SOUTH HARRISON TOWNSHIP ELEMENTARY SCHOOL DISTRICT



Course Name: Science	Grade Level(s): First
BOE Adoption Date: October 2017	Revision Date(s):

ABSTRACT

Science in the first grade consist of three main units. In the Earth science unit, students will observe and predict the motion of the sun, moon and stars, as well as make seasonal pattern observations. During the physical science unit, students will investigate the properties of light and sound that make it essential for communication. In the life science unit, students will make connections among organisms than many have unique structures and traits to help them grow and survive.

TABLE OF CONTENTS

Mission Statement	Page 3
Curriculum and Instruction Goals	Page 3
Philosophy of Shared Curriculum Service with South Harrison Township Elementary	Page 3
How to Read this Document	Page 4
Terms to Know	Pages 4-6
Pacing Guide	Pages 7-10
Curriculum Units	Pages 11-45

Mission Statement

The primary goal of the South Harrison Township Elementary School District is to prepare each student with the real life skills needed to compete in a highly competitive global economy. This will be achieved by providing a comprehensive curriculum, the integration of technology, and the professional services of a competent and dedicated faculty, administration, and support staff.

Guiding this mission will be Federal mandates, including the Every Student Succeeds Act (ESSA), the New Jersey Student Learning Standards, and local initiatives addressing the individual needs of our students as determined by the Board of Education. The diverse resources of the school district, which includes a caring Home and School Association (HSA) and active adult community, contribute to a quality school system. They serve an integral role in supporting positive learning experiences that motivate, challenge and inspire children to learn.

Curriculum and Instruction Goals

Goal(s):

- 1. To ensure students are college and career ready upon graduation
- 2. To vertically and horizontally align curriculum K-12 to ensure successful transition of students at each grade level
- 3. To identify individual student strengths and weaknesses utilizing various assessment measures (formative, summative, alternative, etc.) so as to differentiate instruction while meeting the rigor of the applicable content standards
- 4. To improve student achievement as assessed through multiple measures including, but not limited to, state testing, local assessments, and intermediate benchmarking

Philosophy of the Shared Curriculum Service with Kingsway Regional School District

Together in its partnership with the South Harrison Township Elementary School District, the Kingsway Curriculum & Instruction Department is committed to providing all students grades K-12 with an engaging and quality curricular experience that aligns with the New Jersey Student Learning Standards (NJ SLS) for mathematics and English-Language Arts as well as the New Jersey Student Learning Standards (NJ SLS) for all other core disciplines. It is the goal of this shared service to provide students with curricular and educational experiences that allows them to succeed as they move on to the middle and high school level. Through this shared service, both horizontal and vertical alignment is stressed at and within each grade level with the aim of developing life-long learners who are college and career ready upon graduation from high school. Additionally, classroom instruction will be designed to meet the unique learning desires of all children and will be differentiated according to the needs of each learner. Whether through added support or enrichment activities, it is the role of the educator in the classroom to ensure students are reaching their highest level of social, emotional, and academic growth each school year. A combination of summative, formative, and performance-based

assessments will be used to assess students' understanding and acquisition of necessary concepts and skills. Group work, projects, and a variety of co-curricular activities will make mathematics more meaningful and aid in the understanding of its application across all disciplines as well as in life.

How to Read this Document

This document contains a pacing guide and curriculum units. The pacing guides serve to deliver an estimated timeframe as to when noted skills and topics will be taught. The pacing of each course, however, will differ slightly depending upon the unique needs of each class. The curriculum units contain more detailed information as to the specific skills and concepts that are introduced as well as how students will be assessed. The terms and definitions below will assist the reader in better understanding the sections and components of this curriculum document.

Terms to Know

- 1. Accommodation(s): The term "accommodation" may be used to describe an *alteration* of environment, curriculum format, or equipment that allows an individual with a disability to gain access to content and/or complete assigned tasks. They allow students with disabilities to pursue a regular course of study. The term accommodation is often used interchangeable with the term modification. However, it is important to remember that modifications change or modify the intended learning goal while accommodations result in the same learning goal being expected but with added assistance in that achievement. Since accommodations do not alter what is being taught, instructors should be able to implement the same grading scale for students with disabilities as they do for students without disabilities.
- 2. Differentiated Instruction: Differentiation of instruction relies on the idea that instructional approaches should be tailored to each individual student's learning needs. It provides students an array of options during the learning process that allows them make sense of ideas as it relates to them. The integration of differentiated instructional techniques is a curriculum design approach to increase flexibility in teaching and decrease the barriers that frequently limit student access to materials and learning in classrooms. <u>http://www.udlcenter.org/aboutudl</u>
- 3. Enduring Understanding: Enduring understandings (aka big ideas) are statements of understanding that articulate deep conceptual understandings at the heart of each content area. Enduring understandings are noted in the alongside essential questions within each unit in this document. <u>http://www.ascd.org</u>

4

- 4. Essential Question: These are questions whose purpose is to stimulate thought, to provoke inquiry, and to spark more questions. They extend beyond a single lesson or unit. Essential questions are noted in the beginning of each unit in this document. <u>http://www.ascd.org</u>
- 5. Formative Assessment(s): Formative assessments monitor student learning to provide ongoing feedback that can be used by (1) instructors to improve teaching and (2) by students to improve their learning. Formative assessments help identify students' strengths and weaknesses and address problems immediately.
- 6. Learning Activity(s): Learning activities are those activities that take place in the classroom for which the teacher facilitates and the students participate in to ensure active engagement in the learning process. (Robert J. Marzano, *The Art and Science of Teaching*)
- 7. Learning Assignment(s): Learning assignments are those activities that take place independently by the student inside the classroom or outside the classroom (i.e. homework) to extend concepts and skills within a lesson. http://www.marzanocenter.com
- 8. Learning Goal(s): Learning goals are broad statements that note what students "should know" and/or "be able to do" as they progress through a unit. Learning goals correlate specifically to the NJSLS (New Jersey Student Learning Standards) are noted within each unit.
- 9. Learning Objective(s): Learning objectives are more specific skills and concepts that students must achieve as they progress towards the broader learning goal. These are included within each unit and are assessed frequently by the teacher to ensure students are progressing appropriately. <u>http://www.marzanoresearch.com</u>
- **10. Model Assessment:** Within the model curriculum, model assessments are provided that included assessments that allow for measuring student proficiency of those target skills as the year of instruction progresses. http://www.state.nj.us/education/modelcurriculum/
- 11. Model Curriculum: The model curriculum has been provided by the state of New Jersey to provide a "model" for which districts can properly implement the NJSLS (New Jersey Student Learning Standards) by providing an example from which to work and/or a product for implementation.

