OCEAN COUNTY SCIENCE CURRICULUM

**Content Area:** Science

**Course Title:** Elementary

**Grade Level:** Grade 2

---

**Unit 1:** Structure and Properties of Matter

60 Days

**Unit 2:** Interdependent Relationships in Ecosystems

60 Days
How can you describe and classify different kinds of materials?

Which properties of different materials make them suitable for select functions?

How can an object made of a small set of pieces be disassembled and made into a new object?

How does heating and cooling a substance cause changes?

The performance expectations in second grade help students formulate answers to questions such as: “How does land change and what are some things that cause it to change? What are the different kinds of land and bodies of water? How are materials similar and different from one another, and how do the properties of the materials relate to their use? What do plants need to grow? How many types of living things live in a place?” Second grade performance expectations include PS1, LS2, LS4, ESS1, ESS2, and ETS1 Disciplinary Core Ideas from the NRC Framework. Students are expected to develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination. Students are also expected to compare the diversity of life in different habitats. An understanding of observable properties of materials is developed by students at this level through analysis and classification of different materials. Students are able to apply their understanding of the idea that wind and water can change the shape of the land to compare design solutions to slow or prevent such change. Students are able to use information and models to identify and represent the shapes and kinds of land and bodies of water in an area and where water is found on Earth. The crosscutting concepts of patterns; cause and effect; energy and matter; structure and function; stability and change; 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 second grade performance expectations, students are expected to demonstrate gradeappropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and 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.

<table>
<thead>
<tr>
<th>#</th>
<th>STUDENT LEARNING OBJECTIVES (SLOs)</th>
<th>Corresponding PEs and DCIs</th>
</tr>
</thead>
</table>
| 1  | Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.  
[Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]  
Interactive Science Lessons 1.1, 1.2, 1.3, 1.4, 1.5 | 2-PS1-1                     |
| 2  | Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.  
[Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.]  
[Assessment Boundary: Assessment of quantitative measurements is limited to length.]  
Interactive Science Lessons 1.5 and Chapter 1 STEM Activity | 2-PS1-2                     |
<table>
<thead>
<tr>
<th></th>
<th>Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.] Interactive Science Lessons 1.5 and Chapter 1 STEM Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2-PS1-3</td>
</tr>
<tr>
<td></td>
<td>Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.] Interactive Science Lessons 1.3, 1.4</td>
</tr>
<tr>
<td>4</td>
<td>2-PS1-4</td>
</tr>
</tbody>
</table>

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

**Science and Engineering Practices**
- 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 an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-PS1-1)
- Analyzing and Interpreting Data
  - Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
    - Analyze data from tests of an object or tool

**Disciplinary Core Ideas**

**PS1.A: Structure and Properties of Matter**
- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)
- Different properties are suited to different purposes. (2-PS1-2), (2-PS1-3)
- A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

**PS1.B: Chemical Reactions**
- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)

**Crosscutting Concepts**
- Patterns
  - Patterns in the natural and human designed world can be observed. (2-PS1-1)
- Cause and Effect
  - Events have causes that generate observable patterns. (2-PS1-4)
  - Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2)
- Energy and Matter
  - Objects may break into smaller pieces and be put together into larger pieces, or change shapes. (2-PS1-3)
Connections to other DCIs in second grade: N/A

---

**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. (2-PS1-3)

**Engaging in Argument from Evidence**
- Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).
  - Construct an argument with evidence to support a claim. (2-PS1-4)

---

**Connections to Nature of Science**

**Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena**
- Science searches for cause and effect relationships to explain natural events. (2-PS1-4)

---

**Connections to Engineering, Technology, and Applications of Science**

**Influence of Engineering, Technology, and Science, on Society and the Natural World**
- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. (2-PS1-2)
Articulation of DCIs across grade-levels: PS1-1), (2-PS1-2), (2-PS1-3); 5.PS1.B (2-PS1-4); 4.ESS2.A (2-PS1-3); 5.PS1.A (2-PS1-3)

21st Century Themes/ Career:

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

Primary Interdisciplinary Connections:

Language Arts-
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.
RI.2.3 Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
W.2.1 Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section.
W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations)
W.2.8 Recall information from experiences or gather information from provided sources to answer a question.
Mathematics-
MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

2.MD.D.10 Draw a picture 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.

Technology-
8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.

8.1.2.A.2 Create a document using a word processing application

8.1.2.B.1 Illustrate and communicate original ideas and stories using multiple digital tools and resources.

8.1.2.C.1 Engage in a variety of developmentally appropriate learning activities with students in other classes, schools, or countries using various media formats such as online collaborative tools, and social media.

8.1.2.E.1 Use digital tools and online resources to explain a problem or issue.

8.1.2.F.1 Use geographic mapping tools to plan and solve problems.

<table>
<thead>
<tr>
<th>Grade Level: 2</th>
<th>Title of Unit: Structure and Properties of Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Stage 1 - Desired Results</strong></td>
</tr>
</tbody>
</table>
**Understandings:**

*Students will understand that…*
- Patterns in the natural and human designed world can be observed.
- Events have causes that generate observable patterns.
- Simple tests can be designed to gather evidence to support or refute student ideas about causes.
- Objects may break into smaller pieces and be put together into larger pieces, or change shapes.
- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world.

**Essential Questions:**

1. How can you describe and classify different kinds of materials?
2. Which properties of different materials make them suitable for select functions?
3. How can an object made of a small set of pieces be disassembled and made into a new object?
4. How does heating and cooling a substance cause changes?

**Knowledge:**

*Students will know…*
- different kinds of matter exist and many of them can be either solid or liquid, depending on temperature.
- matter can be described and classified by its observable properties
- different properties are suited to different purposes
- a great variety of objects can be built up from a small set of pieces
- heating or cooling a substance may cause changes that can be observed (sometimes these changes are reversible, and sometimes they are not)

**Skills:**

*Students will be able to…*
- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question
- Analyze data from tests of an object or tool to determine if it works as intended.
- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.
- Construct an argument with evidence to support a claim.
- Search for cause and effect relationships to explain natural events.

