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OCEAN COUNTY SCIENCE CURRICULUM	
Content Area: Science	
Course Title: Elementary	Grade Level: Grade 1
Unit 1: Waves: Light and Sound	September, October, November
Unit 2: Structure, Function, and Information Processing	December, January, February
Unit 3: Space Systems: Patterns and Cycles	March, April, May, June
Unit 4: Engineering and Design	Ongoing

2015 Ocean County Science Curriculum

Grade 1

Unit: Waves

How and why do materials create sound through vibration?

How and why does sound cause materials to vibrate?

How does light and where it is located affect our ability to see objects?

What are different ways you can communicate over a distance using light and/or sound?

The performance expectations in kindergarten help students formulate answers to questions such as: “What happens if you push or pull an object harder? Where do animals live and why do they live there? What is the weather like today and how is it different from yesterday?” Kindergarten performance expectations include PS2, PS3, LS1, ESS2, ESS3, and ETS1 Disciplinary Core Ideas from the NRC Framework. Students are expected to develop understanding of patterns and variations in local weather and the purpose of weather forecasting to prepare for, and respond to, severe weather. Students are able to apply an understanding of the effects of different strengths or different directions of pushes and pulls on the motion of an object to analyze a design solution. Students are also expected to develop understanding of what plants and animals (including humans) need to survive and the relationship between their needs and where they live. The crosscutting concepts of patterns; cause and effect; systems and system models; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the kindergarten performance expectations, students are expected to demonstrate grade-appropriate proficiency in asking questions, developing and using models, planning and carrying out investigations, analyzing and interpreting data, designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

The [Grades k -2 Storyline](#) provides a summary of the understandings that students developed by the end of 2nd grade.

#	STUDENT LEARNING OBJECTIVES (SLOs)	Corresponding PEs and DCIs
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.	1-PS4-1

	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.]	
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.]	1-PS4-2
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.]	1-PS4-3
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.]	1-PS4-4

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

<p style="text-align: center;">Science and Engineering Practices</p> <p>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.</p> <ul style="list-style-type: none"> Plan and conduct investigations collaboratively to produce evidence to answer a question. (1-PS4-1),(1-PS4-3) <p>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-</p>	<p style="text-align: center;">Disciplinary Core Ideas</p> <p>PS4.A: Wave Properties</p> <ul style="list-style-type: none"> Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1) <p>PS4.B: Electromagnetic Radiation</p> <ul style="list-style-type: none"> 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 	<p style="text-align: center;">Crosscutting Concepts</p> <p>Cause and Effect</p> <ul style="list-style-type: none"> 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) <p>-----</p> <p style="text-align: center;"><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p>Influence of Engineering, Technology, and Science, on Society and the Natural World</p>
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<p>based accounts of natural phenomena and designing solutions.</p> <ul style="list-style-type: none"> • 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 problem. (1-PS4-4) <p>-----</p> <p>Connections to Nature of Science</p> <p>Scientific Investigations Use a Variety of Methods</p> <ul style="list-style-type: none"> • Science investigations begin with a question. (1-PS4-1) • Scientists use different ways to study the world. (1-PS4-1) 	<p>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)</p> <p>PS4.C: Information Technologies and Instrumentation</p> <ul style="list-style-type: none"> • People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4) 	<ul style="list-style-type: none"> • People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4)
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<p>Connections to other DCIs in kindergarten: K.ETS1.A (K-PS3-2),(K-ESS3-2); K.ETS1.B (K-PS3-2)</p>
<p>Articulation of DCIs across grade-levels: 1.PS4.B (K-PS3-1),(K-PS3-2); 2.ESS1.C (K-ESS3-2); 2.ESS2.A (K-ESS2-1); 2.ETS1.B (K-PS3-2); 3.ESS2.D (K-ESS2-1),(K-PS3-1); 3.ESS3.B (K-ESS3-2); 4.ESS2.A (K-ESS2-1); 4.ESS2.E (K-ESS2-2); 4.ESS3.B (K-ESS3-2); 4.ETS1.A (K-PS3-2)</p>
<p>21st Century Themes: All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world, as they relate to the individual, global society and the universe.</p>
<p>Common Core State Standards Connections: ELA/Literacy -</p> <p>RI.K.1 With prompting and support, ask and answer questions about key details in a text. (K-ESS3- 2)</p> <p>W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS3-1),(K-PS3-2),(K-ESS2-1)</p>

SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-ESS3-2)

Mathematics -

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

MP.4 Model with mathematics. (K-ESS2-1),(K-ESS3-2)

K.CC Counting and Cardinality (K-ESS3-2)

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

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

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

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

Grade Level: 1

Title of Unit: Waves

Stage 1 - Desired Results

Understandings:

Students will understand that...

1. Simple tests can be designed to gather evidence to support or refute student ideas about causes.
2. People depend on various technologies in their lives; human life would be very different without technology.

Essential Questions:

1. How and why do materials create sound through vibration?
2. How and why does sound cause materials to vibrate?
3. How does light and where it is located affect our ability to see objects?
4. What are different ways you can communicate over a distance using light and/or sound?

<p>Knowledge:</p> <p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● sound can make matter vibrate ● vibrating matter can make sound ● objects can be seen if light is available to illuminate them or if they give off their own light ● 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 ● people also use a variety of devices to communicate (send and receive information) over long distances 	<p>Skills:</p> <p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> ● Plan and conduct investigations collaboratively to produce evidence to answer a question. ● Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. ● Use tools and materials provided to design a device that solves a specific problem. ● Begin an investigation with a question. ● Study the world using different ways.
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Stage 2- Assessment Evidence

Performance Tasks and other evidence:

- Summative Assessments
 - RST- Research Simulation Task
 - Associated Unit tests, quizzes
 - labs and engineering based projects
- Formative Assessments
 - Graphic Organizers & Guided Note Taking
 - Directed Reading
 - Cooperative Group Learning
 - Homework
 - Journal Entries

Stage 3 – Learning Plan

Digital information and technology integration: Indicate any special considerations as well as materials, resources (online, print, video, audio) or equipment.

- <http://www.watchknowlearn.org/Category.aspx?CategoryID=2548>
- https://sites.google.com/a/msad60.org/k-5_science/first-grade/waves-light-sound
- <http://www.teachertube.com/video/sound-for-first-grade-209689>
- http://betterlesson.com/next_gen_science/browse/2069/ngss-1-ps4-2-make-observations-to-construct-an-evidence-based-account-that-objects-can-be-seen-only-when-illuminated
- http://betterlesson.com/next_gen_science/browse/2070/ngss-1-ps4-3-plan-and-conduct-an-investigation-to-determine-the-effect-of-placing-objects-made-with-different-materials-in-the-p
- http://betterlesson.com/next_gen_science/browse/2071/ngss-1-ps4-4-use-tools-and-materials-to-design-and-build-a-device-that-uses-light-or-sound-to-solve-the-problem-of-communicating
- http://betterlesson.com/next_gen_science/browse/2068/ngss-1-ps4-1-plan-and-conduct-investigations-to-provide-evidence-that-vibrating-materials-can-make-sound-and-that-sound-can-make
- <https://www.teachingchannel.org/videos/next-generation-science-standards-achieve>
- <http://www.hookedonscience.org/nextgenerationsciencestandards.html>
- <http://www.propertiesofmatter.si.edu/>
- <http://www.resa.net/curriculum/curriculum/science/professionaldevelopment/ngss-pd/lesson-plans-exploring-ngss/>
- <http://moodle.tbaisd.org/course/view.php?id=1021>
- <https://www.sciencea-z.com/scienceweb/nationalstandards.do>
- <http://www.science4us.com/k-2-science-lesson-plans/>
- <http://www.calacademy.org/educators/science-lesson-plans-for-kindergarten-and-1st-grade>
- <http://climatekids.nasa.gov/science-standards/>

Modifications: (ELLs, Special Education, Gifted and Talented)

