Moonachie School District
Science Curriculum:
Grade 1

New Jersey Student Learning Standards for Science

Born On: August 23, 2022
Re-Adopted: August 26, 2025

Unit 1 Overview
Unit 1: Patterns of Change in the Night Sky
Grade: 1
Content Area: Earth Science
Pacing: 15 Instructional Days
Essential Question
Can we predict how the sky will change over time?
Student Learning Objectives (Performance Expectations)
1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.
1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.
Unit Summary
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.
Technical Terms
Sun, Moon, Stars, Planets, Space, Solar System, Inner Solar System, Outer Solar System, Patterns, Predictions, Degrees, East, West, North, South, Light, Heat, Food Change, Clouds, Rain, Weather, Seasons, Electricity, Solar Power, Calendars, Sundial, Orbits, New Moon, Crescent Moon, Gibbous Moon, Full Moon, Waxing, Waning, Telescope, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, Hemisphere, Constellation, Eclipse
Formative Assessment Measures
Part A: What patterns of change can be predicted when observing the sun, moon, and stars?
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?
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.)

Interdisciplinary Connections	
NJSLS- ELA	**NJSLS- Mathematics**
W.SE.1.6. With guidance and support from adults, gather and select information from multiple sources to answer a question or write about a topic. W.RW.1.7. Engage in discussion, drawing, and writing in brief but regular writing tasks.	MP.2: Reason abstractly and quantitatively. MP.4: Model with mathematics. MP.5: Use appropriate tools strategically. 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.DL.A.1O: 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.`

Core Instructional Materials	SAVVAS K-12 Experience Science and Lab Materials
Career Readiness, Life Literacies and Key Skills	9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive). 9.4.2.IML.2: Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10). 9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1). 9.4.2.TL.6: Illustrate and communicate ideas and stories using multiple digital tools (e.g., SL.2.5.).
Computer Science and Design Thinking	8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats. 8.1.2.DA.3: Identify and describe patterns in data visualizations. 8.1.2.DA.4: Make predictions based on data using charts or graphs. 8.2.2.ED.1: Communicate the function of a product or device.

Modifications				
Multilingual Learners	**Special Education**	**At Risk for School Failure**	**Gifted and Talented**	**504**
Scaffolding Word walls Sentence/paragraph frames Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aides Modeling Cognates	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast	Teacher tutoring Peer tutoring Study guides Graphic organizers Extended time Parent communication Modified assignments Counseling	Curriculum compacting Challenge assignments Enrichment activities Tiered activities Independent research/inquiry Collaborative teamwork Higher level questioning Critical/Analytical thinking tasks Self-directed activities	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast Parent communication

				Modified assignments Counseling

Grade 1 Unit 1: Patterns of Change in the Sky		
1-ESS1-1 Earth's Place in the Universe		
1-ESS1-1 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.		
Evidence Statements: 1-ESS1-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.	**ESS1.A: The Universe and its Stars** Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted.	**Patterns** Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. **Connections to Nature of Science** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** Science assumes natural events happen today as they happened in the past. Many events are repeated.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: 3.PS2.A ; 5.PS2.B ; 5.ESS1.B		

5E Model	
1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.	
Engage **Anticipatory Set**	BrainPOP: The Moon, The Sun, The Solar System https://jr.brainpop.com/science/space/sun/ https://jr.brainpop.com/science/space/moon/ https://jr.brainpop.com/science/space/solarsystem/ Crash Course Kids: Following the Sun https://www.youtube.com/watch?v=b25g4nZTHvM Informational Text: Sky Pattern and the Moon http://www.ck12.org/na/Sky-Patterns-2/lesson/Sky-Patterns-SCIGR1/ http://www.ck12.org/na/The-Moon-2/lesson/The-Moon-SCIGR1/ Outer Space: Time to Shine https://youtu.be/i235Y2HRksA?list=PLPphPHIzdSQNZ5eH4InGXlwxvrjIvtaDw

Exploration **Student Inquiry**	Observing the Sun In this lesson, students will observe and describe patterns in the sun's movement. http://betterlesson.com/lesson/613470/observing-the-sun It's a Pattern! The Moon's Phases In this lesson, students will describe patterns of the moon. http://betterlesson.com/lesson/615207/it-s-a-pattern-the-moon-s-phases Star Light! Star Bright: Star Patterns In this lesson, students will describe patterns of the stars. http://betterlesson.com/lesson/615210/star-light-star-bright-star-patterns
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): ESS1.A: The Universe and its Stars Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted.
Elaboration **Extension Activity**	Moon Phases Flipbook http://spaceracers.org/pdf/moon-phases-flipbook.pdf Lunar Cycle Challenge http://sciencenetlinks.com/interactives/moon/moon_challenge/moon_challenge.html
Evaluation **Assessment Tasks**	Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. Assessment Task A Observations of the Sun Worksheet Assessment Task B Moon Phases Recording Sheet **Benchmark Assessment:** SAVVAS **Formative Assessment:** Entrance Slip, Exit Slip, Student Reflection, Math Accountable Talk, Whiteboard Work, Drawing Journal **Summative Assessment:** Topic Review, Topic Test, Quick Check, Performance Task **Alternate Assessment:** Manipulative Based Task, Open Ended Project, Choice Board, Turn and Talk, Sorting Activity, Picture based assessment

Grade 1 Unit 1: Patterns of Change in the Sky
1-ESS1-2 Earth's Place in the Universe
1-ESS1-2 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.