**Stage 2 - Assessment Evidence**

<p>| Performance Tasks and other evidence: ● Summative Assessments | ● Formative Assessments o Graphic Organizers &amp; Guided Note Taking |</p>
<table>
<thead>
<tr>
<th>o RST- Research Simulation Task o Associated Unit tests, quizzes o labs and engineering based projects</th>
<th>o Directed Reading o Cooperative Group Learning o Homework o Journal Entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Benchmark Assessment - Chapter pre and post test - Chapter STEM projects</td>
<td></td>
</tr>
</tbody>
</table>

**Stage 3 – Learning Plan**
**Digital information and technology integration:** Indicate any special considerations as well as materials, resources (online, print, video, audio) or equipment.

**Ocean County Next Generation Science Standards Resource Center**
- [http://smlevinson.wixsite.com/ocngss/second-grade](http://smlevinson.wixsite.com/ocngss/second-grade)
- Provides sample lesson plans, literature connections, video resources, games/virtual labs, and informational resources

**EPIC**
- [https://www.getepic.com/](https://www.getepic.com/)
- Sign up for free and gain access to thousands of books online. You can search specific key words and choose a book that corresponds with the standard.

**Structures and Properties of Matter Unit**
- This resource provides complete lesson plans and worksheets to complete experiments related to exploring structures and properties of matter.

**Mystery Science**
- [https://mysteryscience.com](https://mysteryscience.com)
- This website provides short videos and experiments that are aligned with the NGSS.

**Open Ed**
- Resource library where you can find resources based on standard and modify search based on resource type (i.e. if you are looking for a video you can find just videos for specific standard).
<table>
<thead>
<tr>
<th>Hooked on Science Experiment Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.hookedonscience.org/nextgenerationsciencestandards.html">http://www.hookedonscience.org/nextgenerationsciencestandards.html</a></td>
</tr>
<tr>
<td>This is a page dedicated to fun experiments for kids. Easy to navigate and lists experiments based on the NGSS.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Earth Science Week</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.earthsciweek.org/classroom-activities/ngss">http://www.earthsciweek.org/classroom-activities/ngss</a></td>
</tr>
<tr>
<td>This website provides a list of classroom activities that are categorized by NGSS.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Better Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>This website allows you to search for lesson plans (created by other educators) based on the NGSS.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RESA</th>
</tr>
</thead>
<tbody>
<tr>
<td>This website provides access to teacher created lesson plans that range across the NGSS.</td>
</tr>
</tbody>
</table>

**Modifications:**

Students with Disabilities/ White:

- 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

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Lesson Essential Question</th>
<th>Lesson Objective</th>
<th>Pacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Try It! Inquiry</td>
<td>What affects evaporation?</td>
<td>Students will observe evaporation rates in open and closed containers.</td>
<td>1 Day</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Day 1 – 15 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Day 2-6 – 5 minutes)</td>
</tr>
<tr>
<td>STEM Activity</td>
<td>What is the best material to use to make a durable trail?</td>
<td>Students will identify a problem that reflects a need, recognize design constraints, and propose and test a solution to the problem.</td>
<td>~5 Days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Day 1 – Find a Problem</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Day 2 – Plan and Draw</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Day 3 – Choose Materials Day</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4 – Make and Test</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Day 5 – Record and Share</td>
</tr>
<tr>
<td>1.1</td>
<td>What are some properties of matter?</td>
<td>Students will carry out investigations to observe the properties of matter.</td>
<td>3 Days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Day 1 – Engage and Explore (30 min)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Day 2 – Explain (35 min)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Day 3 – Elaborate and Evaluate (30 min)</td>
</tr>
<tr>
<td>Component</td>
<td>Question</td>
<td>Activity</td>
<td>Time Allocation</td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
<td>----------</td>
<td>-----------------</td>
</tr>
<tr>
<td>1.2</td>
<td>What are solids, liquids, and gases?</td>
<td>Students will analyze the properties of solids, liquids, and gases.</td>
<td>3 Days Day 1 – Engage and Explore (30 min)</td>
</tr>
<tr>
<td>1.3</td>
<td>What are some ways matter can change?</td>
<td>Students will investigate ways that matter can be changed.</td>
<td>3 Days Day 1 – Engage and Explore (30 min) Day 2 – Explain (35 min) Day 3 – Elaborate and Evaluate (30 min)</td>
</tr>
<tr>
<td>1.4</td>
<td>How can water change?</td>
<td>Students will observe and classify water in its solid, liquid, and gaseous states and compare volume and temperature.</td>
<td>3 Days Day 1 – Engage and Explore (30 min) Day 2 – Explain (35 min) Day 3 – Elaborate and Evaluate (30 min)</td>
</tr>
<tr>
<td>1.5</td>
<td>How can you combine materials?</td>
<td>Students will observe that materials have different properties and provide evidence that materials can be combined to form different things.</td>
<td>3 Days Day 1 – Engage and Explore (30 min) Day 2 – Explain (35 min) Day 3 – Elaborate and Evaluate (30 min)</td>
</tr>
<tr>
<td>Investigate It! Inquiry</td>
<td>How can properties change?</td>
<td>Students will observe that properties of materials can be changed.</td>
<td>1 – 2 Days Day 1 – Directed and Guided Inquiry Day 2 – Open Inquiry</td>
</tr>
<tr>
<td>Review and Assessment</td>
<td>What is matter?</td>
<td>Students will be able to review what they have learned from the chapter to answer the question in their own words.</td>
<td>2 Days Day 1 – Review Day 2 – Assess</td>
</tr>
<tr>
<td>Apply It! Inquiry</td>
<td>Which objects will float?</td>
<td>Students will group objects according to their physical characteristics (for example, shape, color, texture, form, size).</td>
<td>1 Day</td>
</tr>
</tbody>
</table>
| Performance Based Assessment | Varies based on activity | Students will be able to use scientific and engineering practices to complete and reflect on a task with a group. | 4 Days  
Day 1 – Group Objects  
Day 2 – Cool a Balloon  
Day 3 – Order Objects by Mass  
Day 4 – Make a Presentation |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Expectation Activity 1</td>
<td>How can matter be classified by different properties?</td>
<td>Students will plan a method of classification based on the observable properties of materials.</td>
<td>1 Day</td>
</tr>
<tr>
<td>Performance Expectation Activity 2</td>
<td>What materials would be best to soak up water?</td>
<td>Students will analyze data to determine which materials are best suited to absorb water under a potted plant.</td>
<td>1 Day</td>
</tr>
<tr>
<td>Performance Expectation Activity 3</td>
<td>How can the same materials be used to make different structures?</td>
<td>Students will use the same set of objects to create different structures.</td>
<td>1 Day</td>
</tr>
<tr>
<td>Performance Expectation Activity 4</td>
<td>Can changes caused by heating and cooling be reversed?</td>
<td>Students will use evidence to tell how some changed caused by heating or cooling cannot be reversed.</td>
<td>1 Day</td>
</tr>
</tbody>
</table>
Do plants and animals need sunlight and water to grow?