- * Follow all IEP modifications/504 plan
- * Teacher tutoring
- * Peer tutoring
- * Cooperative learning groups
- * Modified assignments
- * Differentiated instruction

Presentation accommodations allow a student to:

- * Listen to audio recordings instead of reading text
- * Learn content from audiobooks, movies, videos and digital media instead of reading print versions
- * Work with fewer items per page or line and/or materials in a larger print size
- * Have a designated reader
- * Hear instructions orally
- * Record a lesson, instead of taking notes
- * Have another student share class notes with him
- * Be given an outline of a lesson
- * Use visual presentations of verbal material, such as word webs and visual organizers
- * Be given a written list of instructions

Response accommodations allow a student to:

- * Give responses in a form (oral or written) that's easier for him
- * Dictate answers to a scribe
- * Capture responses on an audio recorder
- * Use a spelling dictionary or electronic spell-checker
- * Use a word processor to type notes or give responses in class
- * Use a calculator or table of "math facts"

Setting accommodations allow a student to:

- * Work or take a test in a different setting, such as a quiet room with few distractions
- * Sit where he learns best (for example, near the teacher)
- * Use special lighting or acoustics
- * Take a test in small group setting
- * Use sensory tools such as an exercise band that can be looped around a chair's legs (so fidgety kids can kick it and quietly get their energy out)

Timing accommodations allow a student to:

- * Take more time to complete a task or a test
- * Have extra time to process oral information and directions
- * Take frequent breaks, such as after completing a task

Scheduling accommodations allow a student to:

- * Take more time to complete a project
- * Take a test in several timed sessions or over several days
- * Take sections of a test in a different order
- * Take a test at a specific time of day

Organization skills accommodations allow a student to:

- * Use an alarm to help with time management
- * Mark texts with a highlighter
- * Have help coordinating assignments in a book or planner
- * Receive study skills instruction

Assignment modifications allow a student to:

- * Complete fewer or different homework problems than peers
- * Write shorter papers
- * Answer fewer or different test questions
- * Create alternate projects or assignments

Curriculum modifications allow a student to:

- * Learn different material (such as continuing to work on multiplication while classmates move on to fractions)
- * Get graded or assessed using a different standard than the one for classmates

2015 Ocean County Science Curriculum

Grade 1

Unit: Structure, Function, and Information Processing

How do plants and animals use their external parts to help them survive, grow, and meet their needs?

What patterns of behavior of parent and offspring help offspring survive?

How are offspring in both plants and animals alike but not exactly alike their parents?

The performance expectations in first grade help students formulate answers to questions such as: “What happens when materials vibrate? What happens when there is no light? What are some ways plants and animals meet their needs so that they can survive and grow? How are parents and their children similar and different? What objects are in the sky and how do they seem to move?” First grade performance expectations include PS4, LS1, LS3, and ESS1 Disciplinary Core Ideas from the NRC Framework. Students are expected to develop understanding of the relationship between sound and vibrating materials as well as between the availability of light and ability to see objects. The idea that light travels from place to place can be understood by students at this level through determining the effect of placing objects made with different materials in the path of a beam of light. Students are also expected to develop understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs as well as how behaviors of parents and offspring help the offspring survive. The understanding is developed that young plants and animals are like, but not exactly the same as, their parents. Students are able to observe, describe, and predict some patterns of the movement of objects in the sky. The crosscutting concepts of patterns; cause and effect; structure and function; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the first grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

The [Grades k -2 Storyline](#) provides a summary of the understandings that students developed by the end of 2nd grade.