- 12. Modification(s): The term "modification" may be used to describe a *change* in the curriculum. Modifications are typically made for students with disabilities who are unable to comprehend all of the content an instructor is teaching. The term modification is often used interchangeable with the term accommodations. However, it is important to remember that modifications change or modify the intended learning goal while accommodations result in the same learning goal being expected but with assistance in that achievement.
- 13. Performance Assessment(s): (aka alternative or authentic assessments) Performance assessments are a form of assessment that requires students to perform tasks that generate a more authentic evaluation of a student's knowledge, skills, and abilities. Performance assessments stress the application of knowledge and extend beyond traditional assessments (i.e. multiple-choice question, matching, true & false, etc.).
- 14. Standard(s): Academic standards, from which the curriculum is built, are statements that of what students "should know" or "be able to do" upon completion of a grade-level or course of study. Educational standards help teachers ensure their students have the skills and knowledge they need to be successful by providing clear goals for student learning. http://www.state.nj.us/njded/cccs/
 - State: The New Jersey Student Learning Standards (NJSLS) include Preschool Teaching and Learning Standards as well as K-12 standards for: Visual and Performing Arts; Comprehensive Health and Physical Education; Science; Social Studies; World Languages; Technology; and 21st-Century Life and Careers.
- 15. Summative Assessment(s): Summative assessments evaluate student learning at the end of an instructional time period by comparing it against some standard or benchmark. Information from summative assessments can be used formatively when students or faculty use it to guide their efforts and activities in subsequent courses.
- 16. 21st Century Skill(s): These skills emphasis the growing need to focus on those skills that prepare students successfully by focusing on core subjects and 21st century themes; learning and innovation skills; information, media and technology skills; and life and career skills. These concepts are embedded in each unit of the curriculum. http://www.p21.org/our-work/p21framework

Proficiencies and Pacing Guide:

Unit Title	Duration/Month(s)	Related Standards	Learning Goals	Crosscutting Concepts
Unit 1 Earth's Place in the Universe	5 Weeks	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. (1-ESS1-1) ESS1.B: Earth and the Solar System Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1- ESS1-2)	 Students will Use observations of the sun, moon, and stars to describe patterns that can be predicted. Make observations at different times of year to relate the amount of daylight to the time of year. 	Patterns Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1),(1-ESS1-2)
Unit 2 Light and Sound Waves/ Communicating with Light and Sound	5 Weeks	 PS4.A: Wave Properties Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1) PS4.B: Electromagnetic Radiation Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2) 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 	 Students will Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated. Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light. Use tools and materials to 	 Cause and Effect Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1),(1-PS4-2),(1-PS4-3) Structure and Function The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

		through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.)(1- PS4-3) 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)	 design and build a device that uses light or sound to solve the problem of communicating over a distance. 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 Characteristics of Living Things	6 Weeks	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	 Students will Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like their parents. 	 Structure and Function The shape and stability of structures of natural and designed objects are related to their function(s). Patterns Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

		survive. Plants also respond to some external inputs. 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 tosurvive. 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.		
Unit 4 Mimicking Organisms to Solve Problems	7 Weeks	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	 Students will 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. 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. 	 Structure and Function The shape and stability of structures of natural and designed objects are related to their function(s). Patterns Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

	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.	
	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 tosurvive.	
	ETS1.B: Engineering Design	
	Developing Possible Solutions. Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's	

Unit 1: Earth's Place in the Universe	Recommended Duration: 5 Weeks

Unit Description:

In this unit of study, students observe, describe, and predict some patterns of the movement of objects in the sky. Throughout the unit students look for patterns as they plan and carry out investigations and analyze and interpret data.

Essential Questions	Enduring Understandings
• Can we predict how the sky will change over time?	• Patterns of change can be predicted when observing the sun, moon, and stars.

New Jersey Student Learning Standards				
By the end of the unit, the Student will be able to:				
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)				
Science & Engineering Practices	Science & Engineering Practices Disciplinary Core Ideas Crosscutting 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 	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. (1-ESS1-1) ESS1.B: Earth and the Solar System Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)	 Patterns Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1),(1-ESS1-2) 		

collect data that can be used to make	
comparisons. (1-ESS1- 2)	
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. (1-ESS1-1)	

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
RubricsLearning Questions to guide unit progression	 Rubrics Oral and Slate Assessments Science Assessment Tasks 	 Science Assessment Tasks Science Investigations Student Science notebooks Student-designed models 	Possible NGSS Phenomena: In winter, it's dark when I get up and dark when I go to bed. It's not that way in the summer.
 Observe and use patterns in the natural world as evidence. Use observations <i>(firsthand or from media)</i> to describe patterns in the natural world in order to answer scientific questions. 			In this unit's progression of learning, students develop the understanding that natural events happen today as they happened in the past, and that many events are repeated. In addition, they observe and use patterns in the natural world as evidence and to describe phenomena. First graders ask
 Use observations to describe patterns in what plants need to survive. Examples of patterns could include: 			questions and use observations of the sun, moon, and stars to describe apparent patterns of change in each. These patterns are then used to answer

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
			questions and make predictions.
			Some examples of patterns
			include:
			 The sun and moon appear to rise in one part of the sky, move across the sky, and set.
			 The shape of the moon appears to change over a period of time in a predictablepattern. Stars, other than our sun, are visible at night but not during the day.
			After students observe and
			document these types of patterns
			over a period of time, they need
			opportunities to describe the
			patterns and to make predictions
			about the changes that occur in the
			objects in the sky. It is important
			that they use observed patterns as
			evidence to support predictions they
			might make about the sun, moon,
			and stars.
			In this unit, students also learn that
			seasonal patterns of sunrise and
			sunset can be observed, described,
			and predicted. They relate the
			amount of daylight to the time of
			year by making observations at

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
			different times of the year. Over
			time, they collect and use data in
			order to identify the relationship
			between the amount of sunlight
			and the season. Grade 1 students
			are expected to make relative
			comparisons of the amount of
			daylight from one season to the
			next, and assessment should be
			limited to relative amounts of
			daylight, not quantifying the hours
			or time of daylight.

