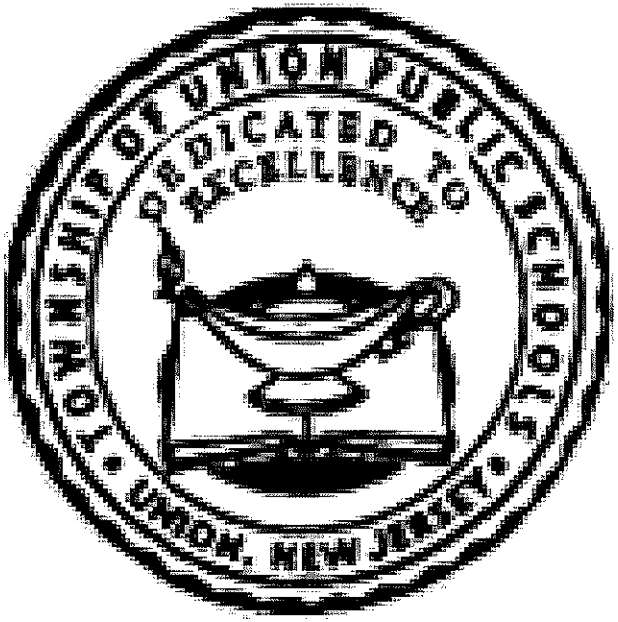
TOWNSHIP OF UNION PUBLIC SCHOOLS



Science Grade 1

Curriculum Guide

Updated December 18, 2018

Mission Statement

The mission of the Township of Union Public Schools is to build on the foundations of honesty, excellence, integrity, strong family, and community partnerships. We promote a supportive learning environment where every student is challenged, inspired, empowered, and respected as diverse learners. Through cultivation of students' intellectual curiosity, skills and knowledge, our students can achieve academically and socially, and contribute as responsible and productive citizens of our global community.

Philosophy Statement

The Township of Union Public School District, as a societal agency, reflects democratic ideals and concepts through its educational practices. It is the belief of the Board of Education that a primary function of the Township of Union Public School System is the formulation of a learning climate conducive to the needs of all students in general, providing therein for individual differences. The school operates as a partner with the home and community.

Statement of District Goals

- Develop reading, writing, speaking, listening, and mathematical skills.
- Develop a pride in work and a feeling of self-worth, self-reliance, and self-discipline.
- Acquire and use the skills and habits involved in critical and constructive thinking.
- Develop a code of behavior based on moral and ethical principles.
- Work with others cooperatively.
- Acquire a knowledge and appreciation of the historical record of human achievement and failures and current societal issues.
- Acquire a knowledge and understanding of the physical and biological sciences.
- Participate effectively and efficiently in economic life and the development of skills to enter a specific field of work.
- Appreciate and understand literature, art, music, and other cultural activities.
- Develop an understanding of the historical and cultural heritage.
- Develop a concern for the proper use and/or preservation of natural resources.
- Develop basic skills in sports and other forms of recreation.

Pacing Guide

Unit 1: Patterns of Change in the Sky	**20 Days**
Unit 2: Characteristics of Living Things	**15 Days**
Unit 3: Mimicking Organisms to Solve Problems	**25 Days**
Unit 4: Light and Sound	**20 Days**
Unit 5: Communicating with Light and Sound	**25 Days**

Curriculum Overview

Unit 1: Patterns of Change in the Sky

In this unit of study, students observe, describe, and predict some patterns in the movement of objects in the sky. The crosscutting concept of *patterns* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations* and *analyzing and interpreting data*. Students are also expected to use these practices to demonstrate understanding of the core ideas.
This unit is based on 1-ESS1-1 and 1-ESS1-2.

Unit 2: Characteristics of Living Things

In this unit of study, students develop an understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs, as well as how the behaviors of parents and offspring help offspring survive. The understanding that young plants and animals are like, but not exactly the same as, their parents is developed. The crosscutting concept of *patterns* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *obtaining, evaluating, and communicating information* and *constructing explanations*. Students are also expected to use these practices to demonstrate understanding of the core ideas.
This unit is based on 1-LS3-1 and 1-LS1-2.

Unit 3: Mimicking Organisms to Solve Problems

In this unit of study, students develop an understanding of how plants and animals use their parts to help them survive, grow, and meet their needs. Students also need opportunities to *develop possible solutions*. As students develop possible solutions, one challenge will be to keep them from immediately implementing the first solution they think of and to instead think through the problem carefully before acting. Having students sketch their ideas or make a physical model is a good way to engage them in shaping their ideas to meet the requirements of the problem. The crosscutting concept of *structure and function* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *constructing explanations, designing solutions*, and in *developing and using models*. Students are expected to use these practices to demonstrate understanding of the core ideas.
This unit is based on 1-LS1-1 and K-2-ETS1-2.

Unit 4: Light and Sound

In this unit of study, students develop an understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. The idea that light travels from place to place can be understood by students at this level by placing objects made with different materials in the path of a beam of light and determining the effect of the different materials. The crosscutting concept of *cause and effect* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations*, *constructing explanations*, and *designing solutions*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 1-PS4-2, 1-PS4-3, and 1-PS4-1.

