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Ocean County Science Curriculum

Content Area: Science	Grade Level: 3
Marking Period 1	Forces and Interactions
Marking Period 2	Inheritance and Variation of Traits: Life Cycles and Traits
Marking Period 3	Interdependent Relationships in Ecosystems: Environmental Impacts on Organisms
Marking Period 4	Weather and Climate

2015 Ocean County Science Curriculum

Grade 3

Unit: Forces and Interactions

What is the impact of forces in nature?

How do equal and unequal forces on an object affect the object? How can magnets be used?

Students examine the effects of balanced and unbalanced forces on the motion of an object and the cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. They are then able to apply their understanding of magnetic interactions to define a simple design problem that can be solved with magnets. Students will perform experiments and participate in lessons that will guide them toward a deeper understanding of key concepts such as: the effect of unbalanced forces on an object results in a change of motion, patterns of motion can be used to predict future motion, some forces act through contact, some forces act even when the objects are not in contact, and the gravitational force of Earth acting on an object near Earth’s surface pulls that object toward the planet’s center.

The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems and system models; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the third grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in asking questions and defining problems; 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 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	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. <i>[Clarification Statement: Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all.] [Assessment Boundary: Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.]</i>	3-PS2-1
2	Make observations and/or measurements of an object’s motion to provide evidence that a pattern can be used to predict future motion. <i>[Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.] [Assessment Boundary: Assessment does not include technical terms such as period and frequency.]</i>	3-PS2-2
3	Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. <i>[Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces</i>	3-PS2-3

	<p>between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.] [Assessment Boundary: Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.]</p>	
4	<p>Define a simple design problem that can be solved by applying scientific ideas about magnets.* [Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.]</p>	3-PS2-4

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

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Asking Questions and Defining Problems Asking questions and defining problems in grades 3-5 builds on grades K-2 experiences and progresses to specifying qualitative relationships.</p> <ul style="list-style-type: none"> Ask questions that can be investigated based on patterns such as cause and effect relationships. (3-PS2-3) Define a simple problem that can be solved through the development of a new or improved object or tool. (3-PS2-4) <p>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.</p> <ul style="list-style-type: none"> Plan and conduct an investigation collaboratively 	<p>PS2.A: Forces and Motion</p> <ul style="list-style-type: none"> Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) (3-PS2-1) The patterns of an object's motion in various situations can be observed and measured; when the past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns of change can be used to make predictions. (3-PS2-2) <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified. (3-PS2-1) Cause and effect relationships are routinely identified, tested, and used to explain change. (3-PS2-3) <p style="text-align: center;">Connections to Engineering, Technology, and Applications of Science</p> <p>Interdependence of Science, Engineering, and Technology</p> <ul style="list-style-type: none"> Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process. (3-PS2-4)

to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-PS2-1)

- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (3-PS2-2)

Connections to Nature of Science

Science Knowledge is Based on Empirical Evidence

- Science findings are based on recognizing patterns. (3-PS2-2)

Scientific Investigations Use a Variety of Methods

- Science investigations use a variety of methods, tools, and techniques. (3-PS2-1)

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

and direction to be described is developed.) (3-PS2-2)

PS2.B: Types of Interactions

- Objects in contact exert forces on each other. (3-PS2-1)
- Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. (3-PS2-3), (3-PS2-4)

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 third grade: N/A

Articulation of DCIs across grade-levels:

K.PS2.A (3-PS2-1); **K.PS2.B** (3-PS2-1); **K.PS3.C** (3-PS2-1); **K.ETS1.A** (3-PS2-4); **1.ESS1.A** (3-PS2-2); **4.PS4.A** (3-PS2-2); **4.ETS1.A** (3-PS2-4); **5.PS2.B** (3-PS2-1); **MS.PS2.A** (3-PS2-1),(3-PS2-2); **MS.PS2.B** (3-PS2-3),(3-PS2-4); **MS.ESS1.B** (3-PS2-1),(3-PS2-2); **MS.ESS2.C** (3-PS2-1)

Interdisciplinary Connections:

ELA/Literacy -

- RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-PS2-1),(3-PS2-3)
- RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-PS2-3)
- RI.3.8** Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence).(3-PS2-3)
- W.3.7** *Conduct short research projects that build knowledge about a topic.* (3-PS2-1),(3-PS2-2)
- W.3.8** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-PS2-1),(3-PS2-2)
- SL.3.3** Ask and answer questions about information from a speaker, offering appropriate elaboration and detail. (3-PS2-3)