Possible Assessment Adjustments (Modifications / Accommodations / Differentiation): How will the teacher provide multiple means for the following student groups to EXPRESS their understanding and comprehension of the content/skills taught?			
Special Education Students	English Language Learners (ELLs)	At-Risk Learners	Advanced Learners
 Modify assignments as needed (e.g., vary length, limit items) Shorten assignments Increase the amount of item allowed to complete assignments and tests Limit amount of work required or length of tests Hands-on-projects Give in small groups Individualized per each student per IEP 	 Word/Picture Wall L1 support Word/Picture Wall Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart Native language support Choice questions Teacher Modeling Illustrations/diagrams/drawin gs Small group 	 Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) Teacher Modeling Small group instruction Extended time Illustrations/diagrams/drawin gs 	 Provide independent learning opportunities through learning contracts Offer accelerated instruction Computer-Assisted Instruction Pairing direct instruction w/coaching to promote self-directed learning

Instructional Strategies

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. ٠
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, ٠ 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 ٠ 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 ٠ 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 ٠ their understandings.
- Use project-based science learning to connect science with observable (NGSS)phenomena. ٠

Illustrations/diagrams/drawings

Small group

Structure the learning around explaining or solving a social or community-based issue.

Possible Instructional Adjustments (Modifications / Accommodations / Differentiation): How will the teacher provide multiple means for the following				
student groups to ACCESS the content/skills being taught?				
Special Education	English Language Learners (ELLs)	At-Risk Learners	Advanced Learners	
Students				
 Read class materials orally Provide small group instruction Provide study outlines/guides Prior notice of 	 Word/Picture Wall Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) Native language support Fact Family Triangles Choice questions 	 Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart, clock,) Teacher Modeling Small group instruction Extended time Illustrations/diagrams/drawings 	 Provide independent learning opportunities through learning contracts Offer accelerated instruction Computer-Assisted Instruction 	
tests	 Teacher Modeling 		 Pairing direct instruction 	

w/coaching to promote

self-directed learning

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student per IEP

groups Individualized per each

Test study guide

Give tests in small

Interdisciplinary Connections	Integration of Technology	21 st Century Themes	21 st Century Skills
(Applicable Standards)			
NJSLS Literacy:	8.1 Educational Technology: All	Leadership and Responsibility-	Leadership and Responsibility- Acting
RI.1.1	students will use digital tools to	Acting responsibly with the	responsibly with the interests of the larger
RI.1.5	access, manage, evaluate, and	interests of the larger community	community in mind.
RI.1.10	synthesize information in order to	in mind.	 Students will participate in class
W.1.2	solve problems individually and	 Students will participate in 	activities and discussions
W.1.5	collaborate and to create and	class activities and	appropriately
L.1.1	communicate knowledge	discussions appropriately	Collaboration- Demonstrating the ability
SL.1.1	• Students may use computers	Collaboration- Demonstrating the	to or kith diverse teams
SL.1.2	for reinforcement of skills	ability to or kith diverse teams	 Students will learn to work with a
	during centers	 Students will learn to work 	partner on various math activities
NJSLS Mathematics:	• Interactive whiteboards may	with a partner on various	Critical Thinking and Problem Solving-
1.CC.B.4	be used to display problems	math activities	Exercising sound reasoning in
1.CC.B.5	and/or interactive	Critical Thinking and Problem	understanding
1.MD.B.3	manipulatives	Solving- Exercising sound reasoning	 Students will develop problem
	 Student use of iPads 	in understanding	solving skills and practice
Mathematical Practices:		 Students will develop 	verbalizing their reasoning behind
MP.1	8.2 All students will develop an	problem solving skills and	it
MP.2	understanding of the nature and	practice verbalizing their	
MP.3	impact of technology, engineering,	reasoning behind it	
MP.4	technological design,	-	
MP.6	computational thinking and the		
	designed world as they relate to		
	the individual, global society, and		
	the environment.		

Resources			
Resources & Materials:			
Suggested Literature:			
 RAZ Kids (Leveled Tex 	ts)		
The Moon (C)	Space (C)	On the Moon (F)	Leap Year birthday (H),(K)
Website/Media Links:			
Science Evidence Stat	ements:		
0 <u>1-ESS1-1</u>			
• <u>1-ESS1-2</u>			
• <u>The Dynamic Trio:</u> In t	his lesson, students will learn about the stars,	planets, and moons found in our solar sy	stem and how they relate to one another. The video
segment enhances th	e learning. After a non-fiction read aloud, stud	ents work in groups to create models of t	he Solar System.
 Our Super Star: This is 	a three part lesson where students use observ	vations, activities, and videos to learn bas	sic facts about the Sun. Students also model the
mechanics of day and	night and use solar energy to make a tasty tre	at. One of the videos is a time-lapse vide	o of a sunrise and a sunset.
 Keen a Moon Journal 	The National Wildlife Federation's "Keen a Mo	oon lournal" page allows students to get	acquainted with the phases of the moon by keeping a
moon journal to reco	rd their nightly observations for one month. Th	e page has links to diagrams, a student p	rintable, and activities connecting the journal to other
content. The page is s	et up as a "family activity" and could be used a	s nightly homework for students then di	scussed weekly in class.
 <u>Patterns of Daylight:</u> 	۲his is a mini-unit that can be taught directly af	ter Space Part 1 or independently. The a	uthor chose to teach the Space Part 1 unit (also
available on Better Le	sson! at http://betterlesson.com/lesson/6134	<u>59/introduction-and-pre-assessment</u>) du	iring January, and follows up at the end of the year
in a recap in May. Thi	s lesson uses prior student knowledge and a vio	leo simulation.	
 Observing the Sun: The Sun of t	is lesson is an activity where students create a	sun tracker and monitor the sun's position	on over the course of a day. Examples of student

journals and connections within a larger unit are provided.