#	STUDENT LEARNING OBJECTIVES (SLOs)	Corresponding PEs and DCIs
1	<p>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</p>	1-LS1-1

	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.]	
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).]	1-LS1-2
3	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.]	1-LS3-1

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

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>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.</p> <ul style="list-style-type: none"> Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1) Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1) <p>Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and</p>	<p>LS1.A: Structure and Function</p> <ul style="list-style-type: none"> 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. (1-LS1-1) <p>LS1.B: Growth and Development of Organisms</p> <ul style="list-style-type: none"> Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2) <p>LS1.D: Information Processing</p>	<p>Patterns</p> <ul style="list-style-type: none"> Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2),(1-LS3-1) <p>Structure and Function</p> <ul style="list-style-type: none"> The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1) <p>-----</p> <p><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p>Influence of Science, Engineering and Technology on Society and the Natural World</p>

<p>uses observations and texts to communicate new information.</p> <ul style="list-style-type: none"> Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2) <p>-----</p> <p style="text-align: center;"><i>Connections to Nature of Science</i></p> <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> Scientists look for patterns and order when making observations about the world. (1-LS1-2) 	<ul style="list-style-type: none"> Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1) <p>LS3.A: Inheritance of Traits</p> <ul style="list-style-type: none"> Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents. (1-LS3-1) <p>LS3.B: Variation of Traits</p> <ul style="list-style-type: none"> Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1) 	<ul style="list-style-type: none"> Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. (1-LS1-1)
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Connections to other DCIs in first grade: N/A

Articulation of DCIs across grade-levels:

K.ETS1.A (1-LS1-1); 3.LS2.D (1-LS1-2); 3.LS3.A (1-LS3-1); 3.LS3.B (1-LS3-1); 4.LS1.A (1-LS1-1); 4.LS1.D (1-LS1-1); 4.ETS1.A (1-LS1-1)

21st Century Themes: All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world, as they relate to the individual, global society and the universe.

Common Core State Standards Connections:

ELA/Literacy -

RI.1.1 Ask and answer questions about key details in a text. (1-LS1-2),(1-LS3-1)

RI.1.2 Identify the main topic and retell key details of a text. (1-LS1-2)

RI.1.10 With prompting and support, read informational texts appropriately complex for grade. (1-LS1-2)

W.1.7 *Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-LS1-1),(1-LS3 -1)*

W.1.8 *With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-LS3-1)*

Mathematics -

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

MP.5 *Use appropriate tools strategically. (1-LS3-1)*

1.NBT.B.3 *Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols $>$, $=$, and $<$. (1-LS1-2)*

1.NBT.C.4 *Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning uses. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2)*

1.NBT.C.5 *Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2)*

1.NBT.C.6 *Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2)*

1.MD.A.1 *Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-LS3-1)*

Grade Level:1

Title of Unit: Structure, Function, and Information Processing

Stage 1 - Desired Results

<p>Understandings:</p> <p><i>Students will understand that...</i></p> <ol style="list-style-type: none"> 1. Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. 2. The shape and stability of structures of natural and designed objects are related to their function(s). 3. Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. 	<p>Essential Questions:</p> <ol style="list-style-type: none"> 1. How do plants and animals use their external parts to help them survive, grow, and meet their needs? 2. What patterns of behavior of parent and offspring help offspring survive? 3. How are offspring in both plants and animals alike but not exactly alike their parents?
<p>Knowledge:</p> <p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● 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 have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow ● adult plants and animals can have young ● parents and the offspring themselves engage in behaviors that help the offspring to survive 	<p>Skills:</p> <p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> ● Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. ● Use materials to design a device that solves a specific problem or a solution to a specific problem. ● Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. ● Scientists look for patterns and order when making observations about the world.

<ul style="list-style-type: none"> ● 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 respond to some external inputs ● young animals and plants are very much, but not exactly like, their parents ● individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways 	
Stage 2- Assessment Evidence	
<p>Performance Tasks and other evidence:</p> <ul style="list-style-type: none"> ● Summative Assessments <ul style="list-style-type: none"> ○ RST- Research Simulation Task ○ Associated Unit tests, quizzes ○ labs and engineering based projects ● Formative Assessments <ul style="list-style-type: none"> ○ Graphic Organizers & Guided Note Taking ○ Directed Reading ○ Cooperative Group Learning ○ Homework ○ Journal Entries 	
Stage 3 – Learning Plan	
<p>Digital information and technology integration: Indicate any special considerations as well as materials, resources (online, print, video, audio) or equipment.</p> <ul style="list-style-type: none"> ● http://betterlesson.com/next_gen_science/browse/2074/ngss-1-Is1-1-use-materials-to-design-a-solution-to-a-human-problem-by-mimicking-how-plants-and-or-animals-use-their-external-par 	