What are the steps that occur when animals help disperse seeds or aid in pollinating plants?

What are observations that can be made about the diversity of living things in different habitats?

The performance expectations in second grade help students formulate answers to questions such as: “How does land change and what are some things that cause it to change? What are the different kinds of land and bodies of water? How are materials similar and different from one another, and how do the properties of the materials relate to their use? What do plants need to grow? How many types of living things live in a place?” Second grade performance expectations include PS1, LS2, LS4, ESS1, ESS2, and ETS1 Disciplinary Core Ideas from the NRC Framework. Students are expected to develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination. Students are also expected to compare the diversity of life in different habitats. An understanding of observable properties of materials is developed by students at this level through analysis and classification of different materials. Students are able to apply their understanding of the idea that wind and water can change the shape of the land to compare design solutions to slow or prevent such change. Students are able to use information and models to identify and represent the shapes and kinds of land and bodies of water in an area and where water is found on Earth. The crosscutting concepts of patterns; cause and effect; energy and matter; structure and function; stability and change; 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 second grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and 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.

<table>
<thead>
<tr>
<th>#</th>
<th>STUDENT LEARNING OBJECTIVES (SLOs)</th>
<th>Corresponding PEs and DCIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.] Interactive Science Lessons 2.1, 2.5</td>
<td>2-LS2-1</td>
</tr>
<tr>
<td>2</td>
<td>Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants. Interactive Science Lessons 2.1, 2.3</td>
<td>2-LS2-2</td>
</tr>
<tr>
<td>3</td>
<td>Make observations of plants and animals to compare the diversity of life in different habitats. [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.] Interactive Science Lessons 2.2, 2.3, 2.4</td>
<td>2-LS4-1</td>
</tr>
</tbody>
</table>
The SLOs were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

<table>
<thead>
<tr>
<th>Science and Engineering Practices</th>
<th>Disciplinary Core Ideas</th>
<th>Crosscutting Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Developing and Using Models</strong></td>
<td><strong>LS2.A: Interdependent Relationships in Ecosystems</strong></td>
<td><strong>Cause and Effect</strong></td>
</tr>
</tbody>
</table>
| 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. | - Plants depend on water and light to grow. (2-LS2-1)  
- Plants depend on animals for pollination or to move their seeds around. (2-LS2-2) | - Events have causes that generate observable patterns. (2-LS2-1) |
| **Planning and Carrying Out Investigations** | **LS4.D: Biodiversity and Humans** | **Structure and Function** |
| 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 | - There are many different kinds of living things in any area, and they exist in different places on land and in water. (2LS4-1) | - The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2) |
| **ETS1.B: Developing Possible Solutions** | | |
| | - Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s | |
## Connections to other DCIs in second grade: N/A

**Articulation of DCIs across grade-levels:**
- K.ETS1.A (2-LS2-2); 3.LS4.C (2-LS4-1); 3.LS4.D (2-LS4-1); 5.LS1.C (2-LS2-1); 5.LS2.A (2-LS2-2), (2-LS4-1); K.LS1.C (2-LS2-1); K.ESS3.A (2-LS2-1); 1

### Solutions
- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-LS2-1)
- Make observations (firsthand or from media) to collect data which can be used to make comparisons. (2-LS4-1)

### Connections to Nature of Science

**Scientific Knowledge is Based on Empirical Evidence**
- Scientists look for patterns and order when making observations about the world. (2-LS4-1)
- Scientists observe and record data to make predictions about the natural world. (2-LS2-2)
- Scientists use evidence to support or challenge ideas. (2-LS4-1)
**21st Century Themes/ Career:**

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

CRP12. Work productively in teams while using cultural global competence.
Primary Interdisciplinary Connections:

Language Arts-
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.

RI.2.3 Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.

W.2.1 Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section.

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question.

Mathematics-
MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

2.MD.D.10 Draw a picture 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.

Technology-
8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.

8.1.2.A.2 Create a document using a word processing application

8.1.2.B.1 Illustrate and communicate original ideas and stories using multiple digital tools and resources.
8.1.2.C.1 Engage in a variety of developmentally appropriate learning activities with students in other classes, schools, or countries using various media formats such as online collaborative tools, and social media.

8.1.2.E.1 Use digital tools and online resources to explain a problem or issue.

8.1.2.F.1 Use geographic mapping tools to plan and solve problems.