Unit 5: Communicating with Light and Sound

In this unit of study, students continue to develop their understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. Students apply their knowledge of light and sound to engage in engineering design to solve a simple problem involving communication with light and sound. The crosscutting concepts of *structure and function and influence of engineering, technology, and science on society and the natural world* are called out as organizing concepts for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *constructing explanations and designing solutions*, *asking questions and defining problems*, and *developing and using models*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 1-PS4-4, K-2-ETS1-1, and K-2-ETS1-2.

Unit 1: Patterns of Change in the Sky

Unit 1 Summary
Can we predict how the sky will change over time?
In this unit of study, students observe, describe, and predict some patterns in the movement of objects in the sky. The crosscutting concept of *patterns* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations* and *analyzing and interpreting data*. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on 1-ESS1-1 and 1-ESS1-2.
Student Learning Objectives
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)**

Part A: *What patterns of change can be predicted when observing the sun, moon, and stars?*

Concepts	Formative Assessment
• Science assumes that 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.	*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.)
Part B: *What is the relationship between the amount of daylight and the time of year?*	
Concepts	**Formative Assessment**
• 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.	*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.)*

Unit 1 Resources and Suggested Activities	
Grades K-5 Science Storylines	Sciencesaurus, Yellow Level, pp. 74–77 Earth Science, Observe the Sky
Grade 1 Unit 1 How Scientists Work (Lessons 1, 3, and 5) Student Edition, pp. 3-38 Teacher Edition, pp. 3A-38A Assessment Guide, p. AG1, AG3, and AG5	Sciencesaurus, Yellow Level, pp. 78–79 Earth Science, Day and Night Sciencesaurus, Yellow Level, p. 69 Earth Science, Spring Sciencesaurus, Yellow Level, p. 70 Earth Science, Summer Sciencesaurus, Yellow Level, p. 71 Earth Science, Fall Sciencesaurus, Yellow Level, p. 72 Earth Science, Winter
Grade 1 Unit 7 Lesson 1: What Is Weather? Student Edition, pp. 257–266 Teacher Edition, pp. 257-266A Assessment Guide, p. AG69	
Grade 1 Unit 7 Lesson 3: What Are Seasons? Student Edition, pp. 273–284 Teacher Edition, pp. 273-284A Assessment Guide, p. AG 71	Science and Engineering Leveled Readers, Grade 1 Unit 7 Extra Support: *How Does the Sky Seem to Change?* Science and Engineering Leveled Readers, Grade 1 Unit 7 On-Level: *How Does the Sky Seem to Change?* Science and Engineering Leveled Readers, Grade 1 Unit 7 Enrich: *A Closer Look at Telescopes*
Grade 1 Unit 8 Lesson 2: How Does the Sky Seem to Change? Student Edition, pp. 305–314	

Teacher Edition, pp. 305A–314A Assessment Guide, p. AG 80 Grade 1 Unit 8 Lesson 3: How Does the Sun Seem to Move? Student Edition, pp. 315–316 Teacher Edition, pp. 315A–316A Assessment Guide, p. AG 81 Teacher Edition, p. 293A Grade 1 Unit 8 Lesson 1: Inquiry: High in the Sky **STEM Activities** What Can the Sun Melt? Make a Cloud in a Jar What Melts in the Sun? The Sun and Moon Lesson	NSTA Lessons The Dynamic Trio Our Super Star Keep a Moon Journal Education.com 1st Grade Science Worksheet Database Education.com 1st Grade Science Activity Database Online Science Activities for Kids First Grade NGSS "I Can" Posters "I Can" Statement Posters for NGSS Engineering Standards K-5 Fair Tests: An NGSS Tool for STEM and the Engineering Design Process Stem Bin Organization Science Resource Collection Brain Pop, Jr. Objects in the Sky Review and Assessment Day and Night Flapbook Science Objects in the Sky Flipbook Comparing Day and Night Sky Day and Night Sorting Activity The Sun and Stars Video The Moon Video Solar System Song Sun, Earth, Moon Rap

Connecting with English Language Arts/Literacy and Mathematics	
English Language Arts/Literacy 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.1.7** 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) **W.1.8**	
Literature Connections	**Science Leveled Readers** • Measuring Weather

Kitten's First Full Moon *Stormy Weather* *Happy Fall* *Why the Sun and the Moon Live in the Sky by Elphinstone Dayrell, Blair Lent* *The Star by Michele Breza* *Owl Moon by Jane Yolen* *Stars by Mary Lyn Ray* *What the Sun Sees, What the Moon Sees by Nancy Tafuri (* *The Day We Saw The Sun Come Up by Alice E. Goudey* *There Was a Bold Lady Who Wanted a Star by Charise Mericle Harper* *Clouds: Let's Read and Find out Science - 1 by Anne F. Rockwell* *Rainstorm by Barbara Lehman* *Hello, Sun! by Dayle Ann Dodds* *To Be Like the Sun by Susan Marie Swanson* *The Sun and the Moon by Brian D. McClure* *Why the Sun and Moon Live in the Sky by Niki Daly* *The Sky Is Full of Stars by Franklyn Mansfield Branley* *How High Is the Sky? [With Poster] by Anna Milbourne* *Who Likes Rain? by Wong Herbert Yee* *Papa, Please Get the Moon for Me: Miniature Edition by Eric Carle* *What Makes Day and Night by Franklyn M. Branley.*	• Seasons • The Four Seasons • The Water Cycle • Weather Safety • Four Seasons on a Farm • Objects in the Sky • Look Up! Our Sky • Sun Time!