Unit 2: Light and Sound Waves	Recommended Duration: 5 Weeks
Unit Description: In this unit of study, students plan and conduct investigations and make observations as they explore sound and light energy. Students	

describe the relationships between sound and vibrating materials and the availability of light and the ability to see objects. They also investigate the effect on a beam of light when objects made of different materials are placed in its path. Throughout the unit, students will use their observations and data as evidence to determine cause-and-effect relationships in the natural world.

Essential Questions	Enduring Understandings
 How does light let us see? How does sound work to let us hear? How would we communicate over a distance without the use of any of the devices that people currently use? 	 Experiments can prove your thinking. Light and sound travels over large distances.

New Jersey Student Learning Standards

By the end of the unit, the Student will be able to:

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.] (<u>1-PS4-1</u>)

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.] (<u>1-PS4-2</u>)

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)

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.]

New Jersey Student Learning Standards

[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. (<u>K-2-ETS1-1</u>)

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)

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting 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. (1- PS4-1),(1-PS4-3) 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. (1- PS4-2) Use tools and materials provided to design a device that solves a specific 	 PS4.A: Wave Properties Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1) PS4.B: Electromagnetic Radiation Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2) 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.) (1- PS4-3) PS4.C: Information Technologies and Instrumentation People also use a variety of devices to 	Cause and Effect • Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1),(1-PS4- 2),(1-PS4-3) Structure and Function The shape and stability of structures of natural and designed objects are related to their function(s). (K- 2-ETS1-2)	

	New Jersey Student Learning Standards	
problem. (1-PS4-4)	communicate (send and receive	
	information) over long distances. (1-PS4-	
Asking Questions and Defining Problems	4)	
 Ask questions based on 	ETS1.A: Defining and Delimiting Engineering	
observations to find more	Problems	
information about the natural	 A situation that people want to 	
and/or designed world(s). (K-2-	change or create can be approached	
ETS1-1)	as a problem to be solved through	
• Define a simple problem that can	engineering. (K-2-ETS1-1)	
be solved through the	 Asking questions, making observations, 	
development of a new or	and gathering information are helpful	
improved object or tool. (K-2-	in thinking about problems. (K-2-ETS1-	
ETS1-1)	1)	
Developing and Using Models	 Before beginning to design a solution, 	
Developing and esting models	it is important to clearly understand	
represent a proposed object or tool. (K-2-ETS1-2)	the problem. (K-2-ETS1-1)	
······································	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 to other people. (K-2-ETS1-2)	

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
 Rubrics Learning Questions to guide unit progression 	 Rubrics Oral and Slate Assessments Science Assessment 	 Science Assessment Tasks Science Investigations Student Science notebooks Student-designed models 	Possible NGSS Phenomena: When music is really loud it can shake my whole body!
 Observe and use patterns in the natural world as evidence. 	Tasks		Students begin this unit by observing objects with and without available light. They need

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
 Use observations 			opportunities to observe a variety
(firsthand or from			of objects in both illuminated and
media) to describe			non-illuminated settings. For
patterns in the			example, observations could be
natural world in			made in a completely dark room,
order to answer			or students can use a pinhole box
scientific questions.			to observe objects. Students can
			also watch videos of cave explorers
Use observations to			deep in the earth, using light from
describe patterns in what			a single flashlight. With
plants need to survive.			experiences such as these, they
include:			will come to understand that
			objects can be seen only when
			illuminated, either from an
			external light source or by when
			they give off their own light.
			Next, students plan and conduct
			simple investigations to
			determine what happens to a
			beam of light when objects
			made of various materials are
			placed in its path. Students need
			the opportunity to explore the
			interaction of light with a variety
			of materials, and they should
			record what they observe with
			each one. When selecting
			materials to use, teachers should
			choose some that allow all light
			to pass through (transparent),

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
			some that allow only a portion of
			the light to pass through
			(translucent), some that do not
			allow any light to pass through
			(opaque), and some that redirect
			the beam of light (reflective).
			Examples could include clear
			plastic, glass, wax paper, thin
			cloth, cardboard, construction
			paper, shiny metal spoons, and
			mirrors.
			As students observe the
			interaction between light and
			various materials, they should
			notice that when some or all of
			the light is blocked, a shadow
			is created beyond the object. If
			only a portion of light is
			blocked (translucent
			materials), a dim shadow will
			form, and some light will pass
			through the object. If all the
			light is blocked (opaque
			materials), students will see
			only see a dark shadow beyond
			the object. They will also
			observe that shiny materials
			reflect light, redirecting the
			beam of light in a different
			direction. Students should use

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
			their observations as evidence
			to support their explanations
			of how light interacts with
			various objects.
			After investigating light energy, students continue to plan and conduct investigations to develop an understanding of
			Students can use a variety of
			objects and materials to observe
			that vibrating materials can
			make sound and that sound can
			make materials vibrate. Students
			need multiple opportunities to
			experiment with a variety of
			objects that will make sound.
			Some opportunities could
			include:
			 ✓ Gently tapping various sizes of tuning forks on a hard surface.
			 ✓ Plucking string or rubber bands stretched across an open box
			 Cutting and stretching a balloon over an open can to make a drum that can be tapped.

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/	Assignments
			\checkmark	Holding the end
				of a ruler on the
				edge of a table,
				leaving the
				opposite end of
				the ruler hanging
				over the edge,
				and then plucking
				the hanging end
				of the ruler.
			✓	Touching a vibrating tuning fork to the surface of water in a bowl.
			\checkmark	Placing dry rice
				grains on a
				drum's surface
				and then
				touching the
				drum with a
				vibrating tuning
				fork or placing
				the drum near
				the speaker of a
				portable sound
				system.
			√	Holding a piece of paper near the speaker of a portable
			A a b b b b b b b b b b	sound system.
			As students cond	uct these simple

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
			investigations, they will notice that
			when objects vibrate (tuning forks that
			have been tapped and string, rubber
			bands, and rulers that have been
			plucked), sound is created. They will
			also notice that sound will cause objects
			to vibrate (sound from a speaker causes
			rice grains to vibrate on the surface of a
			drum, the vibrating tuning fork causes
			ripples on the surface of water, and
			sound from the speaker also causes
			paper to move). Students should use
			these types of observations as evidence
			when explaining the cause and effect
			relationship between sound and
			vibrating materials.

