Created on:	July, 2015
Created by:	Kevin Waldron, Berkeley; Jamie Pratt, Brick; Cathy McBride, Long Beach Island; Christine Manna, Toms River
Revised on:	
Revised by:	
Board Approved on:	9/14/15

Ocean County Science Curriculum

Content Area: Science	Grade Level: 5
Marking Period 1	Structure and Properties of Matter
Marking Period 2	Matter and Energy in Organisms and Ecosystems
Marking Period 3	Space Systems: Stars and the Solar System
Marking Period 4	Earth's Systems

2015 Ocean County Science Curriculum

Grade 5

Unit: Structure and Properties of Matter

What is matter?

How do you identify matter if it is too small to be seen? What is a chemical reaction?

The performance expectations in fifth grade help students formulate answers to questions such as: When matter changes, does its weight change and can new substances be created by combining other substances? Students participate in a variety of labs and inquiry-based lessons in order to discover that matter is made of particles too small to be seen through the development of a model. Students develop an understanding of the idea that regardless of the type of change that matter undergoes, the total weight of matter is conserved. Students determine whether the mixing of two or more substances results in new substances.

The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; energy and matter; and systems and systems models are called out as organizing concepts for these disciplinary core ideas. In the fifth 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, using mathematics and computational thinking, engaging in argument from evidence, and obtaining, evaluating, and communicating information; and to use these practices to demonstrate understanding of the core ideas.

The Grades 3-5 Storyline provides a summary of the understandings that students developed by the end of 5th grade.

#	STUDENT LEARNING OBJECTIVES (SLOs)	Corresponding PEs and DCIs
1	**Develop a model to describe that matter is made of particles too small to be seen.** [Clarification Statement: Examples of evidence supporting a model could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.] [*Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.*]	**5-PS1-1**
2	**Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.** [Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances.] [*Assessment Boundary: Assessment does not include distinguishing mass and weight.*]	**5-PS1-2**
3	**Make observations and measurements to identify materials based on their properties.** [Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.] [*Assessment Boundary: Assessment does not include density or distinguishing mass and weight.*]	**5-PS1-3**

4	**Conduct an investigation to determine whether the mixing of two or more substances results in new substances.**	**5-PS1-4**

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 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Use models to describe phenomena. (5-PS1-1)

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (5-PS1-4)
- Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (5-PS1-3)

Using Mathematics and Computational Thinking

Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.

- Measure and graph quantities such as weight to address scientific and engineering questions and problems. (5-PS1-2)

21st Century themes and skills ***(This link is taken from the Partnership for 21st Century Skills)***

- creativity and innovation
- critical thinking and problem solving
- communication
- collaboration
- information literacy

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. (5-PS1-1)
- The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2)
- Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3)

PS1.B: Chemical Reactions

- When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4)
- No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) (5-PS1-2)

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (5-PS1-4)

Scale, Proportion, and Quantity

- Natural objects exist from the very small to the immensely large. (5-PS1-1)
- Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-2),(5-PS1-3)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems. (5-PS1-2)

• media literacy • information and communications technology (ICT) • literacy • flexibility and adaptability • initiative and self direction • social and cross cultural skills • productivity and accountability • leadership and responsibility		

Engineering Design Next Generation Standards	
NGSS	**Description**
3-5-ETS1-1	**Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.**
3-5-ETS1-2	**Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.**
3-5-ETS1-3	**Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.**

Connections to other DCIs in fifth grade: **N/A**

Articulation of DCIs across grade-levels:

2.PS1.A (5-PS1-1),(5-PS1-2),(5-PS1-3); **2.PS1.B** 5-PS1-2),(5-PS1-4); **MS.PS1.A** (5-PS1-1),(5-PS1-2),(5-PS1-3),(5-PS1-4); **MS.PS1.B** 5-PS1-2),(5-PS1-4)

Interdisciplinary Connections:

ELA/Literacy -

RI.5.7	***Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-PS1-1)***
W.5.7	***Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (5-PS1-2),(5-PS1-3),(5-PS1-4)***
W.5.8	***Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-PS1-2),(5-PS1-3),(5-PS1-4)***
W.5.9	***Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-PS1-2),(5-PS1-3),(5-PS1-4)***