Evidence Statements: 1-ESS1-2

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. Make observations (firsthand or from media) to collect data that can be used to make comparisons.	**ESS1.B: Earth and the Solar System** Seasonal patterns of sunrise and sunset can be observed, described, and predicted.	**Patterns** Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.

Connections to other DCIs in this grade-band: N/A

Articulation of DCIs across grade-bands: 5.PS2.B; 5.ESS1.B

5E Model

1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.

Engage **Anticipatory Set**	The Earth and Beyond: Sunrise, Sunset and Day Length Using the following interactive website, students can compare the amount of daylight that occurs throughout the year. To create a personal connection to the activity, students can input their birthdays and then compare daylight hours. Whose birthday has the most daylight? Whose birthday has the least? http://www.childrensuniversity.manchester.ac.uk/interactives/science/earthandbeyond/sunrisesunset/ Sunrise and Sunset Calendar Using the following website, students can create and view sunrise and sunset calendars for each month of the year for their town. After viewing several calendars, ask students to make predictions about future sunrise & sunset patterns. Calendar data can further be used to compare sunrise and sunset times across seasons. http://www.sunrisesunset.com/usa/New_Jersey.asp Moon Giant Using the following interactive website, students can view the sun and moon patterns for each month the year. As students explore these patterns, draw their attention to the position of the sun and how it changes month to month. http://www.moongiant.com/
Exploration Student Inquiry	The Predictable Patterns of the Sun and the Seasons In this lesson, students will investigate the predictable patterns of our sunrise and sunset and how it relates to our seasonal patterns. http://betterlesson.com/lesson/635856/the-predictable-patterns-of-the-sun-and-the-seasons Patterns of Daylight In this lesson, students will describe patterns of the sun that lead to more sunlight in the summer. http://betterlesson.com/lesson/639226/patterns-of-daylight

	Data for Days In this lesson, students will analyze data to make comparisons between the amount of daylight in summer and winter. http://betterlesson.com/lesson/639228/data-for-days
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): ESS1.B: Earth and the Solar System Seasonal patterns of sunrise and sunset can be observed, described, and predicted.
Elaboration **Extension Activity**	Our Super Star Use this lesson guide to teach students basic facts about the Sun, model the mechanics of day and night, and use solar energy to make a tasty treat. http://az.pbslearningmedia.org/resource/ess05.sci.ess.eiu.lp_superstar/our-super-star/ Additional Related Resources https://www.opened.com/search?offset=0&standard=1.ESS1.2
Evaluation **Assessment Tasks**	Make observations (firsthand or from media) to collect data that can be used to make comparisons. Assessment Task A Sunrise and Sunset Graph Assessment Task B Patterns of Daylight: Summer/Winter T-Chart Assessment Task C Data for Days: Student Data Analysis **Benchmark Assessment:** SAVVAS **Formative Assessment:** Entrance Slip, Exit Slip, Student Reflection, Math Accountable Talk, Whiteboard Work, Drawing Journal **Summative Assessment:** Topic Review, Topic Test, Quick Check, Performance Task **Alternate Assessment:** Manipulative Based Task, Open Ended Project, Choice Board, Turn and Talk, Sorting Activity, Picture based assessment

Unit 2 Overview
Unit 2: Characteristics of Living Things
Grade: 1
Content Area: Life Science
Pacing: 15 Instructional Days
Essential Question

N/A

Student Learning Objectives (Performance Expectations)

1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

Unit 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.

Technical Terms

Parents, Offspring, Similarities, Differences, Traits, Inheritance, Genes, DNA, Survive, Types of Parenting Behaviors (e.g., nesting, etc.), Types of Survival Behaviors (e.g., crying, etc.), Mammals, Reptiles, Fish, Birds, Insects

Formative Assessment Measures

Part A: How are young plants and animals alike and different from 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.

Part B: What types (patterns) of behavior can be observed among parents that help 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.

Interdisciplinary Connections

NJSLS- ELA	NJSLS- Mathematics
RI.CR.1.1. Ask and answer questions about key details in an informational text (e.g., who, what, where, when, why, how). RL.CI.1.2. Determine central message and retell a sequence of events in literary texts (e.g., who, what, where, when, why,	MP.2 : Reason abstractly and quantitatively. MP.4 Model with mathematics. 1.M.A.2 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length

how). RI.IT.1.3. Describe relationships among pieces of information (e.g., sequence of events, steps in a process, cause-effect and compare-contrast relationships) within a text W.SE.1.6. With guidance and support from adults, gather and select information from multiple sources to answer a question or write about a topic. W.RW.1.7. Engage in discussion, drawing, and writing in brief but regular writing tasks SL.UM.1.5. Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings. SL.AS.1.6. Produce complete sentences when appropriate to task and situation.	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

Core Instructional Materials	SAVVAS K-12 Experience Science and Lab Materials
Career Readiness, Life Literacies and Key Skills	9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2). 9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive). 9.4.2.IML.1: Identify a simple search term to find information in a search engine or digital resource. 9.4.2.TL.2: Create a document using a word processing application. 9.4.2.TL.6: Illustrate and communicate ideas and stories using multiple digital tools (e.g., SL.2.5.).
Computer Science and Design Thinking	8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats. 8.1.2.DA.3: Identify and describe patterns in data visualizations. 8.1.2.DA.4: Make predictions based on data using charts or graphs. 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.