Possible Assessment Adjustments (Modifications / Accommodations / Differentiation): How will the teacher provide multiple means for the following				
student groups to EXPRESS their understanding and comprehension of the content/skills taught?				
Special Education Students	English Language Learners (ELLs)	At-Risk Learners	Advanced Learners	
 Modify assignments as needed (e.g., vary length, limit items) Shorten assignments Increase the amount of item allowed to complete assignments and tests Limit amount of work required or length of tests Hands-on-projects Give in small groups Individualized per each student per IEP 	 Word/Picture Wall L1 support Word/Picture Wall Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart Native language support Choice questions Teacher Modeling Illustrations/diagrams/drawin gs Small group 	 Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) Teacher Modeling Small group instruction Extended time Illustrations/diagrams/drawin gs 	 Provide independent learning opportunities through learning contracts Offer accelerated instruction Computer-Assisted Instruction Pairing direct instruction w/coaching to promote self-directed learning 	

Instructional Strategies

- 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.

Possible Instructional Adjustments (Modifications / Accommodations / Differentiation): How will the teacher provide multiple means for the following

- Use project-based science learning to connect science with observable (NGSS)phenomena.
- Structure the learning around explaining or solving a social or community-based issue.

student groups to ACCESS the content/skills being taught?				
Special Education	English Language Learners (ELLs)	At-Risk Learners	Advanced Learners	
Students				
 Read class materials orally Provide small group instruction Provide study outlines/guides Prior notice of tests Test study guide Give tests in small groups Individualized per each student per IEP 	 Word/Picture Wall Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) Native language support Fact Family Triangles Choice questions Teacher Modeling Illustrations/diagrams/drawings Small group 	 Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart, clock,) Teacher Modeling Small group instruction Extended time Illustrations/diagrams/drawings 	 Provide independent learning opportunities through learning contracts Offer accelerated instruction Computer-Assisted Instruction Pairing direct instruction w/coaching to promote self-directed learning 	

Interdisciplinary Connections	Integration of Technology	21 st Century Themes	21 st Century Skills
(Applicable Standards)			
NJSLS Literacy:	8.1 Educational Technology: All	Leadership and Responsibility-	Leadership and Responsibility- Acting
RI.1.1	students will use digital tools to	Acting responsibly with the	responsibly with the interests of the larger
RI.1.5	access, manage, evaluate, and	interests of the larger community	community in mind.
RI.1.10	synthesize information in order to	in mind.	 Students will participate in class
W.1.2	solve problems individually and	 Students will participate in 	activities and discussions
W.1.5	collaborate and to create and	class activities and	appropriately
L.1.1	communicate knowledge	discussions appropriately	Collaboration - Demonstrating the ability
SL.1.1	• Students may use computers	Collaboration - Demonstrating the	to or kith diverse teams
SL.1.2	for reinforcement of skills	ability to or kith diverse teams	 Students will learn to work with a
	during centers	 Students will learn to work 	partner on various math activities
NJSLS Mathematics:	Interactive whiteboards may	with a partner on various	Critical Thinking and Problem Solving-
1.CC.B.4	be used to display problems	math activities	Exercising sound reasoning in
1.CC.B.5	and/or interactive	Critical Thinking and Problem	understanding
1.MD.B.3	manipulatives	Solving- Exercising sound reasoning	Students will develop problem
	Student use of iPads	in understanding	solving skills and practice
Mathematical Practices:		 Students will develop 	verbalizing their reasoning behind
MP.1	8.2 All students will develop an	problem solving skills and	it
MP.2	understanding of the nature and	practice verbalizing their	
MP.3	impact of technology, engineering,	reasoning behind it	
MP.4	technological design,		
MP.6	computational thinking and the		
	designed world as they relate to		
	the individual, global society, and		
	the environment.		

Resources & Materials:

Website/Media Links:

- Science Evidence Statements:
 - 0 <u>1-PS4-1</u>
 - o <u>1-PS4-2</u>
 - <u>1-PS4-3</u>
 - 0 <u>1-PS4-4</u>
 - 0 <u>K-2-ETS1-1</u>
 - <u>K-2-ETS1-2</u>

Videos:

- SciShow Kids (YouTube Channel)
 - <u>The Sound of Waves</u>
- BrainPop Jr
 - Light and Sound Waves

Assessing Light Knowledge - two lessons: In these lessons the students work as partners planning and designing a communication device that will signal across the gym or hallway from one partner to the other partner. The communication device must only use light and objects that block or change the light.

Unit 3: Characteristics of Living Things	Recommended Duration: 6 Weeks

Unit Description: In this unit of study, students observe organisms in order to recognize that many types of young plants and animals are like, but not exactly the same as, their parents. Students also observe how organisms use their external parts to help them survive, grow, and meet their needs, and how the behaviors of parents and offspring help offspring survive. Throughout the unit, students will look for patterns; obtain, evaluate, and communicate information; and construct explanations.

Essential Questions		Enduring Understandings	
•	How do plants and animals meet their needs so they can survive and grow?	• Young plants and animals alike and different from their parents.	
•	How are parents and offspring similar and different?		