Mathematics -

MP.2	***Reason abstractly and quantitatively. (5-PS1-1),(5-PS1-2),(5-PS1-3)***
MP.4	***Model with mathematics. (5-PS1-1),(5-PS1-2),(5-PS1-3)***
MP.5	***Use appropriate tools strategically. (PS1-2),(PS1-3)***
5.NBT.A.1	***Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. (5-PS1-1)***
5.NF.B.7	***Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (5-PS1-1)***
5.MD.A.1	***Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems. (5-PS1-2)***
5.MD.C.3	***Recognize volume as an attribute of solid figures and understand concepts of volume measurement. (5-PS1-1)***
5.MD.C.4	***Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. (5-PS1-1)***

Grade Level: 5	**Title of Unit: Structures and Property of Matter**
Stage 1 - Desired Results	
Understandings: *Students will understand that…* 1. Because matter exists as particles that are too small to see, matter is always conserved even if it seems to disappear. Measurements of a variety of observable properties can be used to identify particular materials. 2. Chemical reactions that occur when substances are mixed can be identified by the emergence of substances with	**Essential Questions:** 1. How can I describe matter when it is made up of particles too small to be seen? 2. Why is the total weight of matter conserved regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved? 3. How can I use a material's properties to identify the material?

different properties; but the total mass remains the same.	4. How can I use two or more different substances to make a new substance, and why will this result in a change of properties?
Knowledge: *Students will know…* ● Matter is made of particles too small to be seen through the development of a model. ● The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. ● No matter what reaction or change in properties occurs, the total weight of the substances does not change ● When two or more different substances are mixed, a new substance with different properties may be formed. ● Examples of observable properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility.	**Skills:** *Students will be able to…* ● Discuss that matter is too small to be seen and how it can be identified. ● Describe the process of adding matter to an enclosed area and how it changes that area. ● Describe the process of mixing matter and what the result of that interaction is. ● Prove the total weight of matter does not change when there is a change in property. ● MIx two different substances and discuss the properties that are formed. ● Identify materials by observable properties and distinguish between them.

Stage 2- Assessment Evidence

Performance Tasks and other evidence:

Successful teaching and learning requires more than a summative assessment at the end of the year. Educators need a new system of assessments to evaluate how well our students are learning and understanding the NGSS supported science curriculum. There are many classroom evaluations beyond traditional standardized testing that can determine whether students are successfully learning. Students can demonstrate competency with tasks like:

- developing and refining models;
- generating, discussing and analyzing data;
- constructing spoken and written scientific explanations;
- engaging in evidence-based argumentation; and
- reflecting on their own understanding.

- Summative Assessments
    - RST- Research Simulation Task
    - Associated Unit tests, quizzes

- Labs and engineering based projects
- Take part in a series of labs on the conservation of mass http://moodle.tbaisd.org/pluginfile.php/92354/mod_resource/content/1/5th%20Grade%20Lesson%203%20-%20Conservation%20of%20Mass.pdf

- Formative Assessments
  - Graphic Organizers & Guided Note Taking
  - Directed Reading
  - Cooperative Group Learning
  - Homework
  - Journal Entries
  - Take part in a series of activities and labs to illustrate that matter is too small to be seen http://betterlesson.com/next_gen_science/browse/2161/ngss-5-ps1-1-develop-a-model-to-describe-that-matter-is-made-of-particles-too-small-to-be-seen http://www.crscience.org/lessonplans/5_Bowring_ChemistryofSoap_1011.pdf
  - Learn about substances by panning for gold http://www.earthsciweek.org/ngss-performance-expectations/5-ps1-3

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.nasa.gov/sites/default/files/atoms/files/lightbutstrong_web.pdf Engineering a Rocket that is light, but strong
- http://www.mccracken.kyschools.us/Downloads/5th%20Grade%20Structures%20and%20Properties%20of%20Matter.pdf (entire NGSS unit)
- http://www.stem4students.net/
- http://interactivesites.weebly.com/matter-chemical--physical.html (links to interactive activities on Matter: Physical and Chemical Changes)
- http://www.readwritethink.org/files/resources/interactives/acrostic/ (create an acrostic about matter)
- http://www.mheducation.ca/school/applets/bcscience7/particle/ (States of matter and changes to matter)
- http://www.bbc.co.uk/schools/scienceclips/ages/9_10/changing_state_fs.shtml (changing matter)
- http://educators.brainpop.com/lesson-plan/matter-sorter-game/ (BrainPop lesson on matter)
- https://quizlet.com/subject/5th-grade-science-properties-matter/ (quizlet vocabulary practice)
- http://betterlesson.com/
- http://www.middleschoolchemistry.com/multimedia/chapter1/lesson2 (molecular motion models)
- http://classroom.jc-schools.net/sci-units/matter.htm (several lessons to address physical changes, measurement, changes in matter)
- http://www.scholastic.com/teachers/article/40-cool-science-experiments-web (experiment ideas, science fair)
- http://phet.colorado.edu/en/simulations/category/by-level/elementary-school (Simulations)

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 5

Unit: Matter and Energy in Organisms and Ecosystems

Why can the food of almost any animal be traced back to plants?