<table>
<thead>
<tr>
<th>Grade Level: 2</th>
<th>Title of Unit: Interdependent Relationships in Ecosystems</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stage 1 - Desired Results</td>
</tr>
<tr>
<td>Understandings:</td>
<td></td>
</tr>
<tr>
<td>Students will understand that… 1. Events have causes that generate observable patterns. 2. The shape and stability of structures of natural and designed objects are related to their function(s).</td>
<td>Essential Questions:</td>
</tr>
<tr>
<td>Essential Questions:</td>
<td>1. Do plants and animals need sunlight and water to grow? 2. What are the steps that occur when animals help disperse seeds or aid in pollinating plants? 3. What are observations that can be made about the diversity of living things in different habitats?</td>
</tr>
</tbody>
</table>
### Knowledge:

*Students will know…*

- plants depend on water and light to grow.
- plants depend on animals for pollination or to move their seeds around
- there are many different kinds of living things in any area, and they exist in different places on land and in water

### Skills:

*Students will be able to…*

- Develop a simple model based on evidence to represent a proposed object or tool.
- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.
- Make observations (firsthand or from media) to collect data which can be used to make comparisons.
- Look for patterns and order when making observations about the world.

### Stage 2 - Assessment Evidence

**Performance Tasks and other evidence:**

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

| Stage 3 – Learning Plan |
Digital information and technology integration: Indicate any special considerations as well as materials, resources (online, print, video, audio) or equipment.

Ocean County Next Generation Science Standards Resource Center
- http://smilevinson.wixsite.com/ocngss/second-grade
- Provides sample lesson plans, literature connections, video resources, games/virtual labs, and informational resources

EPIC
- https://www.getepic.com/
- Sign up for free and gain access to thousands of books online. You can search specific key words and choose a book that corresponds with the standard.

Mystery Science
- https://mysteryscience.com
- This website provides short videos and experiments that are aligned with the NGSS.

Open Ed
- Resource library where you can find resources based on standard and modify search based on resource type (i.e. if you are looking for a video you can find just videos for specific standard).

Hooked on Science Experiment Resource
- http://www.hookedonscience.org/nextgenerationsciencestandards.html
- This is a page dedicated to fun experiments for kids. Easy to navigate and lists experiments based on the NGSS.

Earth Science Week
- http://www.earthsciweek.org/classroom-activities/ngss
- This website provides a list of classroom activities that are categorized by NGSS.

Better Lesson
if-plants-need-
**sunlight-and-water-to-grow?from=domain_core**
  - This website allows you to search for lesson plans (created by other educators) based on the NGSS.

**Exploring Nature**
  - This website provides you with experiments and lesson plans based on the NGSS.

**Clear Into the Classroom**
  - This link provides access to a lesson plan focusing on Who Lives Where and What Grows Where.

**RESA**
  - This website provides access to teacher created lesson plans that range across the NGSS.
Modifications:

Students with Disabilities/ White:

* 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

---

**Interactive Science Chapter 2 – Plants and Animals**

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Lesson Essential Question</th>
<th>Lesson Objective</th>
<th>Pacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Try It! Inquiry</td>
<td>What do plants need to be healthy?</td>
<td>Students will observe and describe how space affects plant growth.</td>
<td>1 Day (3 weeks observing) Day 1 – 20 minutes (3 weeks – 5 minutes)</td>
</tr>
<tr>
<td>STEM Activity</td>
<td>What is the best way to make a trap to capture an insect so you can observe and learn about it?</td>
<td>Students will identify a problem that reflects a need, recognize design constraints, and propose and test a solution to the problem.</td>
<td>~5 Days Day 1 – Find a Problem Day 2 – Plan and Draw Day 3 – Choose Materials Day 4 – Make and Test Day 5 – Record and Share</td>
</tr>
<tr>
<td>2.1</td>
<td>What are the parts of plants?</td>
<td>Students will classify different parts of plants.</td>
<td>3 Days Day 1 – Engage and Explore (30 min) Day 2 – Explain (35 min) Day 3 – Elaborate and Evaluate (35 min)</td>
</tr>
<tr>
<td>2.2</td>
<td>What are some kinds of animals?</td>
<td>Students will observe how animal groups are alike and different.</td>
<td>3 Days Day 1 – Engage and Explore (30 min) Day 2 – Explain (35 min) Day 3 – Elaborate and Evaluate (30 min)</td>
</tr>
<tr>
<td>2.3</td>
<td>What are some parts of animals?</td>
<td>Students will make a model of animal parts and will investigate how animals use body parts to meet their needs.</td>
<td>3 Days  Day 1 – Engage and Explore (30 min) Day 2 – Explain (35 min) Day 3 – Elaborate and Evaluate (35 min)</td>
</tr>
<tr>
<td>-------</td>
<td>---------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>2.4</td>
<td>Where do plants and animals live?</td>
<td>Students will provide evidence that plants and animals live in habitats that meet their needs.</td>
<td>3 Days  Day 1 – Engage and Explore (30 min) Day 2 – Explain (35 min) Day 3 – Elaborate and Evaluate (30 min)</td>
</tr>
<tr>
<td>2.5</td>
<td>How do living things get food?</td>
<td>Students will obtain information about how a food chain works.</td>
<td>3 Days  Day 1 – Engage and Explore (30 min) Day 2 – Explain (35 min) Day 3 – Elaborate and Evaluate (35 min)</td>
</tr>
<tr>
<td>Investigate It! Inquiry</td>
<td>How does water affect plant growth?</td>
<td>Students will observe how water affects plant growth.</td>
<td>5 Days  Day 1 – 5 Directed and Guided Inquiry (Observing the result of no water/too much water on plants) Day 2 – Open Inquiry</td>
</tr>
<tr>
<td>Review and Assessment</td>
<td>How do plants, animals, and people live in their habitat?</td>
<td>Students will be able to review what they have learned from the chapter to answer the question in their own words.</td>
<td>2 Days  Day 1 – Review Day 2 – Assess</td>
</tr>
<tr>
<td>Apply It! Inquiry</td>
<td>How can an octopus use its arms?</td>
<td>Students will explore how an octopus use its suction cups by testing how suction cups can open a jar.</td>
<td>1 Day</td>
</tr>
<tr>
<td>Performance Based Assessment</td>
<td><em>Varies based on activity</em></td>
<td>Students will be able to use scientific and engineering practices to complete and reflect on a task with a group.</td>
<td>4 Days  Day 1 – Put on a Play Day 2 (ongoing) – Light and Seeds Day 3 – Make Observations Day 4 – Write a Song</td>
</tr>
</tbody>
</table>
| Performance Expectation Activity 1 | Do plants need sunlight and water to grow? | Students will plan two separate investigations to determine if plants need sunlight and water to grow. | Several Weeks  
Once set up students can make observations and reflect daily. |
|-----------------------------------|------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| Performance Expectation Activity 2 | How do animals disperse seeds or pollinate plants? | Students will create a model that shows how animals disperse seeds or pollinate plants. | 2 Days  
Day 1 – Research  
Day 2 – Make a Model |
| Performance Expectation Activity 3 | What can we learn from the diversity of plants and animals from different habitats? | Students will use evidence from observations to compare the diversity of life in different habitats. | 2 -3 Days  
Day 1 and 2 – Research and Classify  
Day 3 – Draw Conclusions |