New Jersey Student Learning Standards

By the end of the unit, the Student will be able to:

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).] (<u>1-LS1-2</u>)

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.] (<u>1-LS3-1</u>)

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	
Constructing Explanations and Designing	LS1.A: Structure and Function	Structure and Function	
Solutions	 All organisms have external parts. 	 The shape and stability of structures of 	
Constructing explanations and designing	Different animals use their body parts in	natural and designed objects are	
solutions in K–2 builds on prior experiences and	different ways to see, hear, grasp	related to their function(s).	
progresses to the use of evidence and ideas in	objects, protect themselves, move from	 Patterns Patterns in the natural and human designed 	

constructing ovidence based accounts of natural	place to place, and cook find, and take in	world can be observed used to describe
constructing evidence-based accounts of natural	face to place, and seek, find, and take in	nhenomena, and used as evidence
phenomena and designing solutions.	food, water and air. Plants also have	prenomena, and used as evidence.
 Use materials to design a device that 	different parts (roots, stems, leaves,	
solves a specific problem or a	flowers, fruits) that help them survive	
solution to a specific problem.	and grow.	
 Make observations (firsthand or 		
from media) to construct an	LS1.D: Information Processing	
evidence-based account for natural	Animals have body parts that capture and	
phenomena.	convey different kinds of information	
P	needed for growth and survival Animals	
	respond to these inputs with behaviors	
Obtaining, Evaluating, and Communicating	that hale there are included with behaviors	
Information	that help them survive. Plants also	
Obtaining, evaluating, and communicating	respond to some external inputs.	
information in K–2 builds on prior experiences	LS1.B: Growth and Development of Organisms	
and uses observations and texts to communicate	Adult plants and animals can have young.	
new information.	In many kinds of animals, parents and the	
	offspring themselves engage in behaviors	
Read grade-appropriate texts and use media to	that help the offspring to survive.	
obtain scientific information to determine	LS3.A: Inheritance of Traits	
notterne in the netural world	 Young animals are very much, but not 	
patterns in the natural world.	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.	

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
Rubrics	RubricsOral and Slate	Science Assessment TasksScience Investigations	Possible NGSS Phenomena: There are insects that look like parts of
 Learning Questions to guide unit progression 	 Assessments Science Assessment Tasks 	Student Science notebooksStudent-designed models	plantsleaves, sticks, and thorns.
 Observe and use patterns in the natural world as 			People look for patterns in the natural world and use these

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
evidence.			patterns as evidence to describe
Use observations			phenomena. Students begin this
(firsthand or from			unit by observing and comparing
media) to describe			external features of organisms,
patterns in the			looking for patterns in what they
natural world in order			observe. They will need
to answer scientific			opportunities to observe a variety
questions.			of plants and animals in order to
			look for similarities and
Use observations to			differences in their features. For
describe patterns in what			example, when comparing the
plants need to survive.			shape, size, color, or number of
include:			leaves on plants, students begin to
include:			notice that plants of the same kind
			have leaves that are the same
			shape and color, but the leaves of
			one plant may differ from another
			in size or number. When
			comparing body coverings:
			number size and type of external
			features (legs tail eves mouth
			narts): hody size, hody coloring, or
			parts), body size, body coloring, or
			eye color of animals, students
			learn that animals of the same
			kind have the same type of body
			covering and the same number
			and types of external features, but
			the size of the body, the size of
			external features, body color,
			and/or eye color of individuals

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
			might differ. Making observations
			like these helps students recognize
			that young plants and animals
			look very much, but not exactly,
			like their parents, and that even
			though individuals of the same
			kind of plant or animal are
			recognizable as similar, they can
			also vary in many ways.

Possible Assessment Adjustments (Modifications / Accommodations / Differentiation): How will the teacher provide multiple means for the following student groups to **EXPRESS** their understanding and comprehension of the content/skills taught?

Special Education Students	English Language Learners (ELLs)	At-Risk Learners	Advanced Learners
 Modify assignments as needed (e.g., vary length, limit items) Shorten assignments Increase the amount of item allowed to complete assignments and tests Limit amount of work required or length of tests Hands-on-projects Give in small groups Individualized per each student per IEP 	 Word/Picture Wall L1 support Word/Picture Wall Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart Native language support Choice questions Teacher Modeling Illustrations/diagrams/drawin gs Small group 	 Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) Teacher Modeling Small group instruction Extended time Illustrations/diagrams/drawin gs 	 Provide independent learning opportunities through learning contracts Offer accelerated instruction Computer-Assisted Instruction Pairing direct instruction w/coaching to promote self-directed learning

Instructional Strategies

• Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.

Instructional Strategies

- 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 (NGSS)phenomena.
- Structure the learning around explaining or solving a social or community-based issue.

student groups to ACCESS the content/skins being taught?				
Special Education	English Language Learners (ELLs)	At-Risk Learners	Advanced Learners	
Students				
 Read class materials orally Provide small group instruction Provide study outlines/guides Prior notice of tests Test study guide Give tests in small groups Individualized per each 	 Word/Picture Wall Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) Native language support Fact Family Triangles Choice questions Teacher Modeling Illustrations/diagrams/drawings Small group 	 Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart, clock,) Teacher Modeling Small group instruction Extended time Illustrations/diagrams/drawings 	 Provide independent learning opportunities through learning contracts Offer accelerated instruction Computer-Assisted Instruction Pairing direct instruction w/coaching to promote self-directed learning 	
Student per IEP				

Possible Instructional Adjustments (Modifications / Accommodations / Differentiation): How will the teacher provide multiple means for the following student groups to **ACCESS** the content/skills being taught?

Interdisciplinary Connections	Integration of Technology	21 st Century Themes	21 st Century Skills
(Applicable Standards)			
NJSLS Literacy:	8.1 Educational Technology: All	Leadership and Responsibility-	Leadership and Responsibility- Acting
RI.1.1	students will use digital tools to	Acting responsibly with the	responsibly with the interests of the larger
RI.1.5	access, manage, evaluate, and	interests of the larger community	community in mind.
RI.1.10	synthesize information in order to	in mind.	 Students will participate in class
W.1.2	solve problems individually and	 Students will participate in 	activities and discussions
W.1.5	collaborate and to create and	class activities and	appropriately
L.1.1	communicate knowledge	discussions appropriately	Collaboration- Demonstrating the ability
SL.1.1	Students may use computers	Collaboration - Demonstrating the	to or kith diverse teams
SL.1.2	for reinforcement of skills	ability to or kith diverse teams	 Students will learn to work with a
	during centers	 Students will learn to work 	partner on various math activities
NJSLS Mathematics:	Interactive whiteboards may	with a partner on various	Critical Thinking and Problem Solving-
1.CC.B.4	be used to display problems	math activities	Exercising sound reasoning in
1.CC.B.5	and/or interactive	Critical Thinking and Problem	understanding
1.MD.B.3	manipulatives	Solving- Exercising sound reasoning	 Students will develop problem
	 Student use of iPads 	in understanding	solving skills and practice
Mathematical Practices:		 Students will develop 	verbalizing their reasoning behind
MP.1	8.2 All students will develop an	problem solving skills and	it
MP.2	understanding of the nature and	practice verbalizing their	
MP.3	impact of technology, engineering,	reasoning behind it	
MP.4	technological design,		
MP.6	computational thinking and the		
	designed world as they relate to		
	the individual, global society, and		
	the environment.		