How does matter cycle between the air and soil and among organisms as they live and die?

The performance expectations in fifth grade help students formulate answers to questions such as: How does matter cycle through ecosystems and where does the energy in food come from and what is it used for? Students develop an understanding of the idea that plants get the materials they need for growth chiefly from air and water. Using models, students can describe the movement of matter among plants, animals, decomposers, and the environment and that energy in animals' food was once energy from the sun.

The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; energy and matter; and systems and systems models are called out as organizing concepts for these disciplinary core ideas. In the fifth 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, using mathematics and computational thinking, engaging in argument from evidence, and obtaining, evaluating, and communicating information; and to use these practices to demonstrate understanding of the core ideas.

The Grades 3-5 Storyline provides a summary of the understandings that students developed by the end of 5th grade.

#	STUDENT LEARNING OBJECTIVES (SLOs)	Corresponding PEs and DCIs
1	**Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.** [Clarification Statement: Examples of models could include diagrams, and flow charts.]	**5-PS3-1**
2	**Support an argument that plants get the materials they need for growth chiefly from air and water.** [Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.]	**5-LS1-1**
3	**Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.**[Clarifcation Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.] [Assessment Boundary: Assessment does not include molecular explanations.]	**5-LS2-1**

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 3–5 builds on K–2 experiences and progresses to building and revising simple models and using

Disciplinary Core Ideas

PS3.D: Energy in Chemical Processes and Everyday Life

- The energy released [from] food was once energy from the sun that was captured

Crosscutting Concepts

Systems and System Models

- A system can be described in terms of its components and their interactions. (5-LS2-1)

Energy and Matter

models to represent events and design solutions.

- Use models to describe phenomena. (5-PS3-1)
- Develop a model to describe phenomena. (5-LS2-1)

Engaging in Argument from Evidence

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Support an argument with evidence, data, or a model. (5-LS1-1)

- -

Connections to the Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

- Science explanations describe the mechanisms for natural events. (5-LS2-1)

21st Century themes and skills

(This link is taken from the Partnership for 21st Century Skills)

- creativity and innovation
- critical thinking and problem solving
- communication
- collaboration
- information literacy
- media literacy
- information and communications technology (ICT)
- literacy
- flexibility and adaptability
- initiative and self direction
- social and cross cultural skills
- productivity and accountability

by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1)

LS1.C: Organization for Matter and Energy Flow in Organisms

- Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. *(secondary to 5-PS3-1)*
- Plants acquire their material for growth chiefly from air and water. (5-LS1-1)

LS2.A: Interdependent Relationships in Ecosystems

- The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

- Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1)

- Matter is transported into, out of, and within systems. (5-LS1-1)
- Energy can be transferred in various ways and between objects. (5-PS3-1)

• leadership and responsibility		

Engineering Design Next Generation Standards

NGSS	Description
3-5-ETS1-1	**Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.**
3-5-ETS1-2	**Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.**
3-5-ETS1-3	**Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.**

Connections to other DCIs in fifth grade:

5.PS1.A (5-LS1-1),(5-LS2-1); **5.ESS2.A** (5-LS2-1)

Articulation of DCIs across grade-levels:

K.LS1.C (5-PS3-1),(5- LS1-1); **2.PS1.A** (5-LS2-1); **2.LS2.A** (5-PS3-1),(5-LS1-1); **2.LS4.D** (5-LS2-1); **4.PS3.A** (5-PS3-1); **4.PS3.B** (5-PS3-1); **4.PS3.D** (5-PS3-1);**4.ESS2.E** (5-LS2-1); **MS.PS3.D** (5-PS3-1),(5-LS2-1); **MS.PS4.B** (5-PS3-1); **MS.LS1.C** (5- PS3-1),(5-LS1-1),(5-LS2-1); **MS.LS2.A** (5-LS2-1); **MS.LS2.B** (5-PS3-1),(5-LS2-1)