2015 Ocean County Science Curriculum

Grade 2  
Unit: Earth’s Systems: Processes that Shape the Earth
Why do some Earth events happen very slowly or quickly?
What are different solutions designed to prevent wind or water changing the shape of land?
How can a map represent the shape and kind of water in a specified area?
Where and why is water on Earth found in both solid and liquid form?

The performance expectations in second grade help students formulate answers to questions such as: “How does land change and what are some things that cause it to change? What are the different kinds of land and bodies of water? How are materials similar and different from one another, and how do the properties of the materials relate to their use? What do plants need to grow? How many types of living things live in a place?” Second grade performance expectations include PS1, LS2, LS4, ESS1, ESS2, and ETS1 Disciplinary Core Ideas from the NRC Framework. Students are expected to develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination. Students are also expected to compare the diversity of life in different habitats. An understanding of observable properties of materials is developed by students at this level through analysis and classification of different materials. Students are able to apply their understanding of the idea that wind and water can change the shape of the land to compare design solutions to slow or prevent such change. Students are able to use information and models to identify and represent the shapes and kinds of land and bodies of water in an area and where water is found on Earth. The crosscutting concepts of patterns; cause and effect; energy and matter; structure and function; stability and change; 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 second grade performance expectations, students are expected to develop grade-appropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and 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.

<table>
<thead>
<tr>
<th>#</th>
<th>STUDENT LEARNING OBJECTIVES (SLOs)</th>
<th>Corresponding PEs and DCIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use information from several sources to provide evidence that Earth events can occur quickly or slowly. [Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.] [Assessment Boundary: Assessment does not include quantitative measurements of timescales.] Interactive Science Lessons 3.2, 3.3</td>
<td>2-ESS1-1</td>
</tr>
<tr>
<td></td>
<td><strong>2</strong></td>
<td>Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. [Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.] Interactive Science Lessons 3.2, Chapter 3 STEM Activity</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.] Interactive Science Lessons 3.1</td>
<td></td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Obtain information to identify where water is found on Earth and that it can be solid or liquid. Interactive Science Lessons 1.4, 3.1</td>
<td></td>
</tr>
</tbody>
</table>

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

**Science and Engineering Practices**
- Developing and Using Models
  - Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.
  - Develop a model to represent patterns in the natural world. (2-ESS2-2)

**Disciplinary Core Ideas**
- ESS1.C: The History of Planet Earth
  - Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1)
- ESS2.A: Earth Materials and Systems
  - Wind and water can change the shape of the land. (2-ESS2-1)
- ESS2.B: Plate Tectonics and Large-Scale System Interactions
  - Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)

**Crosscutting Concepts**
- Patterns
  - Patterns in the natural world can be observed. (2-ESS2-2),(2-ESS2-3) (2-ESS2-1)
- Stability and Change
  - Things may change slowly or rapidly. (2ESS2-1)
Make observations from several sources to construct an evidence-based account for natural phenomena. (2-ESS1-1)

Compare multiple solutions to a problem. (2-ESS2-1)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question. (2-ESS2-3)

**ESS2.C: The Roles of Water in Earth’s Surface Processes**
- Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3)

**ETS1.C: Optimizing the Design Solution**
- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (secondary to 2-ESS2-1)

- Developing and using technology has impacts on the natural world. (2-ESS2-1)

**Connections to Nature of Science**

Science Addresses Questions About the Natural and Material World

- Scientists study the natural and material world. (2-ESS2-1)

---

**Connections to other DCIs in second grade:**
2.PS1.A (2-ESS2-3)

**Articulation of DCIs across grade-levels:** 2-PS1-2), (2-PS1-3); 5.PS1.B (2-PS1-4); 5.LS2.A (2-PS1-4); ESS2.A (2-PS1-3); 5.PS1.A (2-PS1-1), (23)
<table>
<thead>
<tr>
<th>CRP1.</th>
<th>Act as responsible and contributing citizen and employee.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRP2.</td>
<td>Apply appropriate academic and technical skills.</td>
</tr>
<tr>
<td>CRP3.</td>
<td>Attend to personal health and financial well-being.</td>
</tr>
<tr>
<td>CRP4.</td>
<td>Communicate clearly and effectively and with reason.</td>
</tr>
<tr>
<td>CRP5.</td>
<td>Consider the environmental, social and economic impacts of decisions.</td>
</tr>
<tr>
<td>CRP6.</td>
<td>Demonstrate creatively and innovation.</td>
</tr>
<tr>
<td>CRP7.</td>
<td>Employ valid and reliable research strategies.</td>
</tr>
<tr>
<td>CRP8.</td>
<td>Utilize critical thinking to make sense of problems and preserve in solving them.</td>
</tr>
<tr>
<td>CRP9.</td>
<td>Model integrity, ethical leadership, and effective management.</td>
</tr>
<tr>
<td>CRP10.</td>
<td>Plan education and career path aligned to personal goals.</td>
</tr>
<tr>
<td>CRP11.</td>
<td>Use technology to enhance productivity.</td>
</tr>
</tbody>
</table>

CRP12. Work productively in teams while using cultural global competence.
Primary Interdisciplinary Connections:

**Language Arts**-
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.

RI.2.3 Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.