Resources				
Resources & M	laterials:			
Suggested Lite	rature:			
RAZ I	Kids (level)			
The Rain	nstorm (A)	Rain in the City (B)	Rain in the Country (B)	Snow Falls (C)
Fog (D)				
34	SHSD Office of Curriculum and In	struction		

Suggested Literature (Leveled Texts/Readers):

- Living or Nonliving? (G)
- How Many Teeth? (E)
- Insect Wings (D)
- All About Orcas (E)
- Which Tree? (E)
- Hibernation (F)
- What Animals Eat (C)
- A Seed Grow (G)
- What Comes from Plants (J)

Website/Media Links:

- Science Evidence Statements:
 - 0 <u>1-LS1-2</u>
 - 0 <u>1-LS1-3</u>
 - 0 <u>K-2-ETS1-2</u>

In addition to observing and documenting similarities and differences in the external features of organisms, students also need opportunities to make direct observations, read texts, or use multimedia resources to determine patterns in the behaviors of parents and offspring that help offspring survive. While both plants and animals can have young, it is the parents of young animals who might engage in behaviors that help their young survive. Some examples of these patterns of behaviors could include the signals that offspring make, such as crying, cheeping, and other vocalizations, and the responses of parents, such as feeding, comforting, and protecting their young.

- Animal adaptations to their environment
- Sort: photos of dogs and their offspring, variations in plants. Parents are similar but not identical to offspring.
- View videos on animal parent and babies
 - Video: <u>Animals and their Babies</u>
 - Video: Baby Animals Who Grow Up to Look Totally Different
- Review life cycles of plants and various animals.
- <u>Chip Off the Old Block</u>: In this lesson students compare adult plants with young plants and then match pictures of adult animals with their young. They then are asked to identify specific physical traits of plants and animals that can be used to identify them. Note: The Parent/Offspring photo collection on page three incorrectly states the offspring of a horse is a pony.
- What Makes a Bird a Bird (January): This lesson and activity is one of several lessons about birds. In this lesson, students learn that bird beaks come in many different sizes and shape. Each beak has a specific shape and function to help the bird to get and eat food.

• Why So Yummy? In this lesson students will investigate how fruits help some plants survive. The background information is important to the overall goals of this lesson. It states, "fruit-bearing plants can be distinguished from other plants, because they contain a reproductive structure that develops into an edible fruit. This reproductive structure is the shelter that protects the seeds until they are mature. This is important, because seeds are not distributed to the earth for germination until they are ripe." The teacher will need to purchase some fruits ahead of time for this lesson. Identifying a variety of fruits and especially fruits children might have less experience with will enhance the experience.

Unit 4: Mimicking	Organisms to	Solve Problems
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Recommended Duration: 7 Weeks

Unit Description: In this unit of study, students investigate how plants and animals use their external structures to help them survive, grow, and meet their needs. Then students are challenged to apply their learning 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.

Essential Questions		Enduring Understandings	
•	How do plants and animals meet their needs so they can survive and grow?	 All living things solve problems in a variety of ways. 	

New Jersey Student Learning Standards

By the end of the unit, the Student will be able to:

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)

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting 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 materials to design a device that	 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, 	 Structure and Function The shape and stability of structures of natural and designed objects are related to their function(s). Patterns Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

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coluce a specific problem or a	flowers fruits) that halp them survive	
solves a specific problem of a	nowers, muits) that help them survive	
solution to a specific problem.	and grow.	
 Make observations (firsthand or from 	LS1.D: Information Processing	
media) to construct an evidence-	 Animals have body parts that capture 	
based account for natural	and convey different kinds of	
phenomena.	information needed for growth and	
Obtaining, Evaluating, and Communicating	survival. Animals respond to these inputs	
Information	with behaviors that help them survive.	
Obtaining evaluating and communicating	Plants also respond to some external	
	inputs.	
information in K–2 builds on prior experiences	LS1.B: Growth and Development of Organisms	
and uses observations and texts to		
communicate new information.	 Adult plants and animals can have young. 	
 Read grade-appropriate texts and use 	In many kinds of animals, parents and the	
media to obtain scientific information	offspring themselves engage in behaviors	
to determine patterns in the natural	that help the offspring to survive.	
world.	ETS1.B: Engineering Design	
Developing and Using Models	Developing Possible Solutions. Designs can be	
Modeling in K–2 builds on prior experiences	conveyed through sketches, drawings, or physical	
and progresses to include using and developing	models. These representations are useful in	
models (i.e., diagram, drawing, physical replica,	communicating ideas for a problem's	
diorama, dramatization, or storyboard) that		
represent concrete events or design solutions.		
 Develop a simple model based on evidence 		
to represent a proposed object or too		

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
 Rubrics Learning Questions to guide unit progression Observe and use patterns in the natural world as evidence. 	 Rubrics Oral and Slate Assessments Science Assessment Tasks 	 Science Assessment Tasks Science Investigations Student Science notebooks Student-designed models 	Possible NGSS Phenomena: There are insects that look like parts of plantsleaves, sticks, and thorns. In order to recognize ways in which animals and plants use their external structures, students

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Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
Use observations			need opportunities to observe
(firsthand or from			and describe how the shape and
media) to describe			stability of organisms' structures
patterns in the			are related to their functions.
natural world in order			Students can make direct
to answer scientific			observations and use media
questions.			resources to find relevant
			examples for both plants and
 Use observations to 			animals. They should observe that
describe patterns in what			different animals use their body
plants need to survive.			parts in different ways to see,
include:			hear, grasp objects, protect
			themselves, move from place to
			place, and seek, find, and take in
			food, water, and air. In addition,
			animals have body parts that
			capture and convey different
			kinds of information from the
			environment, enabling them to
			respond to these inputs in ways
			that aid in survival. Plants, like
			animals, have different parts
			(roots, stems, leaves, flowers,
			fruits) that each serve specific
			functions in survival and growth,
			and plants also respond to
			external inputs. For each structure
			that students observe, they
			should describe how the shape
			and stability of that structure is