- http://betterlesson.com/common_core/browse/2075/ngss-1-ls1-2-read-texts-and-use-media-to-determine-patterns-in-behavior-of-parents-and-offspring-that-help-offspring-survive
- <http://wyobio.org/index.php/education/lesson-plan-heredity/>
- http://betterlesson.com/common_core/browse/2077/ngss-1-ls3-1-make-observations-to-construct-an-evidence-based-account-that-young-plants-and-animals-are-like-but-not-exactly-lik
- <http://www.earthsciweek.org/classroom-activities/ngss>
- <http://www.enchantedlearning.com/subjects/animals/Animalbabies.shtml>
- <http://news.nationalgeographic.com/2015/04/150428-mothers-day-carrying-babies-animals-science-spiders/>
- <http://thefirstgradeparade.blogspot.com/2014/03/plants-aplenty.html>
- <https://www.teachingchannel.org/videos/next-generation-science-standards-achieve>
- <https://www.teachervision.com/plants/printable/56085.html>
- <https://quizlet.com/21717578/animal-body-parts-and-coverings-first-grade-flash-cards/>
- <http://www.hookedonscience.org/nextgenerationsciencestandards.html>
- <http://www.propertiesofmatter.si.edu/>
- <http://www.resa.net/curriculum/curriculum/science/professionaldevelopment/ngss-pd/lesson-plans-exploring-ngss/>
- <http://moodle.tbaisd.org/course/view.php?id=1021>
- <https://www.sciencea-z.com/scienceweb/nationalstandards.do>
- <http://www.science4us.com/k-2-science-lesson-plans/>
- <http://www.calacademy.org/educators/science-lesson-plans-for-kindergarten-and-1st-grade>
- <http://climatekids.nasa.gov/science-standards/>

Modifications: (ELLs, Special Education, Gifted and Talented)

- * Follow all IEP modifications/504 plan
- * Teacher tutoring
- * Peer tutoring
- * Cooperative learning groups
- * Modified assignments
- * Differentiated instruction

Presentation accommodations allow a student to:

- * Listen to audio recordings instead of reading text
- * Learn content from audiobooks, movies, videos and digital media instead of reading print versions
- * Work with fewer items per page or line and/or materials in a larger print size
- * Have a designated reader
- * Hear instructions orally
- * Record a lesson, instead of taking notes
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- * Be given an outline of a lesson
- * Use visual presentations of verbal material, such as word webs and visual organizers
- * Be given a written list of instructions

Response accommodations allow a student to:

- * Give responses in a form (oral or written) that's easier for him
- * Dictate answers to a scribe
- * Capture responses on an audio recorder
- * Use a spelling dictionary or electronic spell-checker
- * Use a word processor to type notes or give responses in class
- * Use a calculator or table of "math facts"

Setting accommodations allow a student to:

- * Work or take a test in a different setting, such as a quiet room with few distractions
- * Sit where he learns best (for example, near the teacher)
- * Use special lighting or acoustics
- * Take a test in small group setting
- * Use sensory tools such as an exercise band that can be looped around a chair's legs (so fidgety kids can kick it and quietly get their energy out)

Timing accommodations allow a student to:

- * Take more time to complete a task or a test
- * Have extra time to process oral information and directions
- * Take frequent breaks, such as after completing a task

Scheduling accommodations allow a student to:

- * Take more time to complete a project
- * Take a test in several timed sessions or over several days
- * Take sections of a test in a different order
- * Take a test at a specific time of day

Organization skills accommodations allow a student to:

- * Use an alarm to help with time management
- * Mark texts with a highlighter
- * Have help coordinating assignments in a book or planner
- * Receive study skills instruction

Assignment modifications allow a student to:

- * Complete fewer or different homework problems than peers
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Curriculum modifications allow a student to:

- * Learn different material (such as continuing to work on multiplication while classmates move on to fractions)
- * Get graded or assessed using a different standard than the one for classmates

2015 Ocean County Science Curriculum

Grade 1

Unit: Space Systems: Patterns and Cycles

What predictable, observable patterns occur due to the motion of the sun, moon and stars?
How is the amount of daylight related to the time of year?