Mathematics -

- MP.2** Reason abstractly and quantitatively. (3-PS2-1)
- MP.5** Use appropriate tools strategically. (3-PS2-1)
- 3.MD.A.2** Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-PS2-1)

Grade Level: 3

Title of Unit: Forces and Interactions

Stage 1 - Desired Results

<p>Understandings:</p> <p><i>Students will understand that...</i></p> <ol style="list-style-type: none">1. The effect of unbalanced forces on an object results in a change of motion.2. Patterns of motion can be used to predict future motion.3. Some forces act through contact, some forces act even when objects are not in contact.4. The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.	<p>Essential Questions:</p> <ol style="list-style-type: none">1. What are the effects of balanced and unbalanced forces on the motion of an object?2. How can you utilize a pattern to predict future motion?3. What is the relationship between electric or magnetic interactions between two objects not in contact?4. How can I solve a design problem using what I have learned about magnets?
<p>Knowledge:</p> <p><i>Students will know...</i></p> <ul style="list-style-type: none">• Each force acts on one particular object and has both strength and a direction.• An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object.• Motion can be described as a change in position over a period of time.• Objects in contact exert forces on each other, however electric and magnetic forces between a pair of objects do not require that the objects be in contact.• Friction affects the motion of an object and the distance it travels.• Earth pulls down on all objects with a force called gravity.	<p>Skills:</p> <p><i>Students will be able to...</i></p> <ul style="list-style-type: none">• Observe moving objects and create a representation that describes their motion• Conduct an investigation with motion and forces recording the time and distance traveled.• Discuss and investigate how barriers and distance can vary the strength of a magnet.• Investigate the relative time of fall for objects of different masses from the same height at the same time.• Examine the effects of gravity on objects of different masses and consistencies.• See how friction affects the distance traveled by an object when sent into motion.

Stage 2- Assessment Evidence

<p>Performance Tasks and other evidence:</p> <p>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:</p> <ul style="list-style-type: none">• developing and refining models;• generating, discussing and analyzing data;
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- 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
 - Solve an engineering design problem about magnets
 - Static Electricity and Magnetic Lab
- Formative Assessments
 - Graphic Organizers & Guided Note Taking
 - Directed Reading
 - Cooperative Group Learning
 - Homework
 - Journal Entries
 - Conduct an investigation on forces that make a ball start and stop rolling
 - After viewing a video of children swinging on a swing, write and discuss observations in order to make predictions of future motion

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.scholastic.com/teachers/activity/force-and-motion-6-studyjams-interactive-science-activities> (forces)
- http://www.bbc.co.uk/bitesize/ks3/science/energy_electricity_forces/forces/activity/ (forces)
- http://www.bbc.co.uk/bitesize/ks2/science/physical_processes/magnets/play/ (magnets)
- <http://phet.colorado.edu/en/simulations/category/by-level/elementary-school> (forces)
- http://betterlesson.com/next_gen_science/browse/2109/ngss-3-ps-physical-sciences?from=megamenu_domain (forces)
- <http://www.youtube.com/watch?v=4mTsrRZEMwA> (Hammer and Feather video- gravity experiment on moon)
- https://nsdl.oercommons.org/browse?f.search=&batch_size=20&f.ngss_alignment_standard=1&f.sublevel=lower-primary&f.sublevel=upper-primary (National Digital Science Library)
- http://idahoptv.org/dialogue4kids/season12/force_and_motion/facts.cfm
- <https://www.brainpop.com/science/motionsforcesandtime/>
- <http://www.discoveryeducation.com/teachers/free-lesson-plans/motion-forces-energy-and-electricity.cfm>
- <http://www.exploratorium.edu/origins/cern/ideas/forces.html> (magnets)
- <http://www.stem4students.net/>

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 3

Unit: Inheritance and Variation of Traits: Life Cycles and Traits

How do unique life cycles and inherited traits help animals survive over time?

How does the environment affect the traits an organism develops and how does this diversity impact long-term survival and success?

Students examine a variety of topics to understand the overarching idea of long-term survival and success in varied time periods and ecosystems. They will perform investigations and experiments to learn how organisms vary in their traits and what happens to organisms with specific traits when their environment changes. Students are expected to develop an understanding of the similarities and differences of organisms' life cycles and that different organisms vary in how they look and function because they have different inherited information. Students are expected to develop an understanding of types of organisms that lived long ago and also about the nature of their environments. Third graders are expected to develop an understanding of the idea that when the environment changes some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die.