Interdisciplinary Connections:

ELA/Literacy -

RI.5.1	***Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-LS1-1)***
RI.5.7	***Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-PS3-1),(5-LS2-1)***
RI.5.9	***Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-LS1-1)***
W.5.1	***Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-LS1-1)***
SL.5.5	***Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-PS3-1),(5-LS2-1)***

Mathematics -

MP.2	***Reason abstractly and quantitatively. (5-LS1-1),(5-LS2-1)***
MP.4	***Model with mathematics. (5-LS1-1),(5-LS2-1)***
MP.5	***Use appropriate tools strategically. (5-LS1-1)***

5.MD.A.1 ***Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. (5-LS1-1)***

Grade Level: 5	**Title of Unit: Matter and Energy in Organisms and Ecosystems**

Stage 1 - Desired Results

Understandings:

Students will understand that…

1. Food provides animals with the materials and energy they need for body repair, growth, warmth and motion. Plants acquire material for growth chiefly from air, water, and process matter and obtain energy from sunlight, which is used to maintain conditions necessary for survival.
2. The food of almost any animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants, while decomposers restore some materials back to the soil.
3. Matter cycles between the air and soil and among organisms as they live and die.
4. Energy can be "produced," "used," or "released" by converting stored energy. Plants capture energy from sunlight, which can later be used as fuel or food.

Essential Questions:

1. How did energy from the sun become the energy found in animals' food that is used for body repair, growth, motion, and to maintain body warmth?
2. How do plants get the materials they need for growth chiefly from air and water?
3. How does matter move among plants, animals, decomposers, and the environment?

Knowledge:

Students will know…

- Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants.
- The energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant matter.

Skills:

Students will be able to…

- Describe the steps of a food chain for animals in an ecosystem.
- Describe how an animal is affected by the elimination of a part of a food chain.
- Show how energy is transferred from the sun into food into an animal through the chemical process.
- Present ideas of ecosystems that can be described as healthy.

• A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. • Plants get the materials they need for growth mainly from air and water, not soil. • Matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food.	• Describe the growth cycle of plants and the necessary factors for their growth. • Describe the process in which plants turn matter that is not food into matter that is food.

Stage 2- Assessment Evidence

Performance Tasks and other evidence:

Successful teaching and learning requires more than a summative assessment at the end of the year. Educators need a new system of assessments to evaluate how well our students are learning and understanding the NGSS supported science curriculum. There are many classroom evaluations beyond traditional standardized testing that can determine whether students are successfully learning. Students can demonstrate competency with tasks like:

- developing and refining models;
- generating, discussing and analyzing data;
- constructing spoken and written scientific explanations;
- engaging in evidence-based argumentation; and
- reflecting on their own understanding.

- Summative Assessments
  - RST- Research Simulation Task
  - Associated Unit tests, quizzes
  - Labs and engineering based projects
  - Participate in a hydroponics lab http://www.kidsgardening.org/node/3760
  - Create a food chain with at least five pieces, including the sun, a producer, consumers, and a decomposer
- Formative Assessments
  - Graphic Organizers & Guided Note Taking
  - Directed Reading
  - Cooperative Group Learning
  - Homework
  - Journal Entries
  - Use diagrams and flow charts to describe how energy in animals' food was once energy from the sun.