Mathematics

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

Model with mathematics. *(1-ESS1-2)* **MP.4**

Use appropriate tools strategically. *(1-ESS1-2)* **MP.5**

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.OA.A.1**

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)* **1.MD.C.4**

Math Activities:

STEM Activity Integration Guide for Go Math

Go Math! STEM Activities Teacher Edition (TE)

Go Math! STEM Activities Student Edition (SE)

Measuring Up: Do the Math! Measure Length Go Math Chapter 9 STEM TE | SE

Sunny Summer: Exploring Summer Go Math Chapter 9 STEM TE | SE

Good Night, Sky Go Math Chapter 11 STEM TE | SE

Modifications

(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).

NJSLS-S and Foundations for the Unit

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*

Unit 2: Characteristics of Living Things

Unit 2 Summary
In this unit of study, students develop an understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs, as well as how the behaviors of parents and offspring help offspring survive. The understanding that young plants and animals are like, but not exactly the same as, their parents is developed. The crosscutting concept of *patterns* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *obtaining, evaluating, and communicating information* and *constructing explanations*. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on 1-LS3-1 and 1-LS1-2.
Student Learning Objectives
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))**
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)**

Part A: *How are young plants and animals alike and different from their parents?*

Concepts	Formative Assessment
• Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. • 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.	*Students who understand the concepts are able to:* • Observe and use patterns in the natural world as evidence and to describe phenomena. • 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. *[Note: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]*
Part B: *What types (patterns) of behavior can be observed among parents that help offspring survive?*	
Concepts	**Formative Assessment**
• Scientists look for patterns and order when making observations about the world. • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. • Adult plants and animals can have young. • In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring survive.	*Students who understand the concepts are able to:* • Observe and use patterns in the natural world as evidence and to describe phenomena. • Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. • Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. Examples of patterns of behaviors could include: ✓ The signals that offspring make, such as crying, cheeping, and other vocalizations. ✓ The responses of the parents, such as feeding, comforting, and protecting the offspring.

Unit 2 Resources and Suggested Activities	
Grades K-5 Science Storylines Grade 1 Unit 3 Lesson 1: What Are Living and Nonliving Things? Student Edition, pp. 83–92 Teacher Edition, pp. 83A–92A Assessment Guide, p. AG 24 Grade 1 Unit 3 Lesson 3: How Are Animals Different? Student Edition, pp. 107–118 Teacher Edition, pp. 107A-118A Assessment Guide, p. AG 26	Sciencesaurus, Yellow Level, pp. 20–28 Life Science, Plants Sciencesaurus, Yellow Level, pp. 29–46 Life Science, Animals Science and Engineering Leveled Readers, Grade 1 Unit 9 Extra Support: *What Can We Learn About Animals?* Science and Engineering Leveled Readers, Grade 1 Unit 9 On-Level: *What Can We Learn About Animals?* Science and Engineering Leveled Readers, Grade 1 Unit 9 Enrich: *Amazing Animals* Science and Engineering Leveled Readers, Grade 1 Unit 10

Grade 1 Unit 5 Lesson 1: Where Do Plants and Animals Live? Student Edition, pp. 175–188 Teacher Edition, pp. 175A-188A Assessment Guide, p. AG 47 Grade 1 Unit 5 Lesson 2: What Is a Terrarium? Student Edition, pp. 189–190 Teacher Edition, pp. 189A-190A Assessment Guide, p. AG 48 Grade 1 Unit 5 Lesson 2: What Is a Terrarium? Inquiry Flipchart, p. 23 **STEM Activities** Brainstorm Living v. Nonliving Living – Nonliving Lab Build a Terrarium Make a Terrarium Mini-Garden	Extra Support: *What Is a Plant?* Science and Engineering Leveled Readers, Grade 1 Unit 10 On-Level: *What Is a Plant?* Science and Engineering Leveled Readers, Grade 1 Unit 10 Enrich: *Weird and Wacky Plants* NSTA Lessons Chip of the Old Block Eat Like a Bird! January Why So Yummy Education.com 1st Grade Science Worksheet Database Education.com 1st Grade Science Activity Database Online Science Activities for Kids First Grade NGSS "I Can" Posters "I Can" Statement Posters for NGSS Engineering Standards K-5 Fair Tests: An NGSS Tool for STEM and the Engineering Design Process Stem Bin Organization Science Resource Collection Brain Pop, Jr. Classifying Animals Lapbook Living and Nonliving Videos NGSS What Do Plants Need to Grow? Journal Pages Living v. Nonliving Powerpoint Living and Nonliving Mini Lesson Living and Nonliving Sorting Activity Living and Nonliving Activity Animal Classification and Characteristic Sorts Activity NSTA Resource Collection Life Cycles by Billy Nye Video Who's Alive Video Learning Time Fun: Living v. Nonliving Video Home Sweet Habitat Video Forests Video Ocean Exploration Video National Geographic Kids Amazing Animals Video SciShow Kids: Build a Tiny Plant World (Terrarium) Video Soda Bottle Terrarium Video How Does a Seed Become a Plant Video