The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems and system models; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the third grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in asking questions and defining problems; 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 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	<p>Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. [Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.]</p>	3-LS1-1
2	<p>Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.]</p>	3-LS3-1
3	<p>Use evidence to support the explanation that traits can be influenced by the environment. [Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight.]</p>	3-LS3-2

4	<p>Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. [Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]</p>	3-LS4-2
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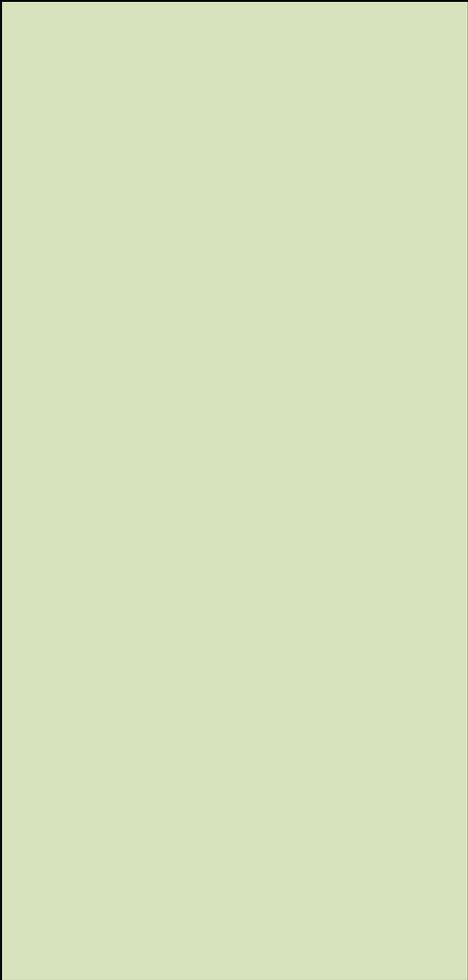
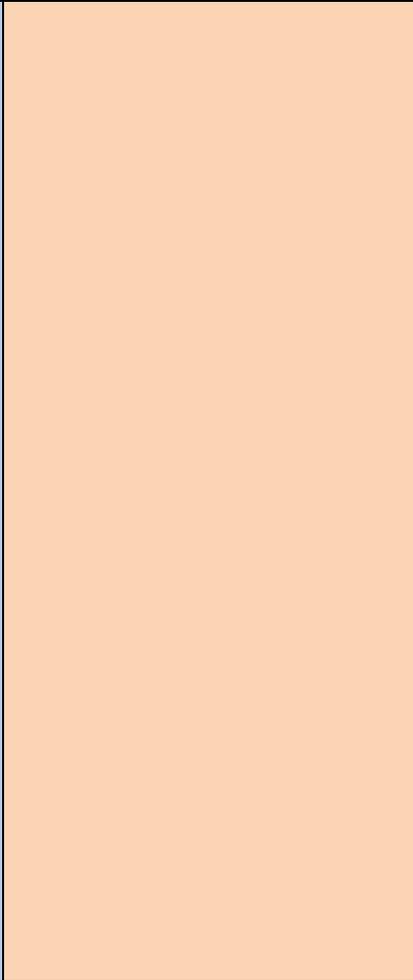
The SLOs were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>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.</p> <ul style="list-style-type: none"> Develop models to describe phenomena. (3-LS1-1) <p>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.</p> <ul style="list-style-type: none"> Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1) <p>Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.</p> <ul style="list-style-type: none"> Use evidence (e.g., observations, patterns) to support an explanation. (3-LS3-2) Use evidence (e.g., observations, patterns) to construct an explanation. (3-LS4-2) <p>-----</p> <p style="text-align: center;">Connections to Nature of Science</p> <p>-----</p> <p>Scientific Knowledge is Based on Empirical Evidence</p>	<p>LS1.B: Growth and Development of Organisms</p> <ul style="list-style-type: none"> Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1) <p>LS3.A: Inheritance of Traits</p> <ul style="list-style-type: none"> Many characteristics of organisms are inherited from their parents. (3-LS3-1) Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2) <p>LS3.B: Variation of Traits</p> <ul style="list-style-type: none"> Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1) The environment also affects the traits that an organism develops. (3-LS3-2) <p>LS4.B: Natural Selection</p> <ul style="list-style-type: none"> Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2) 	<p>Patterns</p> <ul style="list-style-type: none"> Similarities and differences in patterns can be used to sort and classify natural phenomena. (3-LS3-1) Patterns of change can be used to make predictions. (3-LS1-1) <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified and used to explain change. (3-LS3-2),(3-LS4-2)