Modifications				
Multilingual Learners	**Special Education**	**At Risk for School Failure**	**Gifted and Talented**	**504**
Scaffolding	Word walls	Teacher tutoring	Curriculum compacting	Word walls
Word walls	Visual aides	Peer tutoring	Challenge assignments	Visual aides
Sentence/paragraph frames	Graphic organizers	Study guides	Enrichment activities	Graphic organizers
Bilingual dictionaries/translation	Multimedia	Graphic organizers	Tiered activities	Multimedia
	Leveled readers	Extended time	Independent research/inquiry	Leveled readers

Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aides Modeling Cognates	Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast	Parent communication Modified assignments Counseling	Collaborative teamwork Higher level questioning Critical/Analytical thinking tasks Self-directed activities	Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast Parent communication Modified assignments Counseling

Grade 1 Unit 2 Characteristics of Living Things		
1-LS3-1 Heredity: Inheritance and Variation of Traits		
1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.		
Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.		
Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.		
Evidence Statements: 1-LS3-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.	**LS3.A: Inheritance of Traits** Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents. **LS3.B: Variation of Traits** Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.	**Patterns** Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: 3.LS3.A ; 3.LS3.B		
5E Model		
1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.		
Engage **Anticipatory Set**	Animal Parents and Kids that Totally Look Alike https://www.youtube.com/watch?v=8EQKVHHVR6c Baby Animals Who Grow Up To Look Totally Different https://www.youtube.com/watch?v=-0TkOoakcP0	

	Parents and Offspring In this introductory activity, students will describe how animals and their offspring are similar and how they are different. https://www.louisianabelieves.com/docs/default-source/academic-curriculum/task---science---grade-1---parents-and-offspring-pdf.pdf?sfvrsn=4
Exploration **Student Inquiry**	Chip Off the Old Block In this activity, students will identify specific physical traits of adult plants and animals that are passed on to their offspring. Students will examine images of young and mature plants and animals, and then match the adults to their offspring. http://www.siemensscienceday.com/pdf/ChipOfftheOldBlock.pdf Who's Your Animal Parent? In this lesson, students will match animal parents to their offspring and explore their similarities. http://betterlesson.com/lesson/644834/who-s-your-animal-parent Who's Your Plant Parent? In this lesson, students will identify that baby plants resemble adult plants by observing live plants and photographs. http://betterlesson.com/lesson/640492/who-s-your-plant-parent Similarities and Differences In this lesson, students will research physical similarities and differences between animal parents and their offspring by using nonfiction text. Students will record their findings in their science journals. http://betterlesson.com/lesson/644840/similiarities-and-differences
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): LS3.A: Inheritance of Traits Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents. LS3.B: Variation of Traits Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.
Elaboration **Extension Activity**	Heredity: Inheritance and Variation of Traits The following unit includes various activities focused on the inheritance of traits with occurs in both plants and animals. http://www.harmonydc.org/Curriculum/pdf/1sample.pdf
Evaluation **Assessment Tasks**	Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. Assessment Task A Chip Off the Old Block: Student Handout Assessment Task B Who's Your Animal/Plant Parent: Journal Entries

	Assessment Task C Animal Parents and Offspring Worksheet **Benchmark Assessment:** SAVVAS **Formative Assessment:** Entrance Slip, Exit Slip, Student Reflection, Math Accountable Talk, Whiteboard Work, Drawing Journal **Summative Assessment:** Topic Review, Topic Test, Quick Check, Performance Task **Alternate Assessment:** Manipulative Based Task, Open Ended Project, Choice Board, Turn and Talk, Sorting Activity, Picture based assessment

Grade 1 Unit 2 Characteristics of Living Things		
1-LS1-2 From Molecules to Organisms: Structures and Processes		
1-LS1-2. 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).		
Assessment Boundary: N/A		
Evidence Statements: 1-LS1-2		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Obtaining, Evaluating, and Communicating Information	**LS1.B: Growth and Development of Organisms**	**Patterns**
Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.	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.	Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.
Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world.		
Connections to Nature of Science **Scientific Knowledge is Based on Empirical Evidence** Scientists look for patterns and order when making observations about the world.		
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: 3.LS2.D		

5E Model	
1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.	
Engage Anticipatory Set	10 Amazing Animal Parents https://www.youtube.com/watch?v=0auqYct-K9Q Behaviors of Animal Mothers and Fathers http://www.neatorama.com/2011/05/07/the-8-best-mothers-in-the-animal-kingdom/

	http://www.neatorama.com/2010/06/17/12-impressively-active-animal-fathers/ Read Aloud: Mr. Seahorse by Eric Carle https://www.youtube.com/watch?v=cIzCdSM7BBU
Exploration Student Inquiry	Birds Help Their Young Survive: Cranes In this lesson, students will determine patterns in cranes' behavior that help their offspring survive. http://betterlesson.com/lesson/628721/birds-help-their-young-survive-cranes Birds Help Their Young Survive: Puffins In this lesson, students determine patterns in puffins'' behavior that help their offspring survive. http://betterlesson.com/lesson/628722/birds-help-their-young-survive-puffins Birds Help Their Young Survive: Bald Eagles In this lesson, students determine patterns in eagles' behavior that help their offspring survive. http://betterlesson.com/lesson/628723/birds-help-their-young-survive-bald-eagles Birds Help Their Young Survive: Emperor Penguins https://betterlesson.com/lesson/628727/birds-help-their-young-survive-penguins In this lesson, students determine patterns in penguins' behavior that help their offspring survive. Mama Elephant and Her Offspring In this lesson, students will determine ways elephants use their external features to aid in the survival of their offspring. http://betterlesson.com/lesson/613297/mama-elephant-and-her-offspring
Explanation Concepts and Practices	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): 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.
Elaboration Extension Activity	Additional Related Activities http://celebratescience.blogspot.com/2014/01/integrating-science-and-language-arts.html https://www.opened.com/search?offset=0&standard=1.LS1.2
Evaluation Assessment Tasks	Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. Assessment Task A Caring for Offspring Comparison Chart **Benchmark Assessment:** SAVVAS

