationship between the amount of daylight and the time of year?
Concepts:

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.
- Seasonal patterns of sunrise and sunset can be observed, described, and predicted.

Formative Assessment:

Students who understand the concepts can:

- Observe and use patterns in the natural world as evidence and to describe phenomena.
- Make observations (firsthand or from media) to collect data that can be used to make comparisons.
- Make observations at different times of the year to relate the amount of daylight to the time of year. (Note: The emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall; assessment is limited to relative amounts of daylight, not to quantifying the hours or time of daylight.)

Stage 3: Learning Plan

Mystery Science: Spinning Sky

➔ Follow lessons in order & see Mystery Science extensions for each lesson.
    - **1- Could a statue's shadow move?** Students conduct two investigations. First, they place a gnome in the sun and trace its shadow. They observe how the shadow changes as time passes, or as the sun moves

across the sky. Next, students use model gnomes to analyze how to move a light source to change the shape and length of the shadow of the gnome. Interpreting this data, students explain what causes a shadow to move. (DCI: ESS1.A)

- **2- Read-Along: What does your shadow do when you're not looking?** Students gather information about how their shadow changes throughout the day. They trace their shadow in the morning and afternoon, then analyze the data to identify differences in the shadows. Students explain why their shadows point in different directions. (DCI: ESS1.A)
- **3- How can the sun help you if you're lost?** Students develop a Sun Finder, a model of the sun's movement across the sky. Using the model, they reason about how the sun can help guide them during the day. Since they know they walked toward the sun to get to their friend's house in the morning, students must use evidence to argue whether they should walk toward or away from the sun to get home in the afternoon. (DCI: ESS1.A)
- **4- Read-Along: Why do you have to go to bed early in the summer?** Students obtain information about the seasonal patterns of sunrise and sunset through a printable student reader. Students read the text independently to determine seasonal daylight patterns. (DCI: ESS1.B)
- **5- Why do the stars come out at night?** Students develop and use a model of the Big Dipper in the night sky. They investigate why stars are only visible in the night sky. They explain about the stars being outshone by the sun in the daytime sky, and then being visible again when the sun sets. (DCI: ESS1.A)
- **6- Read-Along: How can stars help you if you get lost?** Students obtain, evaluate, and communicate information about the cardinal directions. They investigate to determine which direction each part of their classroom is facing. (DCI: ESS1.A)

More websites to explore:

- Day & Night
- Observing the Sun
- The Moon
- Moon During the Day
- Solar Eclipse Box
- Space Patterns in the Sky
- Predictable Patterns of the Sun and Seasons
- Bill Nye Explains the Seasons
- Patterns of Daylight
- Our Superstar

Connections to STEM/Makerspace:

- Students bring in an object from home and use the object to make sound. They determine ways to use that object to communicate.

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

- 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.

List of Core Instructional and Supplemental Materials:
Mystery Science: Spinning Sky
Other: Graphic organizers, Scholastic News magazines, student science notebooks, etc.
Read Aloud List that pairs with each standard-
http://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf

Integration of 21st Century Skills and Life and Career Standards:
CRP1, 2, 4, 6, 8, 11

Integration of the Technology Standard:
NJSLS.8.1

Pacing Guide

Updated June 2021
Aligned NJSLS 2020

Unit	NJSLS	Marking Period	Duration in Weeks
1- Plant & Animal Superpowers (Heredity: Inheritance and Variation of Traits & From Molecules to Organisms: Structure and Processes)	1-LS3-1 1-LS1-1 1-LS1-2	1-2	10 weeks
2- Lights & Sounds (Waves and their Applications in Technologies for Information Transfer)	1-PS4-1 1-PS4-2 1-PS4-3 1-PS4-4	2-3	6-9 weeks
3-Spinning Sky (Earth's Place in the Universe)	1-ESS1-1 1-ESS1-2	4	6-9 weeks

Total: 28-30 weeks