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.history.com/videos/aztec-ingenuity#aztec-ingenuity learn how early Aztec chinampas were the precursor to hydroponics
- http://www.stem4students.net/
- http://betterlesson.com/
- www.arkive.org (Free wildlife photos and videos)
- www.iknowthat.com/com/L3?Area=Habitats (Animal Universe Game)
- http://switchzoo.com/games/habitatgame.htm (Build an online habitat)
- http://www.carolina.com/teacher-resources/Video/how-to-set-up-a-terrarium-video/tr11209.tr (How to Set up a Terrarium)
- http://www.watchknowlearn.org/Category.aspx?CategoryID=2309 (collection of sites: pbs learning media, study jams, Bill Nye, Discovery, etc.)
- http://www.internet4classrooms.com/science_elem_plants.htm (collection of resources on plants)
- http://kids.nceas.ucsb.edu/biomes/index.html#terrestrial (Kids Do Ecology)
- http://earthobservatory.nasa.gov/Experiments/Biome/index.php (NASA Mission: Biomes)
- http://www.ucmp.berkeley.edu/glossary/gloss5/biome/ (Biomes)
- http://www.windows2universe.org/earth/Life/life.html
- http://www.mhhe.com/biosci/genbio/virtual_labs/BL_02/BL_02.html (Virtual lab: Energy Pyramid)
- http://www.lawrencehallofscience.org/kidsite/ (University of California, activities, games, quizzes)
- http://phet.colorado.edu/en/simulations/category/by-level/elementary-school (Simulations)
- http://www.harcourtschool.com/activity/food/food_menu.html (Interactive food web)
- http://www.montereybayaquarium.org/animals-and-experiences (webcams, animal guides, activities)
- http://nationalzoo.si.edu/education/ (articles, webcams, interactive activities)
- http://www.oregonzoo.org/discover/animals (Oregon Zoo)
- http://www.worldwildlife.org/places (conservation)
- http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm (interactive activity)
- http://www.state.nj.us/dep/fgw/tandespp.htm (New Jersey Endangered and Threatened Wildlfie)
- http://www.conservewildlifenj.org/downloads/cwnj_320.pdf (NJ Osprey population data)
- http://concord.org/stem-resources/experiment-ecosystems (modeling interdependence)
- http://concord.org/stem-resources/virtual-ecosystem (virtual ecosystem)
- http://concord.org/sites/default/files/projects/er/materials/TeacherGuide_Activity10-TXMO-final.pdf (Teacher Guide for virtual ecosystem)
- http://concord.org/stem-resources/variations-and-adaptations (effect of climate on ecosystems)
- http://concord.org/stem-resources/competition (use a model to study effect of competition)
- http://pals.sri.com/tasks/tasks5-8.html (Performance Tasks gr 5-8)

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 5

Unit: Space Systems: Stars and the Solar Systems

What is the impact of Earth in Space?

How do you use distance from Earth and brightness to calculate the size of stars? What observable patterns does Earth's rotation and orbit present?

The performance expectations in fifth grade help students formulate answers to questions such as: How do lengths and directions of shadows or relative lengths of day and night change from day to day, and how does the appearance of some stars change in different seasons? Students are expected to develop an understanding of patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; energy and matter; and systems and systems models are called out as organizing concepts for these disciplinary core ideas. In the fifth 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, using mathematics and computational thinking, engaging in argument from evidence, and obtaining, evaluating, and communicating information; and to use these practices to demonstrate understanding of the core ideas.

The Grades 3-5 Storyline provides a summary of the understandings that students developed by the end of 5th grade.

#	STUDENT LEARNING OBJECTIVES (SLOs)	Corresponding PEs and DCIs
1	**Support an argument that the gravitational force exerted by Earth on objects is directed down.** [Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth.] [*Assessment Boundary: Assessment does not include mathematical representation of gravitational force.*]	**5-PS2-1**
2	**Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth.** [*Assessment Boundary: Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, stage).*]	**5-ESS1-1**
3	**Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.** [Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.] [*Assessment Boundary: Assessment does not include causes of seasons.*]	**5-ESS1-2**

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

Science and Engineering Practices

Analyzing and Interpreting Data

Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. (5-ESS1-2)

Engaging in Argument from Evidence

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Support an argument with evidence, data, or a model. (5-PS2-1),(5-ESS1-1)

21st Century themes and skills

(This link is taken from the Partnership for 21st Century Skills)

- creativity and innovation
- critical thinking and problem solving
- communication
- collaboration
- information literacy
- media literacy
- information and communications technology (ICT)
- literacy
- flexibility and adaptability
- initiative and self direction
- social and cross cultural skills
- productivity and accountability
- leadership and responsibility

Disciplinary Core Ideas

PS2.B: Types of Interactions

- The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5- PS2-1)

ESS1.A: The Universe and its Stars

- The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. (5-ESS1-1)

ESS1.B: Earth and the Solar System

- The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. (5-ESS1-2)

Crosscutting Concepts

Patterns

- Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. (5-ESS1-2)

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (5-PS2-1)

Scale, Proportion, and Quantity

- Natural objects exist from the very small to the immensely large. (5-ESS1-1)

Engineering Design Next Generation Standards	
NGSS	**Description**
3-5-ETS1-1	**Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.**
3-5-ETS1-2	**Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.**
3-5-ETS1-3	**Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.**