	Formative Assessment: Entrance Slip, Exit Slip, Student Reflection, Math Accountable Talk, Whiteboard Work, Drawing Journal **Summative Assessment:** Topic Review, Topic Test, Quick Check, Performance Task **Alternate Assessment:** Manipulative Based Task, Open Ended Project, Choice Board, Turn and Talk, Sorting Activity, Picture based assessment

Unit 3 Overview
Unit 3: Mimicking Organisms to Solve Problems
Grade: 1
Content Area: Life Science
Pacing: 25 Instructional Days
Essential Question
N/A
Student Learning Objectives (Performance Expectations)
1-LS1-1. 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.*
Unit Summary
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.
Technical Terms
Bio, Mimicking, Biomimicry, External Body Parts (e.g., Tails, Roots, Quills, Spines, Beak, Claws, etc.), Adaptation, Engineer, Camouflage, Animals (e.g., Puffin, Elephant, Zebra, etc. - Dependent on Lesson Used)
Formative Assessment Measures
Part A: How can humans mimic how plants and animals use their external parts to help them survive and grow? Concepts F
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.

Interdisciplinary Connections	
NJSLS- ELA	**NJSLS- Mathematics**
W.IW.1.2. With prompts and support, write informative/explanatory texts to examine a topic and convey ideas and information SL.PE.1.1. Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups	N/A

Core Instructional Materials	SAVVAS K-12 Experience Science and Lab Materials
Career Readiness, Life Literacies and Key Skills	9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a) 9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2). 9.4.2.DC.7: Describe actions peers can take to positively impact climate change (e.g., 6.3.2.CivicsPD.1). 9.4.2.IML.3: Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2). 9.4.2.TL.7: Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts (e.g., W.2.6., 8.2.2.ED.2).
Computer Science and Design Thinking	8.2.2.ED.1: Communicate the function of a product or device. 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process. 8.2.2.ITH.1: Identify products that are designed to meet human wants or needs. 8.2.2.ITH.2: Explain the purpose of a product and its value. 8.2.2.ITH.5: Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution. 8.2.2.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

Modifications				
Multilingual Learners	**Special Education**	**At Risk for School Failure**	**Gifted and Talented**	**504**
Scaffolding	Word walls	Teacher tutoring	Curriculum compacting	Word walls
Word walls	Visual aides	Peer tutoring	Challenge assignments	Visual aides
Sentence/paragraph frames	Graphic organizers	Study guides	Enrichment activities	Graphic organizers
Bilingual dictionaries/translation	Multimedia	Graphic organizers	Tiered activities	Multimedia
Think alouds	Leveled readers	Extended time	Independent research/inquiry	Leveled readers
Read alouds	Assistive technology	Parent communication	Collaborative teamwork	Assistive technology
Highlight key vocabulary	Notes/summaries	Modified assignments	Higher level questioning	Notes/summaries
Annotation guides	Extended time	Counseling	Critical/Analytical thinking tasks	Extended time

Think-pair- share Visual aides Modeling Cognates	Answer masking Answer eliminator Highlighter Color contrast		Self-directed activities	Answer masking Answer eliminator Highlighter Color contrast Parent communication Modified assignments Counseling

Grade 1 Unit 3: Mimicking Organisms to Solve Problems		
1-LS1-1 From Molecules to Organisms: Structures and Processes		
1-LS1-1. 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.		
Assessment Boundary: N/A		
Evidence Statements: 1-LS1-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Constructing Explanations and Designing Solutions Use materials to design a device that solves a specific problem or a solution to a specific problem	**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, 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. **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.	**Structure and Function** The shape and stability of structures of natural and designed objects are related to their function(s). **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.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: K.ETS1.A ; 4.LS1.A ; 4.LS1.D ; 4.ETS1.A		
5E Model		

1-LS1-1. 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.*	
Engage **Anticipatory Set**	Discovery World: Biomimicry https://www.youtube.com/watch?v=BiMZYdVLqME What Is Biomimicry? http://www.teacherstryscience.org/ts/what-biomimicry
Exploration **Student Inquiry**	Lesson 1: Changing to Survive Students will solve a human problem by mimicking the external parts of plants or animals. Students will also participate in small-group conversations. https://www.lernerbooks.com/siteassets/downloads/SL_TG_1G.pdf Introducing Engineering In this lesson, students will mimic an external part of a bird in order to solve a human problem.I http://betterlesson.com/lesson/626226/introducing-engineering Engineering Solutions In this lesson, students will design a solution to a human problem by mimicking the external features of birds. http://betterlesson.com/lesson/626229/engineering-solutions
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): 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, 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. 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.
Elaboration **Extension Activity**	Additional Related Activities/Resources https://www.opened.com/search?standard=1.LS1.1 https://www.teacherspayteachers.com/Product/Solving-Problems-by-Mimicking-Nature-Biomimicry-NGSS-Grade-1LS1-1-standard-1255192 http://celebratescience.blogspot.com/2013/11/integrating-science-and-language-arts_18.html
Evaluation **Assessment Tasks**	Use materials to design a device that solves a specific problem or a solution to a specific problem. Assessment Task A Changing to Survive: Discussion Questions

