

Bay Head School

Content Area: Science
Course Title: Science

Grade Level: Third Grade

Unit Plan 1
Motion and Stability: Forces and Interactions

20 days

Unit Plan 2
From Molecules to Organisms: Structures and Processes

20 days

Unit Plan 3
Ecosystems: Interactions, Energy, and Dynamics

30 days

Unit Plan 4
Heredity: Inheritance and Variation of Traits

20 days

Unit Plan 5
Biological Evolution: Unity and Diversity

40 days

Unit Plan 6
Earth's Systems

10 days

Unit Plan 7
Earth and Human Activity

20 days

Unit Plan 8
Engineering Design

10 days

Updated: October 2018 by Sharon Carroll
Aligned to New Jersey Student Learning Standards

Board Approved:

**Bay Head School
SCIENCE CURRICULUM
Unit Overview**

Content Area: Science Unit 1

Grade Level: Third Grade

Domain (Unit Title): 3-PS2 Motion and Stability: Forces and Interactions

Unit Summary: In this unit of study, students determine the effects of balanced and unbalanced forces on the motion of an object. The crosscutting concepts of *patterns and cause and effect* are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Primary Interdisciplinary Connections: Mathematics, Language Arts Literacy, Science, Social Studies. All of the NJ State Standards may be found on the New Jersey state website.

21 Century Themes:

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

21st Century Life & Career Skills	All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
Personal Financial Literacy	All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.
Career Awareness, Exploration, and Preparation	All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

Career and Technical Education

All students who complete a career and technical education program will acquire academic and technical skills for careers in emerging and established professions that lead to technical skill proficiency, credentials, certificates, licenses, and/or degrees.

UNIT 1

Standards/Learning Targets

3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. [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.]

3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. [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.]

3-PS2-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. [Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces 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.]

3-PS2-4. 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.]

Performance Expectation

Science and Engineering Practices

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.

- 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)

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.

- Plan and 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. (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)

Science Knowledge is Based on Empirical Evidence

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

Scientific Investigations Use a Variety of

Disciplinary Core Ideas

PS2.A: Forces and Motion

- 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 that 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 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)

<p>Methods</p> <ul style="list-style-type: none"> Science investigations use a variety of methods, tools, and techniques. (3-PS2-1) 	
<p style="text-align: center;"><u>Crosscutting Concepts</u></p> <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>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) 	<p style="text-align: center;"><u>Learning Objectives</u></p> <p>Students will understand that ...</p> <ul style="list-style-type: none"> 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 objects are not in contact. The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. 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 objects are not in contact.

**Bay Head School
SCIENCE CURRICULUM
Unit Overview**

Content Area: Science Unit 2 **Grade Level:** Third Grade

Domain (Unit Title): 3-LS1 From Molecules to Organisms: Structures and Processes

Unit Summary: In this unit of study, students develop an understanding of the similarities and differences in organisms' life cycles. In addition, students 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. The crosscutting concepts of *patterns* and *cause and effect* are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in *developing and using models and constructing explanations and designing solutions*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Primary Interdisciplinary Connections: Mathematics, Language Arts Literacy, Science, Social Studies. All of the NJ State Standards may be found on the New Jersey state website.

21 Century Themes:

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

<p>21st Century Life & Career Skills</p>	<p>All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.</p>
<p>Personal Financial Literacy</p>	<p>All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.</p>
<p>Career Awareness, Exploration, and Preparation</p>	<p>All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.</p>
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UNIT 2

Standards/Learning Targets

3-LS1-1. 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.]

Performance Expectation

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 models to describe phenomena. (3-LS1-1)

Scientific Knowledge is Based on Empirical Evidence

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

Disciplinary Core Ideas

LS1.B: Growth and Development of Organisms

- Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1)

Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions. (3-LS1-1)

Learning Objectives

Students will understand that ...

- Reproduction is essential to every kind of organism.
- Organisms have unique and diverse life cycles.
- Different organisms vary in how they look and function because they have different inherited information.
- The environment also affects the traits that an organism develops.