	Who Needs Dirt? Video

Connecting with English Language Arts/Literacy and Mathematics	
English Language Arts/Literacy Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS3-1) **RI.3.1** Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS3-1) **RI.3.2** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS3-1) **RI.3.3** Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS1-1) **W.1.7** Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS3-1) **SL.3.4** Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS3-1) **W.3.2**	
Literature Connections *How You Grew* *Animal Teams* *A Tiger Cub Grows Up* *Dot and Jabber and the Big Bug Mystery* *Animal Habitats* *What's Alive? by Kathleen Weidner Zoehfield* *The Little Mouse, the Red Ripe Strawberry, and the Big Hungry Bear (Board Book) by Don Wood* *Over and Under the Pond (Hardcover) by Kate Messner* *Sparky! (Hardcover) by Jenny Offill* *I Took a Walk by Henry Cole* *On the Way to the Beach by Henry Cole* *I See a Kookaburra!: Discovering Animal Habitats Around the World* *From Seed to Plant by Gail Gibbons*	**Science Leveled Readers** • All About Animals • Animal Groups • Move It! • Environments for Living Things • Places to Live • Animals and Plants • Web of Life • Habitats

Oh Say Can You Seed? by Bonnie Worth *Baby Animals Learn - Pamela Chanko [lexile level BR]* *Animal Mothers and Babies - Dona Herwick-Rice [lexile level 460]* *Characteristics of Animals - Libby Romero [lexile level 280]* *Discover Animals - Libby Romero [lexile level 130]* *From Egg to Chicken - Gerald Legg and Carolyn Scrace [lexile level 500]* *From Tadpole to Frog - Gerald Legg and Carolyn Scrace [lexile level 460]* *From Seed to Sunflower - Gerald Legg and Carolyn Scrace [lexile level 450]* *Do Penguins have Puppies? - Michael Dahl [lexile level 440]* *Do Whales have Wings? - Michael Dahl [lexile level 440]* *Hair Traits: Color, Texture and More - Buffy Silverman [lexile level 500]* *Facial Features: Freckles, Earlobes, Noses and More - Jennifer Boothroyd [lexile level 530]* *Life Cycles - Sian Smith [lexile level 650]* *The Life Cycle of Mammals - Susan H. Gray [lexile level 840]* *The Life Cycle of Reptiles - Darlene Stille [lexile level 770]* *The Life Cycle of Fish - Darlene Stille [lexile level 860]* *The Life Cycle of Insects - Susan H. Gray [lexile level 770]* *The Life Cycle of a Kangaroo - Angela Royston [lexile level 650]* *Dogs and Their Puppies - Linda Tagliaferro [lexile level 380]* *Bears and Their Cubs - Linda Tagliaferro [lexile level 450]* *Robins and Their Chicks - Linda Tagliaferro [lexile level 450]* *Life Cycle of a Carrot - Linda Tagliaferro [lexile level 420]* *Ducks and Their Ducklings - Margaret Hall [lexile level 370]* *Elephants and Their Calves - Margaret Hall [lexile level 370]* *Cows and Their Calves - Margaret Hall [lexile level 370]* *Tigers and Their Cubs - Margaret Hall [lexile level 330]*	

Gorillas and Their Infants - Margaret Hall [lexile level 400] *Penguins and Their Chicks - Margaret Hall [lexile level 420]* *Seeds by Gail Saunders-Smith [lexile level 240]* *Sunflower House - Eve Bunting [lexile level 530]* *Saving the Griffin - Kristin Wolden Nitz [lexile level 550]*	

Mathematics

Reason abstractly and quantitatively. (3-LS3-1) **MP.2**

Model with mathematics. (3-LS3-1) **MP.4**

Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS3-1) **3.MD.B.4**

Math Activities:

STEM Activity Integration Guide for Go Math

Go Math! STEM Activities Teacher Edition (TE)

Go Math! STEM Activities Student Edition (SE)

Care for Earth! Do the Math! Solve a Word Problem Go Math Chapter 5 STEM TE | SE

Caring for Pets: Do the Math! Solve a Problem Go Math Chapter 6 STEM TE | SE

Hatch, Swim, Hop: Frog Life Cycle Go Math Chapter 8 STEM TE | SE

Plant Power: Do the Math! Solve a Problem Go Math Chapter 8 STEM TE | SE

All Around You: Salt Water Environments Go Math Chapter 9 STEM TE | SE

Modifications

(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).

NJSLS-S and Foundations for the Unit
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)**
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)**

Unit 3: Mimicking Organisms to Solve Problems

The performance expectations in this unit are developed using the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts from the *NRC Framework for K-12 Science Education:*

Unit 3 Summary		
Analyzing and Interpreting Data • Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1) **Obtaining, Evaluating, and Communicating Information** • Read grade-appropriate texts and use media to obtain scientific information to determine	**LS3.A: Inheritance of Traits** • Many characteristics of organisms are inherited from their parents. (3-LS3-1) **LS1.B: Growth and Development of Organisms** • Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the	**Patterns** • Similarities and differences in patterns can be used to sort and classify natural phenomena. (3-LS3-1) • Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2)

In this unit of study, students develop an understanding of how plants and animals use their parts to help them survive, grow, and meet their needs. Students also need opportunities to develop possible solutions. As students develop possible solutions, one challenge will be to keep them from immediately implementing the first solution they think of and to instead think through the problem carefully before acting. Having students sketch their ideas or make a physical model is a good way to engage them in shaping their ideas to meet the requirements of the problem. The crosscutting concept of structure and function is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in constructing explanations, designing solutions, and in developing and using models. Students are expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 1-LS1-1 and K-2-ETS1-2.