- Science findings are based on recognizing patterns. (3-LS1-1)

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



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 third grade:
3.LS4.C (3-LS4-2)

Articulation of DCIs across grade-levels:

1.LS3.A (3-LS3-1),(3-LS4-2); 1.LS3.B (3-LS3-1); MS.LS1.B (3-LS1-1),(3-LS3-2); MS.LS3.A (3-LS3-1); MS.LS2.A (3-LS4-2); MS.LS3.A (3-LS3-1); MS.LS3.B (3-LS3-1),(3-LS4-2); MS.LS4.B (3-LS4-2)

Interdisciplinary Connections:

ELA/Literacy —

- RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS3-1),(3-LS3-2),(3-LS4-2)
- RI.3.2** Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS3-1),(3-LS3-2),(3-LS4-2)
- RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS3-1),(3-LS3-2),(3-LS4-2)
- RI.3.7** Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). (3-LS1-1)
- W.3.2** Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS3-1),(3-LS3-2),(3-LS4-2)
- SL.3.4** Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS3-1),(3-LS3-2),(3-LS4-2)
- SL.3.5** Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details. (3-LS1-1)

Mathematics —

- MP.2** Reason abstractly and quantitatively. (3-LS3-1),(3-LS3-2),(3-LS4-2)
- MP.4** Model with mathematics. (3-LS1-1),(3-LS3-1),(3-LS3-2),(3-LS4-2)
- 3.NBT** Number and Operations in Base Ten (3-LS1-1)
- 3.NF** Number and Operations—Fractions (3-LS1-1)
- 3.MD.B.3** Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. (3-LS4-2)
- 3.MD.B.4** Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS3-1),(3-LS3-2)

Grade Level: 3	Title of Unit: Inheritance and Variation of Traits: Life Cycles and Traits
Stage 1 - Desired Results	
<p>Understandings:</p> <p><i>Students will understand that...</i></p> <ol style="list-style-type: none"> 1. Reproduction is essential to every kind of organism. 2. Organisms have unique and diverse life cycles. 3. Different organisms vary in how they look and function because they have different inherited information. 	<p>Essential Questions:</p> <ol style="list-style-type: none"> 1. What are the components of life cycles that all organisms share, and how do they differ? 2. Do all plant and animal offspring inherit the same traits? 3. How are traits influenced by the environment?

<p>4. The environment also affects the traits that an organism develops.</p>	<p>4. How do variations and characteristics provide advantages in nature?</p>
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<p>Knowledge:</p> <p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● Living organisms interact with and cause changes in their environment, reproduce, and develop. ● The essential functions required for the well-being of an organism ● The characteristics of each stage of life are different and vary by species. ● Similarities and differences in traits shared between offspring and their parents, or among siblings. ● Variations and adaptations will impact the survival of organisms in the environment. 	<p>Skills:</p> <p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> ● Describe the life cycle of an organism and explain how it is impacted by the environment. ● Compare the life cycles of two different organisms and find similarities and differences. ● Show how specific traits can provide advantages for organisms in their environment. ● Find proof that all organisms do not inherit the exact same traits as their parents. Describe the differences. ● Explain and list adaptations of animals that help them survive in environment.
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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

- o Associated Unit tests, quizzes
- o Labs and engineering based projects
- o Basic Punnett Square
- o From a product choice menu, develop a model representing diverse life cycle
- Formative Assessments
 - o Graphic Organizers & Guided Note Taking
 - o Directed Reading
 - o Cooperative Group Learning
 - o Homework
 - o Journal Entries
 - o Interview a classmate and use the data to create a trait chart
 - o Participate in a Pea Plant Growing Lab where certain environmental necessities are withheld, such as light or water
 - o Create a cause and effect chart, detailing how specific traits provide advantages for plants and animals