**Bay Head School
SCIENCE CURRICULUM
Unit Overview**

Content Area: Science Unit 3

Grade Level: Third Grade

Domain (Unit Title): 3-LS2 Ecosystems: Interactions, Energy, and Dynamics

Unit Summary: In this unit of study, students develop an understanding of the types of organisms that lived long ago and also about the nature of their environments. Students 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 *systems and system models*; *scale, proportion, and quantity*; and *the influence of engineering, technology, and science on society and the natural world* are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *asking questions and defining problems*, *analyzing and interpreting data*, and *engaging in argument from evidence*. Students are also expected to use these practices to demonstrate understanding of the core ideas

Primary Interdisciplinary Connections: Mathematics, Language Arts Literacy, Science, Social Studies. All of the NJ State Standards may be found on the New Jersey state website.

21 Century Themes:

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

<p>21st Century Life & Career Skills</p>	<p>All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.</p>
<p>Personal Financial Literacy</p>	<p>All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.</p>

Career Awareness, Exploration, and Preparation	All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.
Career and Technical Education	All students who complete a career and technical education program will acquire academic and technical skills for careers in emerging and established professions that lead to technical skill proficiency, credentials, certificates, licenses, and/or degrees.

UNIT 3
Standards/Learning Targets

3-LS2-1. Construct an argument that some animals form groups that help members survive.

Performance Expectation

<p style="text-align: center;"><u>Science and Engineering Practices</u></p> <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"> Construct an argument with evidence, data, and/or a model. (3-LS2-1) 	<p style="text-align: center;"><u>Disciplinary Core Ideas</u></p> <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 (Note: Moved from K–2). (3-LS2-1)
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<u>Crosscutting Concepts</u>	<u>Learning Objectives</u>
<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) 	<p>Students will understand that...</p> <ul style="list-style-type: none"> • When the environment changes, some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die. • Being part of a group helps animals obtain food, defend themselves, and cope with changes. • Some living organisms resemble organisms that once lived on Earth. Fossils provide evidence about the types of organisms and environments that existed long ago. • Differences in characteristics between individuals of the same species provide advantages in surviving and reproducing. • Particular organisms can only survive in particular environments. • Populations of organisms live in a variety of habitats. Change in those habitats affects the organisms living there.

<p style="text-align: center;">Bay Head School SCIENCE CURRICULUM Unit Overview</p>	
Content Area: Science Unit 4	Grade Level: Third Grade
Domain (Unit Title): 3-LS3 Heredity: Inheritance and Variation of Traits	
<p>Unit Summary: In this unit of study, students develop an understanding of the similarities and differences in organisms' life cycles. In addition, students 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. The crosscutting concepts of <i>patterns</i> and <i>cause and effect</i> are called out as organizing concepts for these</p>	

disciplinary core ideas. Students demonstrate grade-appropriate proficiency in *developing and using models and constructing explanations and designing solutions*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Primary Interdisciplinary Connections: Mathematics, Language Arts Literacy, Science, Social Studies. All of the NJ State Standards may be found on the New Jersey state website.

21 Century Themes:

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

<p>21st Century Life & Career Skills</p>	<p>All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.</p>
<p>Personal Financial Literacy</p>	<p>All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.</p>
<p>Career Awareness, Exploration, and Preparation</p>	<p>All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.</p>
<p>Career and Technical Education</p>	<p>All students who complete a career and technical education program will acquire academic and technical skills for careers in emerging and established professions that lead to technical skill proficiency, credentials, certificates, licenses, and/or degrees.</p>

UNIT 4

Standards/Learning Targets

3-LS3-1. 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.]

3-LS3-2. 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.]

Performance Expectation

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.

- Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1)

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.

- Use evidence (e.g., observations, patterns) to support an explanation. (3-LS3-2)

Disciplinary Core Ideas

LS3.A: Inheritance of Traits

- 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)

LS3.B: Variation of Traits

- 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)

<u>Crosscutting Concepts</u>		<u>Learning Objectives</u>	
<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) <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) 	<p>Students will ...</p> <ul style="list-style-type: none"> Reproduction is essential to every kind of organism. Organisms have unique and diverse life cycles. Different organisms vary in how they look and function because they have different inherited information. The environment also affects the traits that an organism develops. 		