Student Learning Objectives	
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 structures could include designing 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)**	***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** • Scientists look for patterns and order when making observations about the world. (1-LS1-1)
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-ETS1-2)	

Part A: *How can humans mimic how plants and animals use their external parts to help them survive and grow?*	
Concepts	**Formative Assessment**
• 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.	*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.

Unit 3 Resources and Suggested Activities	
Grades K-5 Science Storylines Grade 1 Unit 3 Lesson 2: What Do Animals Need? Student Edition, pp. 93–104 Teacher Edition, pp. 93A–104A Assessment Guide, p. AG 25	Student Edition, pp. 50–51 Grade 1 Unit 2 Lesson 1: How Do Engineers Work? Find a Problem Student Edition, pp. 34–35 Grade 1 Unit 1 Lesson 5: How Do Scientists Work? Record What You Observe Science and Engineering Leveled Readers, Grade 1 Unit 9

Grade 1 Unit 3 Lesson 4: How Can We Group Animals? Student Edition, pp. 119–121 Teacher Edition, pp. 119A–121A Assessment Guide, p. AG 27 Grade 1 Unit 4 Lesson 1: What Do Plants Need? Student Edition, pp. 131–140 Teacher Edition, pp. 131A–140A Assessment Guide, p. AG 35 Grade 1 Unit 4 Lesson 2: Why Do Plants Grow? Student Edition, pp. 141–142 Teacher Edition, pp. 141A–142A Assessment Guide, p. AG 36 Grade 1 Unit 4 Lesson 3: What Are Some Parts of Plants? Student Edition, pp. 143–152 Teacher Edition, pp. 143A–152A Assessment Guide, p. AG 37 Grade 1 Unit 4 Lesson 4: How Are Plants Different? Student Edition, pp. 155–164 Teacher Edition, pp. 155A–164A Assessment Guide, p. AG 38 Grade 1 Unit 4 Lesson 5: How Can We Compare Leaves? Student Edition, pp. 165–166 Teacher Edition, pp. 165A-166A Assessment Guide, p. AG 39 **STEM Activities** Freebie Animal Habitats Research Do Seeds Need Light and Dirt to GERMINATE? Discovery Education – Animal Classification Lesson	Extra Support: *What Can We Learn About Animals?* Science and Engineering Leveled Readers, Grade 1 Unit 9 On-Level: *What Can We Learn About Animals?* Science and Engineering Leveled Readers, Grade 1 Unit 9 Enrich: *Amazing Animals* Science and Engineering Leveled Readers, Grade 1 Unit 10 Extra Support: *What Is a Plant?* Science and Engineering Leveled Readers, Grade 1 Unit 10 On-Level: *What Is a Plant?* Science and Engineering Leveled Readers, Grade 1 Unit 10 Enrich: *Weird and Wacky Plants* Sciencesaurus, Yellow Level, pp. 20–28 Life Science, Plants Sciencesaurus, Yellow Level, pp. 29–46 Life Science, Animals NSTA Lessons Eat Like a Bird! January Why So Yummy Education.com 1st Grade Science Worksheet Database Education.com 1st Grade Science Activity Database Online Science Activities for Kids First Grade NGSS "I Can" Posters "I Can" Statement Posters for NGSS Engineering Standards K-5 Fair Tests: An NGSS Tool for STEM and the Engineering Design Process Stem Bin Organization Science Resource Collection Brain Pop, Jr. Animal Research Report Printable Plant a Garden: Science and Writing Activities Plant Life Cycle Anchor Charts Interactive Notebook Pages Parts of a Plant Printable Free Plant Resources on TpT NSTA Resource Collection **Videos**

	What Do Animals Need to Stay Alive? Animal Parts Inspect an Insect Bill Nye – Ocean Exploration The Very Hungry Caterpillar – Animated Film Vertebrate Animals Invertebrate Animals Mammals Birds Reptiles Fish Sesame Street – Grover Talks About Plants Photosynthesis Plant Adaptation

Connecting with English Language Arts/Literacy and Mathematics	
English Language Arts/Literacy Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS1-1) Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2) **SL.2.5**	
Literature Connections *Animal Moms and Dads* *Actual Size by Steve Jenkins* *Animal Tracks by Arthur Dorros* *Biggest, Strongest, Fastest by Steve Jenkins* *The Things Birds Eat by Betsey Chessen* *From Head to Toe by Eric Carle* *What Do You Do With a Tail Like This? by Steve Jenkins and Robin Page* *Living Sunlight: How Plants Bring the Earth to Life by Molly Bang* *Around the World on Eighty Legs Book by Amy Gibson*	**Science Leveled Readers** • All About Animals • Animal Groups • Move It! • All About Plants • Plants, Plants, Everywhere! • What Do You Eat?

You Wouldn't Want to Live Without Trees! by *Jim Pipe* *Experiment with Parts of a Plant by Nadia Higgins* *From Seed to Plant By Gail Gibbons* *Oh Say Can You Seed? by Bonnie Worth*	

Mathematics

Math Activities:

STEM Activity Integration Guide for Go Math

Go Math! STEM Activities Teacher Edition (TE)

Go Math! STEM Activities Student Edition (SE)

Move It! Do the Math! Solve a Word Problem Go Math Chapter 4 STEM TE | SE

Hide me! Camouflage Go Math Chapter 8 STEM TE | SE

In the Mix: Compare Soil Properties Go Math Chapter 9 STEM TE | SE

Modifications

(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).