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.sheppardsoftware.com/scienceforkids/life_cycle/frog_lifecycle.htm (frog life cycle interactive activity)
- <http://phet.colorado.edu/en/simulation/legacy/natural-selection> (natural selection interactive activity)
- http://www.sheppardsoftware.com/scienceforkids/life_cycle/butterfly_lifecycle.htm (butterfly life cycle)
- <http://www.scholastic.com/teachers/top-teaching/2014/04/10-ready-go-resources-teaching-life-cycles>
- http://www.pbslearningmedia.org/resource/tdc02.sci.life.cyc.lp_lifecycle/life-cycles-of-frogs-dragonflies-and-butterflies/
- http://www.pbslearningmedia.org/resource/tdc02.sci.life.colt.lp_plantcycle/plant-life-cycles/
- <http://www.neok12.com/Metamorphosis.htm>
- <http://sciencenetlinks.com/lessons/nowhere-to-hide/> (variation in populations interactive activity)
- http://evolution.berkeley.edu/evolibrary/article/0_0_0/bergstrom_02 (natural selection)
- <http://www.stem4students.net/>
- <http://betterlesson.com/>

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 3

Unit: Interdependent Relationships in Ecosystems: Environmental Impacts on Organisms

How have ecosystem dynamics and biodiversity shaped the organisms of the Earth?

Anthropogenic and natural factors have both changed the environment of the Earth. How have organisms adapted?

Students examine how plants, animals, and environments of the past are similar or different from current plants, animals, and environments and what happens to organisms when their environment changes. An understanding that organisms have different inherited traits, and that the environment can also affect the traits that an organism develops, is acquired by students at this level. In addition, students are able to construct an explanation using evidence for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. Students are expected to develop an understanding of types of organisms that lived long ago and also about the nature of their environments. Third graders are expected to develop an understanding of the idea that when the environment changes some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die.

The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems and system models; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the third grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in asking questions and defining problems; 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 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	Construct an argument that some animals form groups that help members survive.	3-LS2-1
2	Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or present plants and	3-LS4-1

	<i>animals. Assessment is limited to major fossil types and relative ages.]</i>	
3	Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]	3-LS4-3
4	Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.* [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]	3-LS4-4

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

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Analyzing and Interpreting Data and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible. Analyzing data in 3–5 builds on K–2 experiences e, digital tools should be used.</p> <ul style="list-style-type: none"> Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS4-1) <p>Engaging in Argument from Evidence</p> <p>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).</p> <ul style="list-style-type: none"> Construct an argument with evidence, data, and/or a model. (3-LS2-1) Construct an argument with evidence. (3-LS4-3) Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-LS4-4) 	<p>LS2.C: Ecosystem Dynamics, Functioning, and Resilience</p> <ul style="list-style-type: none"> When the environment changes in ways that affect a place’s physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. <i>(secondary to 3-LS4-4)</i> <p>LS2.D: Social Interactions and Group Behavior</p> <ul style="list-style-type: none"> Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size <i>(Note: Moved from K–2).</i> (3-LS2-1) <p>LS4.A: Evidence of Common Ancestry and Diversity</p> <ul style="list-style-type: none"> Some kinds of plants and animals that once lived on Earth are no longer found anywhere. <i>(Note: moved from K-2)</i> (3-LS4-1) 	<p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified and used to explain change. (3-LS2-1),(3-LS4-3) <p>Scale, Proportion, and Quantity</p> <ul style="list-style-type: none"> Observable phenomena exist from very short to very long time periods. (3-LS4-1) <p>Systems and System Models</p> <ul style="list-style-type: none"> A system can be described in terms of its components and their interactions. (3-LS4-4) <hr/> <p>Connections to Engineering, Technology, and Applications of Science</p> <p>Interdependence of Engineering, Technology, and Science on Society and the Natural World</p> <ul style="list-style-type: none"> Knowledge of relevant scientific concepts and research findings is important in engineering. (3-LS4-4) <hr/> <p>Connections to Nature of Science</p>

<p><u>21st Century themes and skills</u> (This link is taken from the Partnership for 21st Century Skills)</p> <ul style="list-style-type: none"> ● 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 	<ul style="list-style-type: none"> ● Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1) <p>LS4.C: Adaptation</p> <ul style="list-style-type: none"> ● For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3) <p>LS4.D: Biodiversity and Humans</p> <ul style="list-style-type: none"> ● Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (3-LS4-4) 	<p>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</p> <ul style="list-style-type: none"> ● Science assumes consistent patterns in natural systems. (3-LS4-1)
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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.
<i>Connections to other DCIs in third grade:</i>	