Connections to other DCIs in fifth grade: **N/A**
Articulation of DCIs across grade-levels: **1.ESS1.A** (5-ESS1-2); **1.ESS1.B** (5-ESS1-2); **3.PS2.A** (5-PS2-1),(5-ESS1-2); **3.PS2.B** (5-PS2-1); **MS.PS2.B** (5-PS2-1); **MS.ESS1.A** (5-ESS1-1),(5-ESS1-2);**MS.ESS1.B** (5-PS2-1),(5-ESS1-1),(5-ESS1-2); **MS.ESS2.C** (5-PS2-1)

Interdisciplinary Connections:

ELA/Literacy -

RI.5.1	***Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-PS2-1),(5-ESS1-1)***
RI.5.7	***Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-ESS1-1)***
RI.5.8	***Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).(5-ESS1-1)***
RI.5.9	***Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-PS2-1),(5-ESS1-1)***
W.5.1	***Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-PS2-1),(5-ESS1-1)***
SL.5.5	***Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-ESS1-2)***

Mathematics -

MP.2	***Reason abstractly and quantitatively. (5-ESS1-1),(5-ESS1-2)***
MP.4	***Model with mathematics. (5-ESS1-1),(5-ESS1-2)***
5.NBT.A.2	***Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. (5-ESS1-1)***
5.G.A.2	***Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (5-ESS1-2)***

Grade Level: 5	**Title of Unit:** Space Systems: Stars and the Solar System

Stage 1 - Desired Results

Understandings:	**Essential Questions:**
Students will understand that… 1. Stars range greatly in size and distance from Earth and this can explain their relative brightness. 2. The Earth's orbit and rotation, and the orbit of the moon around Earth cause observable patterns.	1. How does the force of gravity impact life on Earth? 2. Why does the sun appear brighter than other stars? 3. How does Earth's position, relative to the sun, impact the length of day and night, the seasonal appearance of some stars, and the direction of shadow?

Knowledge: *Students will know…* ● The sun is a star that appears larger and brighter than other stars because it is closer. ● Stars are all different sizes and distances from the Earth. Their distances from the Earth will reflect their brightness and size by the observable eye. ● The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. ● The length of each day and the direction of shadows are affected by the orbit of both the Earth and the Moon. ● Patterns can be seen with the Earth's orbit around the sun and the moon's orbit around the Earth. These patterns include day and night.	**Skills:** *Students will be able to…* ● Describe the relative size of the Sun compared to other recognized stars. ● Demonstrate the gravitational force on Earth pulling objects to the center of the planet. ● Describe how the gravitational force may be different in other places in the solar system. ● Show how the length of day and night is affected by the rotation and orbit of both the Earth and the moon. ● Describe seasons and how they are impacted by the Earth's orbit and rotation on its axis.

Stage 2- Assessment Evidence

Performance Tasks and other evidence:

Successful teaching and learning requires more than a summative assessment at the end of the year. Educators need a new system of assessments to evaluate how well our students are learning and understanding the NGSS supported science curriculum. There are many classroom evaluations beyond traditional standardized testing that can determine whether students are successfully learning. Students can demonstrate competency with tasks like:

- developing and refining models;
- generating, discussing and analyzing data;
- constructing spoken and written scientific explanations;
- engaging in evidence-based argumentation; and
- reflecting on their own understanding.

- Summative Assessments
    - RST- Research Simulation Task
    - Associated Unit tests, quizzes
    - Labs and engineering based projects
    - Write an essay to counter the statement, "The force of gravity does not exist on Earth."

- Utilize cross-curricular standards-aligned lessons and assessments to create a model representing various phenomenon of Earth chrome-extension://bpmcpldpdmajfigpchkicefoigmkfalc/views/app.html

- Formative Assessments
  - Graphic Organizers & Guided Note Taking
  - Directed Reading
  - Cooperative Group Learning
  - Homework
  - Journal Entries
  - Write an informative text comparing the distance of the sun and other stars from Earth chrome-extension://bpmcpldpdmajfigpchkicefoigmkfalc/views/app.html