W.2.1 Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section.

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question.

**Mathematics**-
MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

2.MD.D.10 Draw a picture 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.

**Technology**-
8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.

8.1.2.A.2 Create a document using a word processing application

8.1.2.B.1 Illustrate and communicate original ideas and stories using multiple digital tools and resources.
8.1.2.C.1 Engage in a variety of developmentally appropriate learning activities with students in other classes, schools, or countries using various media formats such as online collaborative tools, and social media.

8.1.2.E.1 Use digital tools and online resources to explain a problem or issue.

8.1.2.F.1 Use geographic mapping tools to plan and solve problems.

<table>
<thead>
<tr>
<th>Grade Level: 2</th>
<th>Title of Unit: Earth’s Systems: Processes that Shape the Earth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 1 - Desired Results</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Understandings:</strong></td>
<td><strong>Essential Questions:</strong></td>
</tr>
<tr>
<td>Students will understand that…</td>
<td>1. Why do some Earth events happen very slowly or quickly?</td>
</tr>
<tr>
<td>1. Patterns in the natural world can be observed.</td>
<td>2. What are different solutions designed to prevent wind or water changing the shape of land?</td>
</tr>
<tr>
<td>2. Things may change slowly or rapidly.</td>
<td>3. How can a map represent the shape of land and kind of water in a specified area?</td>
</tr>
<tr>
<td>3. Developing and using technology has impacts on the natural world.</td>
<td>4. Where and why is water on Earth found in both solid and liquid form?</td>
</tr>
<tr>
<td>Knowledge:</td>
<td>Skills:</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td><strong>Students will know…</strong></td>
<td><strong>Students will be able to…</strong></td>
</tr>
</tbody>
</table>
| - some events happen very quickly; others occur very slowly, over a time period much longer than one can observe wind and water can change the shape of the land maps show where things are located one can map the shapes and kinds of land and water in any area water is found in the ocean, rivers, lakes, and ponds water exists as solid ice and in liquid form it is useful to compare and test designs when there is more than one solution to a problem | - Develop a model to represent patterns in the natural world.  
- Make observations from several sources to construct an evidence-based account for natural phenomena.  
- Compare multiple solutions to a problem.  
- Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question. |

**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  
- Benchmark Assessment  
  - Chapter pre and post test  
  - Chapter STEM projects
Stage 3 – Learning Plan
Digital information and technology integration: Indicate any special considerations as well as materials, resources (online, print, video, audio) or equipment.

Ocean County Next Generation Science Standards Resource Center
- [http://smlevinson.wixsite.com/ocngss/second-grade](http://smlevinson.wixsite.com/ocngss/second-grade)
- Provides sample lesson plans, literature connections, video resources, games/virtual labs, and informational resources

EPIC
- [https://www.getepic.com/](https://www.getepic.com/)
- Sign up for free and gain access to thousands of books online. You can search specific key words and choose a book that corresponds with the standard.

Mystery Science
- [https://mysteryscience.com](https://mysteryscience.com)
- This website provides short videos and experiments that are aligned with the NGSS.

Open Ed
- [https://www.opened.com/search?category=earth-s-systems-k-5&grade_group=elementary&standard=2.ESS2.3&standard_group=next-generation-science-standards](https://www.opened.com/search?category=earth-s-systems-k-5&grade_group=elementary&standard=2.ESS2.3&standard_group=next-generation-science-standards)
- Resource library where you can find resources based on standard and modify search based on resource type (i.e. if you are looking for a video you can find just videos for specific standard).

Hooked on Science Experiment Resource
- [http://www.hookedonscience.org/nextgenerationsciencestandards.html](http://www.hookedonscience.org/nextgenerationsciencestandards.html)
- This is a page dedicated to fun experiments for kids. Easy to navigate and lists experiments based on the NGSS.

Earth Science Week
- [http://www.earthsciweek.org/classroom-activities/ngss](http://www.earthsciweek.org/classroom-activities/ngss)
- This website provides a list of classroom activities that are categorized by NGSS.

Better Lesson
- [http://betterlesson.com/next_gen_science/browse/2097/ngss-2-ess1-1-use-information-from-several-sources-to-provide-evidence-that-earth-events-can-occur-quickly-or-slowly](http://betterlesson.com/next_gen_science/browse/2097/ngss-2-ess1-1-use-information-from-several-sources-to-provide-evidence-that-earth-events-can-occur-quickly-or-slowly)
<table>
<thead>
<tr>
<th>kinds-of-land-and-bodies-of-water-in-an-area</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="https://betterlesson.com/next_gen_science/browse/2101/ngss-2-ess2-3-obtain-information-to-identify-where-water-is-found-on-earth-and-that-it-can-be-solid-or-liquid/browse/2101/ngss-2-ess2-3-obtain-information-to-identify-where-water-is-found-on-earth-and-that-it-can-be-solid-or-liquid?from=domain_core">https://betterlesson.com/next_gen_science/browse/2101/ngss-2-ess2-3-obtain-information-to-identify-where-water-is-found-on-earth-and-that-it-can-be-solid-or-liquid/browse/2101/ngss-2-ess2-3-obtain-information-to-identify-where-water-is-found-on-earth-and-that-it-can-be-solid-or-liquid?from=domain_core</a></td>
</tr>
<tr>
<td>This website allows you to search for lesson plans (created by other educators) based on the NGSS.</td>
</tr>
<tr>
<td>Exploring Nature</td>
</tr>
<tr>
<td><a href="http://www.exploringnature.org/db/detail.php?dbID=93&amp;detID=3697">http://www.exploringnature.org/db/detail.php?dbID=93&amp;detID=3697</a></td>
</tr>
<tr>
<td>This website provides you with experiments and lesson plans based on the NGSS.</td>
</tr>
<tr>
<td>RESA</td>
</tr>
<tr>
<td><a href="http://wwwresa.net/curriculum/curriculum/science/professionaldevelopment/ngss-pd/lesson-plans-exploring-ngss/">http://wwwresa.net/curriculum/curriculum/science/professionaldevelopment/ngss-pd/lesson-plans-exploring-ngss/</a></td>
</tr>
<tr>
<td>This website provides access to teacher created lesson plans that range across the NGSS.</td>
</tr>
</tbody>
</table>
**Modifications:**