3.ESS2.D (3-LS4-3); 3.ESS3.B (3-LS4-4)

Articulation of DCIs across grade-levels:

K.ESS3.A (3-LS4-3),(3-LS4-4); K.ETS1.A (3-LS4-4); 1.LS1.B (3-LS2-1); 2.LS2.A (3-LS4-3),(3-LS4-4); 2.LS4.D (3-LS4-3),(3-LS4-4); 4.ESS1.C (3-LS4-1); 4.ESS3.B(3-LS4-4); 4.ETS1.A (3-LS4-4); MS.LS2.A (3-LS2-1),(3-LS4-1),(3-LS4-3),(3-LS4-4); MS.LS2.C (3-LS4-4); MS.LS4.A (3-LS4-1); MS.LS4.B (3-LS4-3); MS.LS4.C (3-LS4-3),(3-LS4-4); MS.ESS1.C (3-LS4-1),(3-LS4-3),(3-LS4-4); MS.ESS2.B (3-LS4-1); MS.ESS3.C (3-LS4-4)

Interdisciplinary Connections:

ELA/Literacy —

- RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS2-1),(3-LS4-1),(3-LS4-3),(3-LS4-4)
- RI.3.2** Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS4-1),(3-LS4-3),(3-LS4-4)
- RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS2-1),(3-LS4-1),(3-LS4-3),(3-LS4-4)
- W.3.1** Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS2-1),(3-LS4-1),(3-LS3-3),(3-LS4-4)
- W.3.2** Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-1),(3-LS3-3),(3-LS3-4)
- W.3.8** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-LS4-1)
- SL.3.4** Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS4-3),(3-LS4-4)

Mathematics —

- MP.2** Reason abstractly and quantitatively. (3-LS4-1),(3-LS4-3),(3-LS4-4)
- MP.4** Model with mathematics. (3-LS2-1),(3-LS4-1),(3-LS4-3),(3-LS4-4)
- MP.5** Use appropriate tools strategically. (3-LS4-1)
- 3.NBT** Number and Operations in Base Ten. (3-LS2-1)
- 3.MD.B.3** Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. (3-LS4-3)
- 3.MD.B.4** Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS4-1)

Grade Level: 3

Title of Unit: Interdependent Relationships in Ecosystems: Environmental Impacts on Organisms

Stage 1 - Desired Results

<p>Understandings:</p> <p><i>Students will understand that...</i></p> <ol style="list-style-type: none"> 1. When the environment changes, some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die. 2. Being part of a group helps animals obtain food, defend themselves, and cope with changes. 3. Some living organisms resemble organisms that once lived on Earth. Fossils provide evidence about the types of organisms and environments that existed long ago. 4. Differences in characteristics between individuals of the same species provide advantages in surviving and reproducing. 5. Particular organisms can only survive in particular environments. 6. Populations of organisms live in a variety of habitats. Change in those habitats affects the organisms living there. 	<p>Essential Questions:</p> <ol style="list-style-type: none"> 1. Why do some animals form groups to help members survive? 2. How do fossils provide evidence of the organisms and the environments in which they lived long ago? 3. How does the chosen habitat affect the survival rate of its inhabitants? <ol style="list-style-type: none"> a. Why do plants and animals change when their environment changes?
<p>Knowledge:</p> <p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● Changes in the environment will affect the lifestyle of an organism. ● When organisms work in groups they are better able to survive in the wild. ● Organisms can only survive in environments in which their needs are met. ● Within ecosystems, organisms interact with and are dependent on their physical and living environment. ● Some kinds of plants and animals that once lived on Earth are no longer found anywhere ● Fossils are evidence from the past that organisms existed in certain places and at a certain time. 	<p>Skills:</p> <p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> ● Examine a variety of ecosystems and settings and compare how the organisms must adapt to live in these places. ● Work in groups to accomplish a task and describe the benefits of doing so. ● Identify the factors that are necessary for an animal to survive in a particular environment. ● Describe how the different parts of a habit depend on each other to effectively create an ecosystem ● Show how the changes in the environment will affect the lifestyle of an organism. ● Examine a fossil and describe where this fossil might have been found.
<p>Stage 2- Assessment Evidence</p>	
<p>Performance Tasks and other evidence:</p>	