	Assessment Task B Bird Beak Design Solution Assessment Task C Bird Claw Design Solution **Benchmark Assessment:** SAVVAS **Formative Assessment:** Entrance Slip, Exit Slip, Student Reflection, Math Accountable Talk, Whiteboard Work, Drawing Journal **Summative Assessment:** Topic Review, Topic Test, Quick Check, Performance Task **Alternate Assessment:** Manipulative Based Task, Open Ended Project, Choice Board, Turn and Talk, Sorting Activity, Picture based assessment

Grade 1 Unit 3: Mimicking Organisms to Solve Problems		
K-2-ETS1-2 Engineering Design		
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.		
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.		
Evidence Statements: K-2-ETS1-2		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)	**ETS1.B: Developing Possible Solutions** Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions, such as climate change, to other people. (K-2-ETS1-2)	**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 K-2-ETS1.B: Kindergarten K-ESS3-3; First Grade 1-PS4-4; Second Grade 2-LS2-2		
Articulation of DCIs across grade-bands: 3-5.ETS1.A; 3-5.ETS1.B; 3-5.ETS1.C		

Unit 4 Overview
Unit 4: Light and Sound
Grade: 1
Content Area: Physical Science
Pacing: 20 Instructional Days
Essential Question

N/A

Student Learning Objectives (Performance Expectations)

1-PS4-2 Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.

1-PS4-3 Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

1-PS4-1 Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

Unit 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.

Technical Terms

Darkness, Illumination, Light, Light Source, Natural Light Source, Artificial Light, Electricity, Energy, Reflected Light, Absorbed Light, Transparent, Translucent, Opaque, Shadow, Stained Glass, Refracts, Sound, Sound Waves, Vibrations, Light Waves, Light Participles, Pinhole Box, Brightness, Position, Distance, Eardrum, Volume, Pitch, Echo

Formative Assessment Measures

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?

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?

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?

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.

Interdisciplinary Connections

NJSLS- ELA	NJSLS- Mathematics

W.IW.1.2. With prompts and support, write informative/explanatory texts to examine a topic and convey ideas and information W.WR.1.5. With prompting and support, generate questions through shared research about a topic and determine possible sources to obtain information on that topic W.SE.1.6. With guidance and support from adults, gather and select information from multiple sources to answer a question or write about a topic. SL.PE.1.1. Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups	N/A	

Core Instructional Materials	SAVVAS K-12 Experience Science and Lab Materials
Career Readiness, Life Literacies and Key Skills	9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a) 9.4.2.CT.2: Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3). 9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive). 9.4.2.IML.1: Identify a simple search term to find information in a search engine or digital resource. 9.4.2.TL.3: Enter information into a spreadsheet and sort the information. 9.4.2.TL.7: Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts (e.g., W.2.6., 8.2.2.ED.2).
Computer Science and Design Thinking	8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats. 8.1.2.DA.4: Make predictions based on data using charts or graphs. 8.2.2.ED.1: Communicate the function of a product or device. 8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process.

Modifications

Multilingual Learners	Special Education	At Risk for School Failure	Gifted and Talented	504
Scaffolding	Word walls	Teacher tutoring	Curriculum compacting	Word walls
Word walls	Visual aides	Peer tutoring	Challenge assignments	Visual aides
Sentence/paragraph frames	Graphic organizers	Study guides	Enrichment activities	Graphic organizers
Bilingual dictionaries/translation	Multimedia	Graphic organizers	Tiered activities	Multimedia
Think alouds	Leveled readers	Extended time	Independent research/inquiry	Leveled readers
Read alouds	Assistive technology	Parent communication	Collaborative teamwork	Assistive technology
Highlight key vocabulary	Notes/summaries	Modified assignments	Higher level questioning	Notes/summaries
Annotation guides	Extended time	Counseling	Critical/Analytical thinking tasks	Extended time
Think-pair- share	Answer masking		Self-directed activities	Answer masking
	Answer eliminator			Answer eliminator

Visual aides Modeling Cognates	Highlighter Color contrast			Highlighter Color contrast Parent communication Modified assignments Counseling

Grade 1 Unit 4: Light and Sound		
1-PS4-3 Waves and their Application in Technologies for Information Transfer		
1-PS4-2 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.		
Evidence Boundary: N/A		
Evidence Statements: 1-PS4-2		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.	**PS4.B: Electromagnetic Radiation** Objects can be seen if light is available to illuminate them or if they give off their own light.	**Cause and Effect** Simple tests can be designed to gather evidence to support or refute student ideas about causes.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: N/A		
5E Model		
1-PS4-2 Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.		
Engage **Anticipatory Set**	BrainPOP Jr: Light https://jr.brainpop.com/science/energy/light/ Let's Explore Light Sources In this lesson, students will identify which light sources are natural or man-made. http://betterlesson.com/lesson/627218/let-s-explore-light-sources	
Exploration **Student Inquiry**	Are You Afraid of the Dark? In this lesson, the students will be working with a partner to discover that objects need light to be seen. http://betterlesson.com/lesson/627219/are-you-afraid-of-the-dark Light It Up!	