The performance expectations in first grade help students formulate answers to questions such as: “What happens when materials vibrate? What happens when there is no light? What are some ways plants and animals meet their needs so that they can survive and grow? How are parents and their children similar and different? What objects are in the sky and how do they seem to move?” First grade performance expectations include PS4, LS1, LS3, and ESS1 Disciplinary Core Ideas from the NRC Framework. Students are expected to develop understanding of the relationship between sound and vibrating materials as well as between the availability of light and ability to see objects. The idea that light travels from place to place can be understood by students at this level through determining the effect of placing objects made with different materials in the path of a beam of light. Students are also expected to develop understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs as well as how behaviors of parents and offspring help the offspring survive. The understanding is developed that young plants and animals are like, but not exactly the same as, their parents. Students are able to observe, describe, and predict some patterns of the movement of objects in the sky. The crosscutting concepts of patterns; cause and effect; structure and function; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the first grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

The [Grades k -2 Storyline](#) provides a summary of the understandings that students developed by the end of 2nd grade.

#	STUDENT LEARNING OBJECTIVES (SLOs)	Corresponding PEs and DCIs
1	<p>Use observations of the sun, moon, and stars to describe patterns that can be predicted. <i>[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.]</i></p>	1-ESS1-1

2	<p>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.]</p>	1-ESS1-2
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The SLOs were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

<p style="text-align: center;">Science and Engineering Practices</p> <p>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.</p> <ul style="list-style-type: none"> • Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2) <p>Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1) 	<p style="text-align: center;">Disciplinary Core Ideas</p> <p>ESS1.A: The Universe and its Stars</p> <ul style="list-style-type: none"> • Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) <p>ESS1.B: Earth and the Solar System</p> <ul style="list-style-type: none"> • Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2) 	<p style="text-align: center;">Crosscutting Concepts</p> <p>Patterns</p> <ul style="list-style-type: none"> • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1),(1-ESS1-2) <p>-----</p> <p style="text-align: center;">Connections to Nature of Science</p> <p>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</p> <ul style="list-style-type: none"> • Science assumes natural events happen today as they happened in the past. (1-ESS1-1) • Many events are repeated. (1-ESS1-1)
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Connections to other DCIs in first grade: N/A

Articulation of DCIs across grade-levels:

3.PS2.A (1-ESS1-1); **5.PS2.B** (1-ESS1-1),(1-ESS1-2); **5.ESS1.B** (1-ESS1-1),(1-ESS1-2)

21st Century Themes: All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world, as they relate to the individual, global society and the universe.

Common Core State Standards Connections:

ELA /Literacy –

W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-ESS1-1),(1-ESS1-2)

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-1),(1-ESS1-2)

Mathematics —

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

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

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

1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)

1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)

Grade Level: 1	Title of Unit: Space Systems: Patterns and Cycles
Stage 1 - Desired Results	
Understandings: <i>Students will understand that...</i> <ol style="list-style-type: none">1. Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.2. Science assumes natural events happen today as they happened in the past.3. Many events are repeated.	Essential Questions: <ol style="list-style-type: none">1. What predictable, observable patterns occur due to the motion of the sun, moon, and stars?2. How is the amount of daylight related to the time of year?