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 structured peer debate about the value of animal groupings
 - Design a model ecosystem habitat and explain why only select animals could flourish there
 - Write a letter to the editor explaining why anthropogenic factors are responsible for dynamic ecosystem change
- Formative Assessments
 - Graphic Organizers & Guided Note Taking
 - Directed Reading
 - Cooperative Group Learning
 - Homework
 - Journal Entries
 - Use a 3D pen to create a fossil that you would find in your local environment

Stage 3 – Learning Plan

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

- <http://betterlesson.com/lesson/632399/animal-groups-benefits-and-disadvantages> - (Lesson Idea)
- <http://betterlesson.com/lesson/633016/adaptations-and-environmental-change-an-assessment> - (Lesson Idea)
- http://betterlesson.com/next_gen_science/browse/2115/ngss-3-1s-life-sciences?from=megamenu_domain - (Lessons)
- <https://www.brainpop.com/search/search.weml?keyword=fossils> - (Videos with Quizzes and Resources)
- <https://www.flocabulary.com/adaptation/> - (Video/Song)
- http://the-curious-scientist.weebly.com/uploads/2/3/6/6/23667706/animal_groups_lesson_2-insects_that_work_together.pdf - (Lesson and Activity)
- <http://www.mccracken.kyschools.us/Downloads/ECOSYSTEMS%203.pdf> - (Unit)

- <http://www.epa.gov/climatestudents/impacts/effects/ecosystems.html> - (Resource Website)
- <http://www.stem4students.net/>

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

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- * Have extra time to process oral information and directions
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Scheduling accommodations allow a student to:

- * Take more time to complete a project
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- * Take sections of a test in a different order
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Organization skills accommodations allow a student to:

- * Use an alarm to help with time management
- * Mark texts with a highlighter
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Assignment modifications allow a student to:

- * Complete fewer or different homework problems than peers

- * Write shorter papers
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Curriculum modifications allow a student to:

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

2015 Ocean County Science Curriculum		
Grade 3		
Unit: Weather and Climate		
<p>How can humans analyze and utilize climatic data to help understand and reduce the impact of naturally occurring hazardous phenomenon?</p> <p>How can historical weather patterns help predict possible future occurrences?</p>		
<p>The performance expectations in third grade help students formulate answers to questions such as: “What is typical weather in different parts of the world and during different times of the year? How can the impact of weather-related hazards be reduced? Students are able to organize and use data to describe typical weather conditions expected during a particular season. By applying their understanding of weather-related hazards, students are able to make a claim about the merit of a design solution that reduces the impacts of such hazards.</p> <p>The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems and system models; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the third grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in asking questions and defining problems; 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.</p> <p>The Grades 3-5 Storyline provides a summary of the understandings that students developed by the end of 5th grade.</p>		
#	STUDENT LEARNING OBJECTIVES (SLOs)	Corresponding PEs and DCIs
1	<p>Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. <i>[Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.]</i> <i>[Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]</i></p>	3-ESS2-1
2	<p>Obtain and combine information to describe climates in different regions of the world.</p>	3-ESS2-2

3	<p>Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.* [Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.]</p>	3-ESS3-1
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The SLOs were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

<p style="text-align: center; background-color: #4a7ebb; color: white; padding: 2px;">Science and Engineering Practices</p> <p>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.</p> <ul style="list-style-type: none"> Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. (3-ESS2-1) <p>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).</p> <ul style="list-style-type: none"> Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-ESS3-1) <p>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.</p> <ul style="list-style-type: none"> Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2) <p><u>21st Century themes and skills</u> (This link is taken from the Partnership for 21st Century Skills)</p> <ul style="list-style-type: none"> creativity and innovation critical thinking and problem solving communication collaboration 	<p style="text-align: center; background-color: #f4a460; padding: 2px;">Disciplinary Core Ideas</p> <p>ESS2.D: Weather and Climate</p> <ul style="list-style-type: none"> Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1) Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2) <p>ESS3.B: Natural Hazards</p> <ul style="list-style-type: none"> A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1) <i>(Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)</i> 	<p style="text-align: center; background-color: #90d290; padding: 2px;">Crosscutting Concepts</p> <p>Patterns</p> <ul style="list-style-type: none"> Patterns of change can be used to make predictions. (3-ESS2-1),(3-ESS2-2) <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1) <p style="text-align: center;">-----</p> <p style="text-align: center;">---</p> <p style="text-align: center;">Connections to Engineering, Technology, and Applications of Science</p> <p>Influence of Engineering, Technology, and Science on Society and the Natural World</p> <ul style="list-style-type: none"> Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). (3-ESS3-1) <p style="text-align: center;">-----</p> <p style="text-align: center;">-----</p> <p style="text-align: center;">Connections to Nature of Science</p> <p>Science is a Human Endeavor</p> <ul style="list-style-type: none"> Science affects everyday life. (3-ESS3-1)
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<ul style="list-style-type: none"> ● 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 		
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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 third grade: N/A