	In this lesson, students will be given the opportunity to discover light sources in the environment. http://betterlesson.com/lesson/622016/light-it-up Lesson 6: In the Dark In this lesson, students will working with a partner to use pinhole boxes to observe that objects need light to be seen. They will record findings and explanations on student journal page, verifying that objects can only be seen when they are illuminated. http://www.alvordschools.org/cms/lib8/CA01900929/Centricity/Domain/2616/1st%20Grade%20Teachers%20Guide%20Complete.pdf Lesson 7: What's That Glow? In this lesson, students will explore various sources of light and how they illumination objects in the dark. http://www.alvordschools.org/cms/lib8/CA01900929/Centricity/Domain/2616/1st%20Grade%20Teachers%20Guide%20Complete.pdf
Explanation Concepts and Practices	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): PS4.B: Electromagnetic Radiation Objects can be seen if light is available to illuminate them or if they give off their own light.
Elaboration Extension Activity	Light Science for Kids http://www.sciencekids.co.nz/light.html
Evaluation Assessment Tasks	Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. Assessment Task A Are You Afraid of the Dark: Pinhole Box Recording Sheet & Journal Assessment Task B Light It Up: Concentration Cards Game & Journal Entry Assessment Task C In the Dark: Can You See It Observation Sheet pg. 24 **Benchmark Assessment:** SAVVAS **Formative Assessment:** Entrance Slip, Exit Slip, Student Reflection, Math Accountable Talk, Whiteboard Work, Drawing Journal **Summative Assessment:** Topic Review, Topic Test, Quick Check, Performance Task **Alternate Assessment:** Manipulative Based Task, Open Ended Project, Choice Board, Turn and Talk, Sorting Activity, Picture based assessment

Grade 1 Unit 4: Light and Sound
1-PS4-3 Waves and their Application in Technologies for Information Transfer
1-PS4-3 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.

Evidence Statements: 1-PS4-3

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. Plan and conduct investigations collaboratively to produce evidence to answer a question.	**PS4.B: Electromagnetic Radiation** 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.)	**Cause and Effect** Simple tests can be designed to gather evidence to support or refute student ideas about causes.

Connections to other DCIs in this grade-band: N/A

Articulation of DCIs across grade-bands: 2.PS1.A

5E Model

1-PS4-3 Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

Engage **Anticipatory Set**	Informational Text: Shadows & Transparent, Translucent and Opaque materials http://www.bbc.co.uk/bitesize/ks2/science/physical_processes/shadows/read/1/ The Dr. Binocs Show: Shadow https://www.youtube.com/watch?v=lOIGOT88Aqc Lights and Shadows Using the following interactive website, students will investigate shadows both inside and outside. http://www.bbc.co.uk/schools/scienceclips/ages/7_8/light_shadows.shtml
Exploration **Student Inquiry**	Translucent, Transparent, Opaque OH MY!! In this lesson, students will conduct an investigation to find out what happens when you put an object front of a beam of light. http://betterlesson.com/lesson/630117/translucent-transparent-opaque-oh-my Shadows, Shadows, Shadows In this lesson, students will explore the effect of moving opaque objects in the path of a beam of light, as well as how shadows change shape, size and color. http://betterlesson.com/lesson/630118/shadows-shadows-shadows Mirror, Mirror on the Wall In this lesson, students will explore with mirrors and flashlights to understand how to bend light. http://betterlesson.com/lesson/627221/mirror-mirror-on-the-wall

	Lesson 8: Camera Lens Magic In this lesson, students will investigate how light rays can pass through, reflect off, or are absorbed by an object based on whether the objects are translucent, transparent, opaque or reflective. http://www.alvordschools.org/cms/lib8/CA01900929/Centricity/Domain/2616/1st%20Grade%20Teachers%20Guide%20Complete.pdf Lesson 9: Making Shadows In this lesson, students will conduct a series of investigations to determine what happens when an object blocks a path of light? http://www.alvordschools.org/cms/lib8/CA01900929/Centricity/Domain/2616/1st%20Grade%20Teachers%20Guide%20Complete.pdf
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): PS4.B: Electromagnetic Radiation 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.)
Elaboration **Extension Activity**	What If There Were No Windows? In this activity, students will consider materials from the perspective of how much light they let through, then use these materials to create a work of art. https://mysteryscience.com/light/mystery-2/light-materials-transparent-opaque/106?r=2700175
Evaluation **Assessment Tasks**	Plan and conduct investigations collaboratively to produce evidence to answer a question. Assessment Task A Translucent, Transparent, Opaque Oh My: Observation Sheet & Journal Entry Assessment Task B Shadows, Shadows, Shadows & Mirror, Mirror on the Wall: Guiding Questions & Journal Entries Assessment Task C Camera Lens Magic: Transparent, Translucent, and Opaque Worksheet pg. 34 Assessment Task D Making Shadows: Mini Book pg.38 **Benchmark Assessment:** SAVVAS **Formative Assessment:** Entrance Slip, Exit Slip, Student Reflection, Math Accountable Talk, Whiteboard Work, Drawing Journal **Summative Assessment:** Topic Review, Topic Test, Quick Check, Performance Task **Alternate Assessment:** Manipulative Based Task, Open Ended Project, Choice Board, Turn and Talk, Sorting Activity, Picture based assessment