Bay Head School SCIENCE CURRICULUM Unit Overview	
Content Area: Science Unit 5	Grade Level: Third Grade
Domain (Unit Title): 3-LS4 Biological Evolution: Unity and Diversity	
<p>Unit Summary: In this unit of study, students acquire an understanding that organisms have different inherited traits and that the environment can also affect the traits that an organism develops. The crosscutting concepts of <i>patterns</i> and <i>cause and effect</i> are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency <i>in analyzing and interpreting data, constructing explanations, and designing solutions</i>. Students are also expected to use these practices to demonstrate understanding of the core ideas.</p>	
<p>Primary Interdisciplinary Connections: Mathematics, Language Arts Literacy, Science, Social Studies. All of the NJ State Standards may be found on the New Jersey state website.</p>	

21 Century Themes:

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

21st Century Life & Career Skills	All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
Personal Financial Literacy	All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.
Career Awareness, Exploration, and Preparation	All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.
Career and Technical Education	All students who complete a career and technical education program will acquire academic and technical skills for careers in emerging and established professions that lead to technical skill proficiency, credentials, certificates, licenses, and/or degrees.

UNIT 5**Standards/Learning Targets**

3-LS4-1. 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 animals. Assessment is limited to major fossil types and relative ages.]

3-LS4-2. 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.]

3-LS4-3. 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-LS4-4. 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.]

Performance Expectation

<u>Science and Engineering Practices</u>	<u>Disciplinary Core Ideas</u>
<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-LS4-1) <p>Constructing Explanations and Designing Solutions</p>	<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. (secondary to 3-LS4-4) <p>LS4.A: Evidence of Common Ancestry and Diversity</p>

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.

- Use evidence (e.g., observations, patterns) to construct an explanation. (3-LS4-2)

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).

- 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)

- Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (Note: moved from K-2) (3-LS4-1)
- Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1)

LS4.B: Natural Selection

- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)

LS4.C: Adaptation

- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)
- **LS4.D: Biodiversity and Humans** Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (3-LS4-4)

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (3-LS4- 2),(3-LS4-3)

Scale, Proportion, and Quantity

- Observable phenomena exist from very short to very long time periods. (3-LS4-1)

Systems and System Models

- A system can be described in terms of its components and their interactions. (3-LS4-4)

Interdependence of Science, Engineering, and Technology

- Knowledge of relevant scientific

Learning Objectives

Students will understand that...

- Reproduction is essential to every kind of organism.
- Organisms have unique and diverse life cycles.
- Different organisms vary in how they look and function because they have different inherited information.
- The environment also affects the traits that an organism develops.

<p>concepts and research findings is important in engineering. (3-LS4-4)</p> <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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**Bay Head School
SCIENCE CURRICULUM
Unit Overview**

Content Area: Science Unit 6	Grade Level: Third Grade
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Domain (Unit Title): 3-ESS2 Earth’s Systems

Unit Summary: In this unit of study, students 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. The crosscutting concepts of *patterns*, *cause and effect*, and the *influence of engineering, technology, and science on society and the natural world* are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in *asking questions and defining problems*, *analyzing and interpreting data*, *engaging in argument from evidence*, and *obtaining, evaluating, and communicating information*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Primary Interdisciplinary Connections: Mathematics, Language Arts Literacy, Science, Social Studies. All of the NJ State Standards may be found on the New Jersey state website.

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

21st Century Life & Career Skills	All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and
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Career Awareness, Exploration, and Preparation	All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.
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UNIT 6

Standards/Learning Targets

3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]

3-ESS2-2. Obtain and combine information to describe climates in different regions of the world

Performance Expectation

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<p style="text-align: center;"><u>Science and Engineering Practices</u></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>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 style="text-align: center;"><u>Disciplinary Core Ideas</u></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 style="text-align: center;"><u>Crosscutting Concepts</u></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 style="text-align: center;"><u>Learning Objectives</u></p> <p>Students will understand that ...</p> <ul style="list-style-type: none"> • Climate describes patterns of typical weather conditions over different scales and variations. • Data in tables and graphical displays to describe typical weather conditions. • Weather patterns can be analyzed. • Solutions can be designed to reduce the impact of a weather-related hazard.

**Bay Head School
SCIENCE CURRICULUM
Unit Overview**

Content Area: Science Unit 7

Grade Level: Third Grade

Domain (Unit Title): 3-ESS3 Earth and Human Activity

Unit Summary: In this unit of study, students develop an understanding of the types of organisms that lived long ago and also about the nature of their environments. Students 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 *systems and system models*; *scale, proportion, and quantity*; and *the influence of engineering, technology, and science on society and the natural world* are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *asking questions and defining problems*, *analyzing and interpreting data*, and *engaging in argument from evidence*. Students are also expected to use these practices to demonstrate understanding of the core ideas

Primary Interdisciplinary Connections: Mathematics, Language Arts Literacy, Science, Social Studies. All of the NJ State Standards may be found on the New Jersey state website.