Articulation of DCIs across grade-levels:

K.ESS2.D (3-ESS2-1); **K.ESS3.B** (3-ESS3-1); **K.ETS1.A** (3-ESS3-1); **4.ESS2.A** (3-ESS2-1); **4.ESS3.B** (3-ESS3-1); **4.ETS1.A** (3-ESS3-1); **5.ESS2.A** (3-ESS2-1); **MS.ESS2.C** (3-ESS2-1),(3-ESS2-2); **MS.ESS2.D** (3-ESS2-1),(3-ESS2-2); **MS.ESS3.B** (3-ESS3-1)

Interdisciplinary Connections:

ELA/Literacy —

- RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-ESS2-2),(3-ESS3-1)
- RI.3.9** Compare and contrast the most important points and key details presented in two texts on the same topic. (3-ESS2-2)
- W.3.1** Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-ESS3-1)
- W.3.7** Conduct short research projects that build knowledge about a topic. (3-ESS3-1)
- W.3.8** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-ESS2-2)

Mathematics —

MP.2 Reason abstractly and quantitatively. (3-ESS2-1),(3-ESS2-2),(3-ESS3-1)

MP.4 Model with mathematics. (3-ESS2-1),(3-ESS2-2),(3-ESS3-1)

MP.5 Use appropriate tools strategically. (3-ESS2-1)

3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-ESS2-1)

3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in bar graphs. (3-ESS2-1)

Grade Level: 3

Title of Unit: Weather and Climate

Stage 1 - Desired Results

Understandings:

Students will understand that...

1. Climate describes patterns of typical weather conditions over different scales and variations.
2. Weather patterns can be analyzed.

Essential Questions:

1. How do seasonal changes affect weather conditions?
2. How does the global location of a region determine the climate?
3. How do engineers design a solution to reduce the impact of a weather-related hazard?

Knowledge:

Students will know...

- Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next.
- Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years.
- Weather changes from day to day and over the seasons can be measured and documented.
- A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.

Skills:

Students will be able to...

- Record weather patterns and predict what weather that particular area might see in the future.
- Research weather and climate in regions around the world and locate reasons for the regions' weather conditions.
- Identify and describe weather related hazards
- Find ways for humans to reduce the impact of these weather related natural processes.

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
 - Visit <http://easyscienceforkids.com/all-about-climate-around-the-world/> and <http://www.ucmp.berkeley.edu/glossary/gloss5/biome/> to learn more about the world's biomes in order to create an interactive presentation
 - Design a solution to reduce the impact of a weather-related hazard
- Formative Assessments
 - Graphic Organizers & Guided Note Taking
 - Directed Reading
 - Cooperative Group Learning
 - Homework
 - Journal Entries
 - Use <http://www.weather.com/> and/or <http://www.almanac.com/weather/history/NJ> in order to create data tables and graphical displays pertaining to weather conditions over time

Stage 3 – Learning Plan

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

- https://sites.google.com/a/msad60.org/k-5_science/third-grade/same-day-different-weather - (Lessons)
- <http://www.earthsciweek.org/ngss-performance-expectations/3-ess2-1> - (Lessons)
- <http://www.crayola.com/lesson-plans/weather-graphs-lesson-plan/> - (Weather Graph)
- <http://weather.thinkport.org/lesson-overview.html> - (Lesson Activity)
- <http://climatekids.nasa.gov/next-generation-standards/review/> - (Articles and Videos)
- https://betterlesson.com/next_gen_science/browse/2131/ngss-3-ess2-2-obtain-and-combine-information-to-describe-climates-in-different-regions-of-the-world/browse/2131/ngss-3-ess2-2-obtain-and-combine-information-to-describe-climates-in-different-regions-of-the-world?from=domain_core - (Lesson Ideas)

- http://education.nationalgeographic.com/education/activity/extreme-weather-on-earth/?ar_a=1
- <http://www.weatherwizkids.com/> - (Weather Info)
- <http://www.weatherforkids.org/> - (Kids Site)
- <http://www.stem4students.net/>

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**