Grade 1 Unit 4: Light and Sound		
1-PS4-3 Waves and their Application in Technologies for Information Transfer		
1-PS4-1 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.		
Assessment Boundary: N/A		
Evidence Statements: 1-PS4-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. Plan and conduct investigations collaboratively to produce evidence to answer a question. **Connections to Nature of Science** **Scientific Investigations Use a Variety of Metho** Science investigations begin with a question. Scientists use different ways to study the world.	**PS4.A: Wave Properties** Sound can make matter vibrate, and vibrating matter can make sound.	**Cause and Effect** Simple tests can be designed to gather evidence to support or refute student ideas about causes.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: 4.ETS1.A		

5E Model	
1-PS4-1 Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.	
Engage **Anticipatory Set**	BrainPOP Jr: Sound https://jr.brainpop.com/science/energy/sound/ What is Sound? https://www.youtube.com/watch?v=3-xKZKxXuu0 The Magic School Bus: Sound is Vibration https://www.youtube.com/watch?v=ZxYmPAEW840 Vibration Song https://www.youtube.com/watch?v=VOnwW6TTTT4
Exploration **Student Inquiry**	Shhh! Did You Hear That? In this lesson, students will identify that sound is a form of energy that travels in waves.

	http://betterlesson.com/lesson/612981/shhh-did-you-hear-that Va-Va-Vibrations! In this lesson, students will describe how different wave vibrations can change sound. http://betterlesson.com/lesson/614793/va-va-vibrations Shakin' and a Movin' In this lesson, students will explain ways that sound can make matter vibrate. http://betterlesson.com/lesson/615698/shakin-and-a-movin Lesson 3: What's the Buzz? In this lesson, students will make and use a kazoo to discover how vibrations create sound waves that travel through the air to your ear. http://www.alvordschools.org/cms/lib8/CA01900929/Centricity/Domain/2616/1st%20Grade%20Teachers%20Guide%20Complete.pdf Lesson 4: Making a Splash and Musical Rulers In this lesson, students will learn that all sound is made up of vibrations which produce sound waves that travel through the air to our ears. Vibrating matter can make sound and sound makes matter vibrate causing sound waves to travel through the air. http://www.alvordschools.org/cms/lib8/CA01900929/Centricity/Domain/2616/1st%20Grade%20Teachers%20Guide%20Complete.pdf
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): PS4.A: Wave Properties Sound can make matter vibrate, and vibrating matter can make sound.
Elaboration **Extension Activity**	Sound Vibrations This lesson is designed to help students understand that vibrations are responsible for the sounds we hear. Additionally, they learn that sound vibrations can travel through different mediums. http://nj.pbslearningmedia.org/resource/phy03.sci.phys.howmove.lp_sound/sound-vibrations/ Additional Related Activities & Resources https://www.opened.com/search?standard=1.PS4.1
Evaluation **Assessment Tasks**	Plan and conduct investigations collaboratively to produce evidence to answer a question. Assessment Task A Shakin' and a Movin': Journal Page & Journal Entry Assessment Task B Making a Splash: Discussion Questions **Benchmark Assessment:** SAVVAS

	Formative Assessment: Entrance Slip, Exit Slip, Student Reflection, Math Accountable Talk, Whiteboard Work, Drawing Journal **Summative Assessment:** Topic Review, Topic Test, Quick Check, Performance Task **Alternate Assessment:** Manipulative Based Task, Open Ended Project, Choice Board, Turn and Talk, Sorting Activity, Picture based assessment

Unit 5 Overview
Unit 5: Communicating with Light and Sound
Grade: 1
Content Area: Physical Science
Pacing: 25 Instructional Days
Essential Question
How would we communicate over a distance without the use of any of the devices that people currently use?
Student Learning Objectives (Performance Expectations)
1-PS4-4 Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.*
Unit Summary
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.
Technical Terms
Light Communication, Sound Communication, String Phone, Vocal Cords
Formative Assessment Measures
Part A: How can light or sound be used to communicate over a distance?
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
Interdisciplinary Connections

NJSLS- ELA	NJSLS- Mathematics
W.RW.1.7. Engage in discussion, drawing, and writing in brief but regular writing tasks. RL.CR.1.1. Ask and answer questions about key details in a literary text (e.g., who, what, where, when, why, how) W.SE.1.6. With guidance and support from adults, gather and select information from multiple sources to answer a question or write about a topic W.WR.1.5. With prompting and support, generate questions through shared research about a topic and determine possible sources to obtain information on that topic SL.PE.1.1. Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups	MP.2 : Reason abstractly and quantitatively. MP.4 : Model with mathematics. MP.5 Use appropriate tools strategically. 1.M.A.1: Order three objects by length; compare the lengths of two objects indirectly by using a third object. 1.M.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. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps. 1.DL.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

Core Instructional Materials	SAVVAS K-12 Experience Science and Lab Materials
Career Readiness, Life Literacies and Key Skills	9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2). 9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a) 9.4.2.DC.7: Describe actions peers can take to positively impact climate change (e.g., 6.3.2.CivicsPD.1). 9.4.2.IML.3: Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2). 9.4.2.TL.7: Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts (e.g., W.2.6., 8.2.2.ED.2).
Computer Science and Design Thinking	8.2.2.ED.1: Communicate the function of a product or device. 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process. 8.2.2.ITH.3: Identify how technology impacts or improves life. 8.2.2.ITH.5: Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution. 8.2.2.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