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
			related to its function.
			The next step in this unit is to
			engage in engineering design.
			Students need opportunities
			to use materials to design a
			device that solves a specific
			human problem. Designs
			should mimic how plants
			and/or animals use their
			external parts to help them
			survive and grow. The
			engineering design process
			students engage in should
			include the following steps:
			• As a class or in small
			groups, students
			participate in shared
			research to find
			examples of human-
			made products that
			have been designed
			and built by applying
			knowledge of the
			natural world. For
			each example,
			students identify the
			human problem(s)
			that the product
			solves and how that
			solution was

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
			designed using an
			understanding of
			thenatural world.
			 Students brainstorm
			possible human
			problems that can be
			solved by mimicking
			how plants and/or
			animals use their
			external parts to help
			them survive, grow, and
			meet their needs.
			Examples could include:
			 Designing clothing or equipment to protect bicyclists that mimics turtle shells, acorn shells, and animal scales. Stabilizing structures that mimic animal tails and plant roots. Keeping out intruders by mimicking thorns on branches and animal quills. Detecting intruders by mimicking eyes and
			edis.
			students use sketches.
			drawings, or physical

Formative Assessments	Summative Assessments	Performance Assessments	Major Activities/ Assignments
			models to convey a
			design that solves a
			problem by mimicking
			one or more external
			structures of plants
			and/or animals.
			 Use materials to create the design solution.
			 Share the design solution with others in the class.

Possible Assessment Adjustments (Modifications / Accommodations / Differentiation): How will the teacher provide multiple means for the following student groups to **EXPRESS** their understanding and comprehension of the content/skills taught?

Special Education Students	English Language Learners (ELLs)	At-Risk Learners	Advanced Learners
 Modify assignments as needed (e.g., vary length, limit items) Shorten assignments Increase the amount of item allowed to complete assignments and tests Limit amount of work required or length of tests Hands-on-projects Give in small groups Individualized per each student per IEP 	 Word/Picture Wall L1 support Word/Picture Wall Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart Native language support Choice questions Teacher Modeling Illustrations/diagrams/drawin gs Small group 	 Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) Teacher Modeling Small group instruction Extended time Illustrations/diagrams/drawin gs 	 Provide independent learning opportunities through learning contracts Offer accelerated instruction Computer-Assisted Instruction Pairing direct instruction w/coaching to promote self-directed learning

Instructional Strategies

• 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,



Instructional Strategies

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 (NGSS)phenomena.
- Structure the learning around explaining or solving a social or community-based issue.

Possible Instructional Adjustments (Modifications / Accommodations / Differentiation): How will the teacher provide multiple means for the following student groups to **ACCESS** the content/skills being taught?

Special Education	English Language Learners (ELLs)	At-Risk Learners	Advanced Learners
Students			
 Read class materials orally Provide small group instruction Provide study outlines/guides Prior notice of tests Test study guide Give tests in small groups Individualized per each student per IEP 	 Word/Picture Wall Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart) Native language support Fact Family Triangles Choice questions Teacher Modeling Illustrations/diagrams/drawings Small group 	 Manipulatives (etc. Counters, Connecting Cubes, Base-Ten Blocks, Place Value T-Chart, clock,) Teacher Modeling Small group instruction Extended time Illustrations/diagrams/drawings 	 Provide independent learning opportunities through learning contracts Offer accelerated instruction Computer-Assisted Instruction Pairing direct instruction w/coaching to promote self-directed learning

Interdisciplinary Connections	Integration of Technology	21 st Century Themes	21 st Century Skills
(Applicable Standards)			
NJSLS Literacy:	8.1 Educational Technology: All	Leadership and Responsibility-	Leadership and Responsibility- Acting
RI.1.1	students will use digital tools to	Acting responsibly with the	responsibly with the interests of the larger
RI.1.5	access, manage, evaluate, and	interests of the larger community	community in mind.
RI.1.10	synthesize information in order to	in mind.	 Students will participate in class
W.1.2	solve problems individually and	 Students will participate in 	activities and discussions
W.1.5	collaborate and to create and	class activities and	appropriately
L.1.1	communicate knowledge	discussions appropriately	Collaboration- Demonstrating the ability
SL.1.1	Students may use computers	Collaboration - Demonstrating the	to or kith diverse teams
SL.1.2	for reinforcement of skills	ability to or kith diverse teams	 Students will learn to work with a
	during centers	 Students will learn to work 	partner on various math activities
NJSLS Mathematics:	Interactive whiteboards may	with a partner on various	Critical Thinking and Problem Solving-
1.CC.B.4	be used to display problems	math activities	Exercising sound reasoning in
1.CC.B.5	and/or interactive	Critical Thinking and Problem	understanding
1.MD.B.3	manipulatives	Solving- Exercising sound reasoning	 Students will develop problem
	 Student use of iPads 	in understanding	solving skills and practice
Mathematical Practices:		 Students will develop 	verbalizing their reasoning behind
MP.1	8.2 All students will develop an	problem solving skills and	it
MP.2	understanding of the nature and	practice verbalizing their	
MP.3	impact of technology, engineering,	reasoning behind it	
MP.4	technological design,		
MP.6	computational thinking and the		
	designed world as they relate to		
	the individual, global society, and		
	the environment.		

Resources & Materials:

Suggested Literature:

RAZ Kids (level)
 Animal Horns (D) Bats Day and Night (D) A
 Work (G) Ride, Cling, Run (G) E

D) Animals, Animals (E) Extreme Insects (I) Arctic Animals (E) Night Animals (F Smart Crows (F) Some Birds (F) Big and Small Cats (G) Dogs at Fast and Faster (I)



44

Website/Media Links:

- Science Evidence Statements:
 - 0 <u>1-LS1-1</u>
 - <u>K-2-ETS1-2</u>