Students with Disabilities/White:

* 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

### Interactive Science Chapter
**3 – Earth’s Materials**

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Lesson Essential Question</th>
<th>Lesson Objective</th>
<th>Pacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Try It! Inquiry</td>
<td>How much water and land are on Earth?</td>
<td>Students will collect and analyze data to infer the proportions of water and land on Earth.</td>
<td>1 Day (3 weeks observing) Day 1 – 20 minutes (3 weeks – 5 minutes)</td>
</tr>
<tr>
<td>STEM Activity</td>
<td>How can you make recycled paper?</td>
<td>Students will identify a problem that reflects a need, recognize design constraints, and propose and test a solution to the problem.</td>
<td>~5 Days Day 1 – Find a Problem Day 2 – Plan and Draw Day 3 – Choose Materials Day 4 – Make and Test Day 5 – Record and Share</td>
</tr>
<tr>
<td>3.1</td>
<td>What are some kinds of land and water?</td>
<td>Students will compare and contrast landforms and bodies of water.</td>
<td>3 Days Day 1 – Engage and Explore (30 min) Day 2 – Explain (35 min) Day 3 – Elaborate and Evaluate (35 min)</td>
</tr>
<tr>
<td>3.2</td>
<td>What changes land?</td>
<td>Students will investigate how changes on Earth can occur quickly or slowly.</td>
<td>3 Days Day 1 – Engage and Explore (30 min) Day 2 – Explain (35 min) Day 3 – Elaborate and Evaluate (30 min)</td>
</tr>
<tr>
<td>3.3</td>
<td>What is a fossil?</td>
<td>Students will make a model of fossils to help explain how fossils provide evidence of change over time.</td>
<td>3 Days Day 1 – Engage and Explore (30 min) Day 2 – Explain (25 min) Day 3 – Elaborate and Evaluate (35 min)</td>
</tr>
</tbody>
</table>
| **Investigate It! Inquiry** | **How can rocks crack?** | **Students will use their observations to infer what can cause cracks in Earth’s rocks.** | **3 Days**  
Day 1 – 3 Directed and Guided Inquiry  
(Observing the result of temperature) Day 2 – Open Inquiry |
|----------------------------|--------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------|
| **Review and Assessment** | **What is Earth made of?** | **Students will be able to review what they have learned from the chapter to answer the question in their own words.** | **2 Days**  
Day 1 – Review  
Day 2 – Assess |
| **Apply It! Inquiry** | **Does gravel, sand, or soil make the best imprint?** | **Students will make and observe imprints to find out whether gravel, sand, or soil makes the best imprint.** | **1 Day** |
| **Performance Based Assessment** | **Varies based on activity** | **Students will be able to use scientific and engineering practices to complete and reflect on a task with a group.** | **4 Days**  
Day 1 – Make a Poster Day 2 – Erosion  
Day 3 – Make a Puzzle  
Day 4 – Model Earthquake Damage |
| **Performance Expectation Activity 1** | **Do changes to Earth’s surface occur quickly or slowly?** | **Students will observe and evaluate evidence of changes to Earth’s surface.** | **1 Day** |
| **Performance Expectation Activity 2** | **What are the best approaches to prevent erosion?** | **Students will compare different approaches to erosion prevention.** | **2 Days**  
Day 1 – Research  
Day 2 – Evaluate |
| **Performance Expectation Activity 3** | **What are some kinds of land and water?** | **Students will develop models of land and water features on Earth’s surface.** | **2 Days**  
Day 1– Research  
Day 2 – Make a Model |
| **Performance Expectation Activity 4** | **What are some similarities and differences between bodies of water on Earth?** | **Students will obtain information about bodies of water on Earth and make a chart to compare them.** | **2 Days**  
Day 1 – Research  
Day 2 – Make a Chart |
2015 Ocean County Science Curriculum

Grade 2

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 second grade help students formulate answers to questions such as: “How does land change and what are some things that cause it to change? What are the different kinds of land and bodies of water? How are materials similar and different from one another, and how do the properties of the materials relate to their use? What do plants need to grow? How many types of living things live in a place?” Second grade performance expectations include PS1, LS2, LS4, ESS1, ESS2, and ETS1 Disciplinary Core Ideas from the NRC Framework. Students are expected to develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination. Students are also expected to compare the diversity of life in different habitats. An understanding of observable properties of materials is developed by students at this level through analysis and classification of different materials. Students are able to apply their understanding of the idea that wind and water can change the shape of the land to compare design solutions to slow or prevent such change. Students are able to use information and models to identify and represent the shapes and kinds of land and bodies of water in an area and where water is found on Earth. The crosscutting concepts of patterns; cause and effect; energy and matter; structure and function; stability and change; 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 second grade performance expectations, students are expected to demonstrate gradeappropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and 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.
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>SLO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>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.</td>
<td>K-2-ETS-1-1</td>
</tr>
<tr>
<td>2</td>
<td>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.</td>
<td>K-2-ETS1-2</td>
</tr>
<tr>
<td>3</td>
<td>Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</td>
<td>K-2-ETS1-3</td>
</tr>
</tbody>
</table>

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

#### Asking Questions and Defining Problems
Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions.
- Ask questions based on observations to find more information about the natural and/or designed world(s). (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)

#### Developing and Using Models
Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.
- Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)

#### Analyzing and Interpreting Data
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
- Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)

### Disciplinary Core Ideas

#### ETS1.A: Defining and Delimiting Engineering Problems
- A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1)
- Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)
- Before beginning to design a solution, it is important to clearly understand the problem. (K-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)

#### ETS1.C: Optimizing the Design Solution
- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)

### Crosscutting Concepts

#### Structure and Function
- The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

---

**Connections to K-2-ETS1.B: Developing Possible Solutions to Problems include:**
- Second Grade: 2-LS2-2

**Connections to K-2-ETS1.C: Optimizing the Design Solution include:**
- Second Grade: 2-ESS2-1

**Articulation of DCIs across grade-levels:** 1-3; 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)

---

50
### 21st Century Themes/ Career:

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

### Primary Interdisciplinary Connections:

**Language Arts -**

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.