Modifications				
Multilingual Learners	**Special Education**	**At Risk for School Failure**	**Gifted and Talented**	**504**
Scaffolding Word walls Sentence/paragraph frames	Word walls Visual aides Graphic organizers	Teacher tutoring Peer tutoring Study guides	Curriculum compacting Challenge assignments Enrichment activities	Word walls Visual aides Graphic organizers

Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aides Modeling Cognates	Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast	Graphic organizers Extended time Parent communication Modified assignments Counseling	Tiered activities Independent research/inquiry Collaborative teamwork Higher level questioning Critical/Analytical thinking tasks Self-directed activities	Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast Parent communication Modified assignments Counseling

Grade 1 Unit 5: Communicating with Light and Sound		
1-PS4-4 Waves and Their Application in Technologies for Information Transfer		
1-PS4-4 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.		
Evidence Statements: 1-PS4-4		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. Use tools and materials provided to design a device that solves a specific problem.	**PS4.C: Information Technologies and Instrumentation** People also use a variety of devices to communicate (send and receive information) over long distances.	**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.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: K.ETS1.A ; 2.ETS1.B ; 4.PS4.B ; 4.PS4.C		
5E Model		
1-PS4-4 Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.*		
Engage **Anticipatory Set**	The Science of the String Phone https://www.youtube.com/watch?v=3yqB2KFwJCo Communicating with Light: People In this lesson, students will explain devices that people use light to communicate.	

	http://betterlesson.com/lesson/635196/communicating-with-light-people Communicating with Light: Animals In this lesson, students will learn about how animals communicate with light. http://betterlesson.com/lesson/635297/communicating-with-light-animals
Exploration **Student Inquiry**	Lesson 5: Cup-A-Phone In this lesson, students will use different materials to design and build a device that allows them to communicate over a distance http://www.alvordschools.org/cms/lib8/CA01900929/Centricity/Domain/2616/1st%20Grade%20Teachers%20Guide%20Complete.pdf STEM & Sound - Day 1 & Day 2 In this two-day lesson, students will identify a communication problem and research possible solutions. http://betterlesson.com/lesson/622032/stem-sound-day-1?from=profile_curriculum_title http://betterlesson.com/lesson/640135/stem-sound-day-2?from=profile_curriculum_title
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): PS4.C: Information Technologies and Instrumentation People also use a variety of devices to communicate (send and receive information) over long distances.
Elaboration **Extension Activity**	Additional Related Activities & Resources https://www.opened.com/search?standard=1.PS4.4 Sound Devices: Planning, Building and Testing In these lessons, students will plan, construct and test a tool to transmit sound. http://betterlesson.com/lesson/631409/sound-devices-planning http://betterlesson.com/lesson/633823/sound-devices-building-and-testing Communication Devices: Planning & Revising In these lessons, students will plan and revise a tool to communicate over a distance utilizing light and/or sound. http://betterlesson.com/lesson/635312/communication-devices-planning http://betterlesson.com/lesson/638534/communication-devices-revising-plans
Evaluation **Assessment Tasks**	Use tools and materials provided to design a device that solves a specific problem. Assessment Task A Cup-A-Phone: I'm a Scientist: STEM & Sound: Project Page pg. 20 **Benchmark Assessment:** SAVVAS **Formative Assessment:** Entrance Slip, Exit Slip, Student Reflection, Math Accountable Talk, Whiteboard Work, Drawing Journal **Summative Assessment:** Topic Review, Topic Test, Quick Check, Performance Task **Alternate Assessment:** Manipulative Based Task, Open Ended Project, Choice Board, Turn and Talk, Sorting Activity,

	Picture based assessment

Grade 1 Unit 5: Communicating with Light and Sound		
K-2-ETS1-1: 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.		
Clarification Statement: N/A		
Assessment Boundary: N/A		
Evidence Statements: K-2-ETS1-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Asking Questions and Defining Problems Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions. Ask questions based on observations to find more information about the natural and/or designed world(s). Define a simple problem that can be solved through the development of a new or improved object or tool.	**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) 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- ETS1-1) Before beginning to design a solution, it is important to clearly understand the problem. (K-2- ETS1-1)	
Connections to other DCIs in this grade-band: Kindergarten- K-PS2-2, K-ESS3-2		
Articulation of DCIs across grade-bands: 3-5.ETS1.A ; 3-5.ETS1.C		

Grade 1 Unit 5: Communicating with Light and Sound		
K-2-ETS1-2 Engineering Design		
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.		
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.		
Evidence Statements: K-2-ETS1-2		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Developing and Using Models Modeling in K–2 builds on prior experiences and	**ETS1.B: Developing Possible Solutions** Designs can be conveyed through sketches,	**Structure and Function** The shape and stability of structures of natural

progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)	drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions, such as climate change, to other people. (K-2-ETS1-2)	and designed objects are related to their function(s). (K-2-ETS1-2)
Connections to K-2-ETS1.B: Kindergarten K-ESS3-3; First Grade 1-PS4-4; Second Grade 2-LS2-2		
Articulation of DCIs across grade-bands: 3-5.ETS1.A; 3-5.ETS1.B; 3-5.ETS1.C		