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://stem-talk.weebly.com/sample-lessons.html
- http://www.stem4students.net/ - (STEM)
- http://betterlesson.com/ - (Lesson Plans)
- http://static.nsta.org/files/sc1403_26.pdf
- https://solarsystem.nasa.gov/planets/profile.cfm?Object=SolarSys&Display=Educ&Page=All - (Planet and Space)
- http://www.buzzfeed.com/daves4/the-universe-is-scary?sub=3512580_4258681#.nxRPPG72JX - (Earth in perspective)
- http://www.stem4teachers.org/ - (STEM)
- http://www.mastersindatascience.org/blog/the-ultimate-stem-guide-for-kids-239-cool-sites-about-science-technology-engineering-and-math/ - (STEM Exploration)
- https://marsed.asu.edu/solar-system-scale-and-size - (Scale of Solar System)
- https://sites.google.com/site/5thgradesolarsystemwebquest/task - (Webquest)
- http://amazing-space.stsci.edu/resources/explorations/index.shtml - (Resources)
- http://www.kidsastronomy.com/solar_system.htm - (Planet resources)

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

* **Follow all IEP modifications/504 plan**
* **Teacher tutoring**
* **Peer tutoring**
* **Cooperative learning groups**
* **Modified assignments**
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Presentation accommodations allow a student to:

* **Listen to audio recordings instead of reading text**
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* **Work or take a test in a different setting, such as a quiet room with few distractions**
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* **Take a test in small group setting**
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Timing accommodations allow a student to:
* **Take more time to complete a task or a test**
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* **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 5

Unit: Earth's Systems

How do the geosphere, biosphere, hydrosphere, and/or atmosphere interact?

Where is most of Earth's water? How have anthropogenic activities impacted the Earth?

Students work to understand how much water can be found in different places on Earth. They will learn how rainfall shapes the land and affects the types of living things found in a region. They will learn about water in glaciers and in oceans. Through the development of a model using an example, students are able to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. They describe and graph data to provide evidence about the distribution of water on Earth. Students will learn about the impact societal activities have had on the land and water and will discover information about global warming.

The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; energy and matter; and systems and systems models are called out as organizing concepts for these disciplinary core ideas. In the fifth 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, using mathematics and computational thinking, engaging in argument from evidence, and obtaining, evaluating, and communicating information; and to use these practices to demonstrate understanding of the core ideas.

The Grades 3-5 Storyline provides a summary of the understandings that students developed by the end of 5th grade.

#	STUDENT LEARNING OBJECTIVES (SLOs)	Corresponding PEs and DCIs
1	**Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.** [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [*Assessment Boundary: Assessment is limited to the interactions of two systems at a time.*]	**5-ESS2-1**
2	**Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.** [*Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.*]	**5-ESS2-2**
3	**Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.**	**5-ESS3-1**

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 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop a model using an example to describe a scientific principle. (5-ESS2-1)

Using Mathematics and Computational Thinking

Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.

Disciplinary Core Ideas

ESS2.A: Earth Materials and Systems

- Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact

Crosscutting Concepts

Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight and volume. (5-ESS2-2)

Systems and System Models

- A system can be described in terms of its components and their interactions. (5-ESS2-1),(5-ESS3-1)

Connections to Nature of Science

Science Addresses Questions About the Natural and Material World.

• Describe and graph quantities such as area and volume to address scientific questions. (5-ESS2-2) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1) ***21st Century themes and skills* (This link is taken from the Partnership for 21st Century Skills)** • creativity and innovation • critical thinking and problem solving • communication • collaboration • information literacy • media literacy • information and communications technology (ICT) • literacy • flexibility and adaptability • initiative and self direction • social and cross cultural skills • productivity and accountability • leadership and responsibility	with the landforms to determine patterns of weather. (5-ESS2-1) **ESS2.C: The Roles of Water in Earth's Surface Processes** • Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2) **ESS3.C: Human Impacts on Earth Systems** • Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)	• Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)

Engineering Design Next Generation Standards	
NGSS	**Description**
3-5-ETS1-1	**Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.**

3-5-ETS1-2	**Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.**
3-5-ETS1-3	**Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.**

Connections to other DCIs in fifth grade: **N/A**

Articulation of DCIs across grade-levels:

2.ESS2.A (5-ESS2-1); **2.ESS2.C** (5-ESS2-2); **3.ESS2.D** (5-ESS2-1); **4.ESS2.A** (5-ESS2-1); **MS.ESS2.A** (5-ESS2-1); **MS.ESS2.C** (5-ESS2-1),(5-ESS2-2); **MS.ESS2.D**(5-ESS2-1); **MS.ESS3.A** (5-ESS2-2),(5-ESS3-1); **MS.ESS3.C** (5-ESS3-1); **MS.ESS3.D** (5-ESS3-1)