<p>Knowledge:</p> <p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted ● seasonal patterns of sunrise and sunset can be observed, described, and predicted 	<p>Skills:</p> <p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> ● Make observations (firsthand or from media) to collect data that can be used to make comparisons. ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.
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Stage 2- Assessment Evidence

<p>Performance Tasks and other evidence:</p> <ul style="list-style-type: none"> ● Summative Assessments <ul style="list-style-type: none"> ○ RST- Research Simulation Task ○ Associated Unit tests, quizzes ○ labs and engineering based projects ● Formative Assessments <ul style="list-style-type: none"> ○ Graphic Organizers & Guided Note Taking ○ Directed Reading ○ Cooperative Group Learning ○ Homework ○ Journal Entries
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Stage 3 – Learning Plan

<p>Digital information and technology integration: Indicate any special considerations as well as materials, resources (online, print, video, audio) or equipment.</p> <ul style="list-style-type: none"> ● http://betterlesson.com/next_gen_science/browse/2080/ngss-1-ess1-1-use-observations-of-the-sun-moon-and-stars-to-describe-patterns-that-can-be-predicted ● http://www.stem4students.net/first-grade-1-ess1-earths-place-in-the-universe-quarter-2-2014-2015.html ● http://betterlesson.com/next_gen_science/browse/2081/ngss-1-ess1-2-make-observations-at-different-times-of-year-to-relate-the-amount-of-daylight-to-the-time-of-year ● http://www.earthsciweek.org/classroom-activities/ngss
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- <http://www.exploringnature.org/db/detail.php?dbID=93&detID=3711>
- <http://www.hookedonscience.org/nextgenerationsciencestandards.html>
- <https://www.teachingchannel.org/videos/next-generation-science-standards-achieve>
- <http://www.propertiesofmatter.si.edu/>
- <http://www.resa.net/curriculum/curriculum/science/professionaldevelopment/ngss-pd/lesson-plans-exploring-ngss/>
- <http://moodle.tbaisd.org/course/view.php?id=1021>
- <https://www.sciencea-z.com/scienceweb/nationalstandards.do>
- <http://www.science4us.com/k-2-science-lesson-plans/>
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Curriculum modifications allow a student to:

- * Learn different material (such as continuing to work on multiplication while classmates move on to fractions)
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2015 Ocean County Science Curriculum

Grade 1

Unit: Engineering and Design

**How are asking questions, gathering information, and making observation helpful when thinking about problems?
How does sketching or creating a model to illustrate its shape help solve a given problem?
How does testing a model determine its strengths and weaknesses in solving a given problem?**

The performance expectations in first grade help students formulate answers to questions such as: “What happens when materials vibrate? What happens when there is no light? What are some ways plants and animals meet their needs so that they can survive and grow? How are parents and their children similar and different? What objects are in the sky and how do they seem to move?” First grade performance expectations include PS4, LS1, LS3, and ESS1 Disciplinary Core Ideas from the NRC Framework. Students are expected to develop understanding of the relationship between sound and vibrating materials as well as between the availability of light and ability to see objects. The idea that light travels from place to place can be understood by students at this level through determining the effect of placing objects made with different materials in the path of a beam of light. Students are also expected to develop understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs as well as how behaviors of parents and offspring help the offspring survive. The understanding is developed that young plants and animals are like, but not exactly the same as, their parents. Students are able to observe, describe, and predict some patterns of the movement of objects in the sky. The crosscutting concepts of patterns; cause and effect; structure and function; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the first grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

The [Grades k -2 Storyline](#) provides a summary of the understandings that students developed by the end of 2nd grade.

#	STUDENT LEARNING OBJECTIVES (SLOs)	Corresponding PEs and DCIs
1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	K-2-ETS-1-1
2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	K-2-ETS1-2

3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	K-2-ETS1-3
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The SLOs were developed using the following elements from the NRC document <i>A Framework for K-12 Science Education</i> :		
<p style="text-align: center;">Science and Engineering Practices</p> <p>Asking Questions and Defining Problems Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions.</p> <ul style="list-style-type: none"> Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1) Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1) <p>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.</p> <ul style="list-style-type: none"> Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2) <p>Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3) 	<p style="text-align: center;">Disciplinary Core Ideas</p> <p>ETS1.A: Defining and Delimiting Engineering Problems</p> <ul style="list-style-type: none"> A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1) <p>ETS1.B: Developing Possible Solutions</p> <ul style="list-style-type: none"> 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) <p>ETS1.C: Optimizing the Design Solution</p> <ul style="list-style-type: none"> Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3) 	<p style="text-align: center;">Crosscutting Concepts</p> <p>Structure and Function</p> <ul style="list-style-type: none"> The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)
<p><i>Connections to K-2-ETS1.B: Developing Possible Solutions to Problems include:</i> First Grade: 1-PS4-4</p>		
<p><i>Articulation of DCIs across grade-levels:</i></p>		