NJSLS-S and Foundations for the Unit
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)**
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-ETS1-2)

Unit 4: Light and Sound

Unit 4 Summary
In this unit of study, students develop an understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. The idea that light travels from place to place can be understood by students at this level by placing objects made with different materials in the path of a beam of light and determining the effect of the different materials. The crosscutting concept of *cause and effect* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations, constructing explanations,* and *designing solutions.* Students are also expected to use these practices to demonstrate understanding of the core ideas.
Student Learning Objectives
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)**

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data • Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1) • Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1)	**LS1.A: Structure and Function** • All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1)	**Patterns** • Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2) **Structure and Function** • The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)
Developing and Using Models • Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)	**LS1.B: Growth and Development of Organisms** • Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2) **LS1.D: Information Processing** • Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1) **ETS1.B: Developing Possible Solutions** • Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating	• The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2) --- ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Science, Engineering and Technology on Society and the Natural World** • Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. (1-LS1-1)

Part A: *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	Formative Assessment
• 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.	*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).

Part B: *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	Formative Assessment
• 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. • Mirrors can be used to redirect a light beam. *(Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.)*	*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) – Reflective (a mirror, a shiny metal spoon)

Part C: *How do instruments (band) make sound?*

Concepts	Formative Assessment
• 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.	*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.

Unit 4 Resources and Suggested Activities	
Grades K-5 Science Storylines Grade 1 Unit 9 Lesson 1: What Can We Observe About Objects? Student Edition, pp. 325–336 Teacher Edition, pp. 325A-336A Assessment Guide, pp. AG89 Grade 1 Unit 9 Lesson 4: How Can Matter Change? Student Edition, pp. 351–360 Teacher Edition, pp. 351A-360A Assessment Guide, pp. AG92 Grade 1 Unit 10 Lesson 2: How Can We Change the Way Objects Move? Student Edition, pp. 379–390 Teacher Edition, pp. 379A-390A Assessment Guide, pp. AG102 Grade 1 Unit 10 Lesson 3: How Can We Change Motion? Student Edition, pp. 393–394 Teacher Edition, pp. 393A-394A Assessment Guide, pp. AG103 Grade 1 Unit 10 Lesson 4: What Is Sound? Student Edition, pp. 395–404	Sciencesaurus, Yellow Level, pp. 108–109 Physical Science, Light Sciencesaurus, Yellow Level, pp. 106–107 Physical Science, Sound Science and Engineering Leveled Readers, Grade 1 Unit 4 Extra Support: *What Are Forces and Energy?* Science and Engineering Leveled Readers, Grade 1 Unit 4 On-Level: *What Are Forces and Energy?* Grade 1 Unit 8 STE: See the Light? Student Edition, pp. 317–318 Teacher Edition, pp. 317–318B Education.com 1st Grade Science Worksheet Database Education.com 1st Grade Science Activity Database Online Science Activities for Kids First Grade NGSS "I Can" Posters "I Can" Statement Posters for NGSS Engineering Standards K-5 Fair Tests: An NGSS Tool for STEM and the Engineering Design Process Stem Bin Organization Science Resource Collection Brain Pop, Jr.

Teacher Edition, pp. 395A–404A Assessment Guide, p. AG 104 Grade 1 Unit 10 Lesson 5: How Do We Make Sound? Student Edition, pp. 405–406 Teacher Edition, pp. 405A–406A Assessment Guide, p. AG 105 Grade 1 Unit 9 STEM: High Tech! Classroom Technology Student Edition, pp. 363–364 Grade 1 Unit 9 STEM: Redesign It: Better Technology Inquiry Flipchart, p. 45 Grade 1 Unit 10 Lesson 1: How Do Objects Move? Do the Math Student Edition, p. 373 Grade 1 Unit 10 Lesson 3: How Can We Change Motion? Inquiry Flipchart, p. 48 **STEM Activities** Inflating Balloon Experiment Vinegar Baking Soda Video Balloon Experiment Measurement, States of Matter, Force and Motion, Sink or Float, Engineering Educator Guide Website Frozen Ice Melt Activities Salt Water Density Sink or Float / Cross curricular Literature STEM Baking Soda	Light and Sound Lessons and Activities More Light and Sound Lessons and Activities NGSS Sound Vibrations Video Light and Sound Picture Sort Solids, Liquids, Gases Solids, Liquids, Gases Karaoke Mixtures Energy & Matter Heat Light Sound Bill Nye Phases of Matter Bill Nye Energy Bill Nye Heat Bill Nye Buoyancy Float/Sink Surface Tension, Buoyancy, Density, Chemical Reaction

Connecting with English Language Arts/Literacy and Mathematics
English Language Arts/Literacy To integrate the CCSS for English Language Arts into this unit, students need opportunities to read informational texts in order to gather information about light and sound. With adult guidance, they identify the main topic and retell key details from texts and ask and answer questions about key details. Students should also participate in shared research and writing projects. They can gather information from a variety of preselected, grade-level appropriate texts and resources, and use

that information to answer questions about light and sound. In pairs or small groups, students can use pictures and words to create simple books about vibration (sound) and illumination (light). The students' writing should include facts about the topic and have a sense of closure. Throughout the unit of study, students need multiple opportunities to share their experiences with light and sound in collaborative conversations with adults and peers, in small and large group settings.