Interdisciplinary Connections:

ELA/Literacy -

RI.5.1	***Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-ESS3-1)***
RI.5.7	***Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-ESS2-1),(5-ESS2-2),(5-ESS3-1)***
RI.5.9	***Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS3-1)***
W.5.8	***Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-ESS2-2),(5-ESS3-1)***
W.5.9	***Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-ESS3-1)***
SL.5.5	***Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-ESS2-1),(5-ESS2-2)***

Mathematics -

MP.2	***Reason abstractly and quantitatively. (5-ESS2-1),(5-ESS2-2),(5-ESS3-1)***
MP.4	***Model with mathematics. (5-ESS2-1),(5-ESS2-2),(5-ESS3-1)***
5.G.A.2	***Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (5-ESS2-1)***

Grade Level: 5	**Title of Unit: Earth's Systems**

Stage 1 - Desired Results

Understandings: *Students will understand that…* 1. Four major Earth systems interact. 2. Rainfall helps to shape the land and affects the types of living things found in a region. 3. Most of Earth's water is in the ocean and much of the Earth's freshwater is in glaciers or underground. 4. Social activities have had major effects on the land, ocean, atmosphere, and even outer space. Society does things to protect Earth's resources and environments. 5. Humans and other organisms will be affected in many different ways if Earth's global mean temperature continues to rise.	**Essential Questions:** 1. How do the geosphere, biosphere, hydrosphere, and/or atmosphere interact? 2. How are salt water and fresh water distributed on Earth? 3. How do individual communities use science ideas to protect the Earth's resources and environment?
Knowledge: *Students will know…* ● Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). ● The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. ● The atmosphere affects landforms and ecosystems through weather and climate. ● Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. ● Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space.	**Skills:** *Students will be able to…* ● Investigate Earth's major systems and describe their similarities and differences. ● Provide examples to show that the Earth's systems interact with one another. ● Demonstrate the impact that the ocean has on each of the following: ecosystems, landform shape, and climate. ● Prove that mountain ranges impact the winds and the clouds. ● Study and graph the amounts of water on the planet other than the oceans. ● Provide ways humans can protect our land, vegetation, waterways, and outer space.
Stage 2- Assessment Evidence	
Performance Tasks and other evidence: Successful teaching and learning requires more than a summative assessment at the end of the year. Educators need a new system of assessments to evaluate how well our students are learning and understanding the NGSS supported science curriculum. There are many classroom	

evaluations beyond traditional standardized testing that can determine whether students are successfully learning. Students can demonstrate competency with tasks like:

- developing and refining models;
- generating, discussing and analyzing data;
- constructing spoken and written scientific explanations;
- engaging in evidence-based argumentation; and
- reflecting on their own understanding.
- Summative Assessments
    - RST- Research Simulation Task
    - Associated Unit tests, quizzes
    - Labs and engineering based projects
    - Work in a group to research how the parts of Earth interact--after viewing the links on this NASA site--present your information to the class http://climatekids.nasa.gov/next-generation-standards/review//
    - Create a project to demonstrate how to protect the Earth's resources and environment
    - Design an excel spreadsheet to represent the portion of fresh water in a variety of bodies of water
- Formative Assessments
    - Graphic Organizers & Guided Note Taking
    - Directed Reading
    - Cooperative Group Learning
    - Homework
    - Journal Entries
    - Lab Experiment to learn about the percentage of fresh drinking water http://www.earthsciweek.org/classroom-activities/groundwater-movement

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.crscience.org/lessonplans/5_FollowtheRiver_Penny_1112.pdf
- http://www.stem4students.net/
- http://betterlesson.com/
- http://www.earthsciweek.org/classroom-activities/groundwater-movement
- http://climatekids.nasa.gov/next-generation-standards/review//
- https://www.populationeducation.org/content/ngss-lesson-plan-elementary-grades-water-water-everywhere
- http://www.miseagrant.umich.edu/lessons/lessons/by-broad-concept/earth-science/water-quantity/
- http://water.usgs.gov/edu/earthwherewater.html - (Water Data for Earth)
- https://sites.google.com/a/msad60.org/k-5_science/fifth-grade/earth-systems
- http://dnr.wi.gov/eek/ - (Environmental Links)
- http://www.ciese.org/curriculum/tempproj/
- http://www.nrdc.org/reference/kids.asp - (Natural Resources for Kids)

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**