3-5.ETS1.A (K-2-ETS1-1),(K-2-ETS1-2),(K-2-ETS1-3); 3-5.ETS1.B (K-2-ETS1-2),(K-2-ETS1-3); 3-5.ETS1.C (K-2-ETS1-1),(K-2-ETS1-2),(K-2-ETS1-3)

21st Century Themes: All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world, as they relate to the individual, global society and the universe.

Common Core State Standards Connections:

ELA/Literacy —

RI.2.1 Ask and answer such questions as *who, what, where, when, why, and how* to demonstrate understanding of key details in a text. (K-2-ETS1-1)

W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1),(K-2-ETS1-3)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1),(K-2-ETS1-3)

SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)

Mathematics —

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

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

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

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1),(K-2-ETS1-3)

Grade Level:1

Title of Unit: Engineering and Design

Stage 1 - Desired Results

<p>Understandings:</p> <p><i>Students will understand that...</i></p> <ol style="list-style-type: none"> 1. The shape and stability of structures of natural and designed objects are related to their function(s). 	<p>Essential Questions:</p> <ol style="list-style-type: none"> 1. How does sketching or creating a model to illustrate its shape help solve a given problem? 2. How does testing a model determine its strengths and weaknesses in solving a given problem? 3. How are asking questions, gathering information, and making observation helpful when thinking about problems?
<p>Knowledge:</p> <p><i>Students will know...</i></p> <ul style="list-style-type: none"> • how to solve a problem through engineering • to use questioning, observing, and gathering information to help solve problems • a clear understanding of the problem is the first step • designs can be conveyed through sketches, drawings, or physical models and will aid in communicating with others • comparing and testing designs is a useful way to determine the best solution to a problem 	<p>Skills:</p> <p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> • 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. • Develop a simple model based on evidence to represent a proposed object or tool. • Analyze data from tests of an object or tool to determine if it works as intended.
<p>Stage 2- Assessment Evidence</p>	
<p>Performance Tasks and other evidence:</p> <ul style="list-style-type: none"> • Summative Assessments <ul style="list-style-type: none"> o RST- Research Simulation Task o Associated Unit tests, quizzes o labs and engineering based projects 	

- Formative Assessments
 - Graphic Organizers & Guided Note Taking
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 - Journal Entries

Stage 3 – Learning Plan

Digital information and technology integration: Indicate any special considerations as well as materials, resources (online, print, video, audio) or equipment.

- http://betterlesson.com/common_core/browse/2105/ngss-k-2-ets1-1-ask-questions-make-observations-and-gather-information-about-a-situation-people-want-to-change-to-define-a-simpl
- http://betterlesson.com/next_gen_science/browse/2107/ngss-k-2-ets1-3-analyze-data-from-tests-of-two-objects-designed-to-solve-the-same-problem-to-compare-the-strengths-and-weaknesse
- <http://www.asee.org/documents/conferences/k12/2011/07/17-Ready-for-Primary-Time.pdf>
- <http://teachers.egfi-k12.org/>
- <http://www.maryville-schools.org/site/Default.aspx?PageID=4713>
- <https://www.teachengineering.org/>
- <http://app15c.aws.livebinders.com/play/play?id=137603>
- <http://www.hookedonscience.org/nextgenerationsciencestandards.html>
- <http://www.propertiesofmatter.si.edu/>
- <http://www.resa.net/curriculum/curriculum/science/professionaldevelopment/ngss-pd/lesson-plans-exploring-ngss/>
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