Literature Connections

What is the World Made Of? by Kathleen Wiedner Zoehfeld

What's the Matter in Mr. Whiskers' Room? by Michael Elsohn

Bartholomew and the Oobleck by Dr. Seuss

The Magic School Bus Ups And Downs: A Book About Floating And Sinking

Let's Try It Out in the Water : Hands On Early Learning Science Activities by Seymour Simon

JoeJoe the Wizard Brews Up Solids, Liquids, and Gases by Eric Braun

You Wouldn't Want to Live Without Electricity by Ian Graham

Oscar and the Moth: A Book About Light and Dark by Geoff Waring

Sound: Loud, Soft, High, and Low by Natalie M. Rosinsky

Light: Shadows, Mirrors, and Rainbows by Natalie M. Rosinsky

Newton and Me by Lynne Mayer

Science Leveled Readers

- All About Matter
- What is Matter?
- Fantastic Fruit
- Motion
- In Motion!
- Ride On

Mathematics

Math Activities:

STEM Activity Integration Guide for Go Math

Go Math! STEM Activities Teacher Edition (TE)

Go Math! STEM Activities Student Edition (SE)

Kinds of Energy: Do the Math! Solve a Problem Go Math Chapter 1 STEM TE | SE

Using Force: Predict Motion Go Math Chapter 2 STEM TE | SE

Get Together: Explore Magnets Go Math Chapter 5 STEM TE | SE

What's It Like? Go Math Chapter 7 STEM TE | SE

Set Things in Motion Go Math Chapter 10 STEM TE | SE

Modifications
(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).

NJSLS-S and Foundations for the Unit
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)**

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Unit 5: Communicating with Light and Sound

Unit 5 Summary		
Planning and Carrying Out Investigations	**PS4.A: Wave Properties**	**Cause and Effect**
• Plan and conduct investigations collaboratively, produce evidence to answer a question. (1-PS4-1) (1-PS4-3)	• Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)	• Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1) (1-PS4-3) (1-PS4-2)

How would we communicate over a distance without the use of any of the devices that people currently use?

In this unit of study, students continue to develop their understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. Students apply their knowledge of light and sound to engage in engineering design to solve a simple problem involving

Part A: *How can light or sound be used to communicate over a distance?*	
Concepts	**Formative Assessment**
• The shape and stability of structures of natural and designed objects are related to their function(s). • People depend on various technologies in their lives; human life would be very different without technology. • People also use a variety of devices to communicate (send and receive information) over long distances. • 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. • 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.	*Students who understand the concepts can:* • Describe how the shape and stability of structures are related to their function. • 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 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. • 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. • Use tools and materials provided to design a device that solves a specific problem. • Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance. Examples of devices could include: ✓ A light source to send signals ✓ Paper cup and string telephones ✓ A pattern of drum beats

Unit 5 Resources and Suggested Activities	
Grades K-5 Science Storylines Grade 1 Unit 2 Lesson 1: How Do Engineers Work?	Sciencesaurus, Yellow Level, pp. 12–15 Doing Science, Using the Design Process Sciencesaurus, Yellow Level, pp. 2–3

Student Edition, pp. 47–58 Teacher Edition, pp.47A–58A Assessment Guide, p. AG 13 Grade 1 Unit 2 Lesson 2: How Can We Solve a Problem? Student Edition, pp. 59–60 Teacher Edition, pp. 59A–60A Assessment Guide, p. AG 14 Grade 1 Unit 9 Lesson 2: What Are Solids, Liquids, and Gases? Student Edition, pp. 339–348 Teacher Edition, pp. 339A-348A Assessment Guide, p. AG90 Grade 1 Unit 9 Lesson 4: How Can Matter Change? Student Edition, pp. 351–360 Teacher Edition, pp. 351A-360A Assessment Guide, p. AG92 Teacher Edition, p.47A Grade 1 Unit 2 Lesson 1: Inquiry: Make It Fly! Teacher Edition, p.47A Grade 1 Unit 2 Lesson 1: Inquiry: Don't Crack Up! Grade 1 Unit 2 Lesson 2: How Can We Solve a Problem? Inquiry Flipchart, p. 8 **STEM Activities** 5 Engineering Challenges Making a Boat Straw Bridges Red Cup Stem Challenge Ice Cream Roman Arch Pretzel and Marshmallow Structures	Doing Science, Science is Observing Sciencesaurus, Yellow Level, pp. 4–7 Doing Science, Doing an Investigation Sciencesaurus, Yellow Level, pp. 8–11 Doing Science, Using Science Tools Grade 1 Unit 2 Lesson 1: How Do Engineers Work? Plan and Build Student Edition, pp. 52–53 NSTA Lesson Assessing Light Knowledge Education.com 1st Grade Science Worksheet Database Education.com 1st Grade Science Activity Database Online Science Activities for Kids First Grade NGSS "I Can" Posters "I Can" Statement Posters for NGSS Engineering Standards K-5 Fair Tests: An NGSS Tool for STEM and the Engineering Design Process Stem Bin Organization Science Resource Collection Brain Pop, Jr. Simple Machines Video Phases of Matter Video What is an Engineer? Video The Design Process Video Jessi Has a Problem/ Engineers Identify and Solve Problems Video Solve Problems and be an Engineer! Video Engineering Crash Course Kids Video Material World Video Materials Song Video Natural Resources Scientific Theory and Evidence Solids, Liquids, Gases Solids, Liquids, Gases Karaoke Mixtures