RI.2.3 Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
W.2.1 Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section.

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question.

Mathematics-
MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

2.MD.D.10 Draw a picture 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.

Technology-
8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.

8.1.2.A.2 Create a document using a word processing application

8.1.2.B.1 Illustrate and communicate original ideas and stories using multiple digital tools and resources.

8.1.2.C.1 Engage in a variety of developmentally appropriate learning activities with students in other classes, schools, or countries using various media formats such as online collaborative tools, and social media.

8.1.2.E.1 Use digital tools and online resources to explain a problem or issue.

8.1.2.F.1 Use geographic mapping tools to plan and solve problems.
<table>
<thead>
<tr>
<th>Grade Level: 2</th>
<th>Title of Unit: Engineering and Design</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 1 - Desired Results</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Understandings:</strong></td>
<td><strong>Essential Questions:</strong></td>
</tr>
<tr>
<td><em>Students will understand that…</em></td>
<td>1. How are asking questions, gathering information, and making observation helpful when thinking about problems?</td>
</tr>
<tr>
<td>1. The shape and stability of structures of natural and designed objects are related to their function(s).</td>
<td>2. How does sketching or creating a model to illustrate its shape help solve a given problem?</td>
</tr>
<tr>
<td>2.</td>
<td>3. How does testing a model determine its strengths and weaknesses in solving a given problem?</td>
</tr>
<tr>
<td><strong>Knowledge:</strong></td>
<td><strong>Skills:</strong></td>
</tr>
<tr>
<td><em>Students will know…</em></td>
<td><em>Students will be able to…</em></td>
</tr>
<tr>
<td>● A situation that people want to change or create can be approached as a problem to be solved through engineering.</td>
<td>● Ask questions based on observations to find more information about the natural and/or designed world(s).</td>
</tr>
<tr>
<td>● Asking questions, making observations, and gathering information are helpful in thinking about problems.</td>
<td>● Define a simple problem that can be solved through the development of a new or improved object or tool.</td>
</tr>
<tr>
<td>● Before beginning to design a solution, it is important to clearly understand the problem.</td>
<td>● Develop a simple model based on evidence to represent a proposed object or tool.</td>
</tr>
<tr>
<td>● 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.</td>
<td>● Analyze data from tests of an object or tool to determine if it works as intended.</td>
</tr>
<tr>
<td>● Because there is always more than one possible solution to a problem, it is useful to compare and test designs.</td>
<td></td>
</tr>
</tbody>
</table>
### Stage 2 - Assessment Evidence

**Performance Tasks and other evidence:**
- Summative Assessments o RST- Research Simulation Task o Associated Unit tests, quizzes o labs and engineering based projects
- Formative Assessments o Graphic Organizers & Guided Note Taking o Directed Reading o Cooperative Group Learning
  o Homework
  o Journal Entries
- Benchmark Assessment
  - Chapter pre and post test
  - Chapter STEM projects

### Stage 3 – Learning Plan
**Digital information and technology integration:** Indicate any special considerations as well as materials, resources (online, print, video, audio) or equipment.

**Ocean County Next Generation Science Standards Resource Center**
- [http://smlevinson.wixsite.com/ocngss/second-grade](http://smlevinson.wixsite.com/ocngss/second-grade)
- Provides sample lesson plans, literature connections, video resources, games/virtual labs, and informational resources

**EPIC**
- [https://www.getepic.com/](https://www.getepic.com/)
- Sign up for free and gain access to thousands of books online. You can search specific key words and choose a book that corresponds with the standard.

**Mystery Science**
- [https://mysteryscience.com](https://mysteryscience.com)
- This website provides short videos and experiments that are aligned with the NGSS.

**Open Ed**
- [https://www.opened.com/search?category=earth-s-systems-k-5&grade_group=elementary&standard=2.ESS2.3&standard_group=next-generation-science-standards](https://www.opened.com/search?category=earth-s-systems-k-5&grade_group=elementary&standard=2.ESS2.3&standard_group=next-generation-science-standards)
- Resource library where you can find resources based on standard and modify search based on resource type (i.e. if you are looking for a video you can find just videos for specific standard).
Hooked on Science Experiment Resource
- [http://www.hookedonscience.org/nextgenerationsciencestandards.html](http://www.hookedonscience.org/nextgenerationsciencestandards.html)
- This is a page dedicated to fun experiments for kids. Easy to navigate and lists experiments based on the NGSS.

Earth Science Week
- [http://www.earthsciweek.org/classroom-activities/ngss](http://www.earthsciweek.org/classroom-activities/ngss)
- This website provides a list of classroom activities that are categorized by NGSS.

Better Lesson
- This website allows you to search for lesson plans (created by other educators) based on the NGSS.

Adapting Engineering Curriculum for the K-12 Classroom
- The website provides links to other sites with ideas for engineering projects, lesson plans, and activities.

ASEE
- This website provides lesson plans and class activities that promote engineering.

Teach Engineering
- [https://www.teachengineering.org/](https://www.teachengineering.org/)
- This website provides access to engineering lesson plans, activities, and maker’s challenges

RESA
- This website provides access to teacher created lesson plans that range across the NGSS.

**Modifications:**

Students with Disabilities/ White:

* 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 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:
* 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