21 Century Themes:

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

21st Century Life & Career Skills	All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
Personal Financial Literacy	All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.
Career Awareness, Exploration, and Preparation	All students will apply knowledge about and engage in the process of career awareness, exploration, and

	preparation in order to navigate the globally competitive work environment of the information age.
Career and Technical Education	All students who complete a career and technical education program will acquire academic and technical skills for careers in emerging and established professions that lead to technical skill proficiency, credentials, certificates, licenses, and/or degrees.

UNIT 7

Standards/Learning Targets

3-ESS3-1. 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.]

Performance Expectation

Science and Engineering Practices

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).

- 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)

Disciplinary Core Ideas

ESS3.B: Natural Hazards

- 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) (Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)

<u>Crosscutting Concepts</u>	<u>Learning Objectives</u>
<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>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>Science is a Human Endeavor</p> <ul style="list-style-type: none"> • Science affects everyday life. (3-ESS3-1) 	<p>Students will understand that...</p> <ul style="list-style-type: none"> • Climate describes patterns of typical weather conditions over different scales and variations. • Data in tables and graphical displays to describe typical weather conditions. • Weather patterns can be analyzed. • Solutions can be designed to reduce the impact of a weather-related hazard.

<p style="text-align: center;">Bay Head School SCIENCE CURRICULUM Unit Overview</p>	
<p>Content Area: Science Unit 8</p>	<p>Grade Level: Third Grade</p>
<p>Domain (Unit Title): 3-5 ETS1 Engineering Design</p>	
<p>Primary Interdisciplinary Connections: Mathematics, Language Arts Literacy, Science, Social Studies. All of the NJ State Standards may be found on the New Jersey state website.</p>	
<p>21 Century Themes: All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world, as they relate to the individual, global society and the universe.</p>	

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UNIT 8

Standards/Learning Targets

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.

Performance Expectation

Science and Engineering Practices

Asking Questions and Defining Problems

Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1)

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.

- Plan and 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. (3-5-ETS1-3)

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.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and

Disciplinary Core Ideas

ETS1.A: Defining and Delimiting Engineering Problems

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1)

ETS1.B: Developing Possible Solutions

- Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2)
- At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2)
- Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3)

ETS1.C: Optimizing the Design Solution

- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)

constraints of the design problem. (3-5-ETS1-2)	
<p style="text-align: center;"><u>Crosscutting Concepts</u></p> <p>Influence of Engineering, Technology, and Science on Society and the Natural World</p> <ul style="list-style-type: none"> ● People’s needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1) ● Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2) 	<p style="text-align: center;"><u>Learning Objectives</u></p> <p>Students will understand that...</p> <ul style="list-style-type: none"> ● A situation that people want to change or create can be approached as a problem to be solved through engineering. ● Asking questions, making observations, and gathering information are helpful in thinking about problems. ● The shape and stability of structures of natural and designed objects are related to their function(s)

<h2 style="margin: 0;">Suggested Accommodation For All Units</h2>
<p>Special Education/504 Plans/Students with Disabilities:</p> <ul style="list-style-type: none"> ● Follow specific IEP/504 accommodations and modifications ● Extended time ● Modified assignments ● Labeled pictures of weather phenomenon ● Pre-teach concepts ● Differentiate assignments <p>Gifted and Talented:</p> <ul style="list-style-type: none"> ● Differentiate assignments ● Higher level texts ● Homework questions should be open ended to increase higher level thinking ● Differentiate test questions ● Create alternate projects or assignments that challenge thinking ● Reference and possibly apply assessment boundary skills <p>Students at Risk of Failure:</p>

- Small group instruction
- Frequent breaks
- Model how assignments should look
- Incorporate social/emotional discussions
- Encourage and monitor positive peer collaboration
- Provide academic resources for both school and home use

Economically Disadvantaged:

- Structure the learning around explaining or solving a social or community-based issue.
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).

Culturally Diverse:

- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).