Connecting with English Language Arts/Literacy and Mathematics	
English Language Arts/Literacy 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-PS4-4) **W.1.7** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1) **RI.2.1** With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1) **W.2.6** Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1) **W.2.8** Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2) **SL.2.5**	
Literature Connections *The Kite* *Touch It!: Materials, Matter and You by Adrienne Mason* *Change It!: Solids, Liquids, Gases and You by Adrienne Mason* *JoeJoe the Wizard Brews Up Solids, Liquids, and Gases by Eric Braun* *Around the World from a to z by Christinia Cheung & Han Tran* *Let's Build a Doghouse!* *A Bubble Guppies Book* *Look at That Building! A First Book of Structures by Scot Ritchie* *Not a Box by Antoinette Portis* *Sky High by Germany Zullo* *The Story of Buildings: From the Pyramids to the Sydney Opera House and Beyond by Patrick Dillon* *The Three Little Pigs, An Architectural Tale by Steven Guarnaccia* *When I Build with Blocks by Niki Alling* *Changes, Changes by Pat Hutchins* *Block City by Robert Louis Stevenson* *If I Built a House by Chris Van Dusen*	**Science Leveled Readers** • All About Matter • What is Matter? • Fantastic Fruit

Engineering the ABC's: How Engineers Shape Our World by Patty O'Brien	

Mathematics

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

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

Use appropriate tools strategically. (1-PS4-4),(K-2-ETS1-1) **MP.5**

Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-PS4-4) **1.MD.A.1**

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. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps. (1-PS4-4) **1.MD.A.2**

Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1) **2.MD.D.10**

Math Activity:

Which Math Column can Hold Up Books?

STEM Activity Integration Guide for Go Math

Go Math! STEM Activities Teacher Edition (TE)

Go Math! STEM Activities Student Edition (SE)

Play Your Part: Do the Math! Solve a Problem Go Math Chapter 3 STEM TE | SE

Rocks and Soil: Identify Natural Resources Go Math STEM Chapter 6 STEM TE | SE

Plan & Build: Make a Back Scratcher Go Math Chapter 9 STEM TE | SE

Modifications

(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).

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

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations • Plan and conduct investigations collaboratively to produce evidence to answer a question. (1-PS4-1),(1-PS4-3) **Constructing Explanations and Designing Solutions** • Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4) **Asking Questions and Defining Problems** • Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1) • Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)	**PS4.C: Information Technologies and Instrumentation** • People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4) **ETS1.A: Defining and Delimiting Engineering Problems** • A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) • Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) • Before beginning to design a solution, it is important to clearly understand the problem. (K-	**Structure and Function** • The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2) ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Engineering, Technology, and Science, on Society and the Natural World** • People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4)

Best Practices and Exemplars

Students with Disabilities, English Language Learners, and Gifted & Talented Students:
Differentiating instruction is a flexible process that includes the planning and design of instruction, how that instruction is delivered, and how student progress is measured. Teachers recognize that students can learn in multiple ways. By providing appropriately challenging learning, teachers can maximize success for all students.

Examples of Strategies and Practices that Support Students with Disabilities:
***Refer to students' IEP for specific modifications and accommodations**

- Use of visual and multisensory formats
- Use of assisted technology
- Use of prompts
- Modification of content and student products
- Testing accommodations
- Authentic assessments

Examples of Strategies and Practices that Support Gifted & Talented Students:

- Adjusting the pace of lessons
- Curriculum compacting

- Inquiry-based instruction
- Independent study
- Higher-order thinking skills
- Interest-based content
- Student-driven instruction
- Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
***All WIDA Can Do Descriptors can be found at:** https://wida.wisc.edu/teach/can-do/descriptors
- Pre-teaching of vocabulary and concepts
- Visual learning, including graphic organizers
- Use of cognates to increase comprehension
- Teacher modeling
- Pairing students with beginning English language skills
with students who have more advanced English language skills
- Scaffolding
- Word walls
- Sentence frames
- Think-pair-share
- Cooperative learning groups
- Teacher think-aloud

Interdisciplinary connections are made across grades and content areas to model the integration of knowledge and skills in the real world.

21st Century Themes

- Global Awareness
- Environmental Literacy
- Health Literacy

- Civic Literacy
- Financial, Economic, Business, and Entrepreneurial Literacy

21st Century Skills

- Creativity and Innovation (E)
- Critical Thinking and Problem Solving (T) (A)
- Communication (E)
- Collaboration (E) (T)

Career Ready Practices:

- CRP1: Act as a responsible and contributing citizen and employee.
- CRP2: Apply appropriate academic and technical skills.
- CRP3: Attend to personal health and financial well-being.
- CRP4: Communicate clearly and effectively and with reason.
- CRP5: Consider the environmental, social and economic impacts of decisions.
- CRP6: Demonstrate creativity and innovation.
- CRP7: Employ valid and reliable research strategies.
- CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9: Model integrity, ethical leadership and effective management.
- CRP10: Plan education and career paths aligned to personal goals.
- CRP11: Use technology to enhance productivity.
- CRP12: Work productively in teams while using global competence.

9.1 Personal Financial Literacy
This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

9.2 Career Awareness, Exploration, and Preparation
This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

9.3 Career and Technical Education
This standard outlines what students should know and be able to do upon completion of a CTE Program of Study

Technology Standards: Technology standards are embedded throughout all curricular units.

8.1 Educational Technology All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.

8.2 Technology Education, Engineering, Design and Computational Thinking - Programming
All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.