July 2022

Califon Public School
Science Curriculum

Subject: Science	Grade: 6	Unit #: 1	Pacing: 25 days
Unit Title: Growth, Development and Reproduction of Organisms			

OVERVIEW OF UNIT:

Students use data and conceptual models to understand how the environment and genetic factors determine the growth of an individual organism. They connect this idea to the role of animal behaviors in animal reproduction and to the dependence of some plants on animal behaviors for their reproduction. Students provide evidence to support their understanding of the structures and behaviors that increase the likelihood of successful reproduction by organisms.

Unit References	
Big Ideas	Essential Questions
• Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. ✓ There are a variety of ways that plants reproduce. • Specialized structures for plants affect their probability of successful reproduction. • Some characteristic animal behaviors affect the probability of successful reproduction in plants. • Animals engage in characteristic behaviors that affect the probability of successful reproduction. • There are a variety of characteristic animal behaviors that affect their probability of successful reproduction. • There are a variety of animal behaviors that attract a mate. ● Successful reproduction of animals and plants may have more than one cause, and some cause-and-effect relationships in systems can only be described using probability.	● How do plants increase their odds of reproduction? ● How do characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants, respectively? ● What behaviors do animals engage in to increase reproduction? ● How do environmental and genetic factors influence the growth of organisms?

• Genetic factors as well as local conditions affect the growth of organisms. ✓ A variety of local environmental conditions affect the growth of organisms. • Genetic factors affect the growth of organisms (plant and animal). • The factors that influence the growth of organisms may have more than one cause. ● Some cause-and-effect relationships in plant and animal systems can only be described using probability.	

Objectives

- Students will be able to describe how plants and animals increase their odds of reproduction.
- Students will be able to categorize animal behaviors and plant structures that affect the probability of successful reproduction.
- Students will be able to describe environmental and genetic factors that can influence the growth of organisms.

Assessment

Formative Assessment:

- Labs
- Claim-Evidence- Reasoning
- Class Discussions

Summative Assessment:

- Multiple Choice Assessment
- Open Ended Response
- Claim-Evidence- Reasoning

Benchmark:

- Unit Assessments

Alternative:

- Performance Assessments
- Projects
- Models

- Modified Tests Independently Developed by Teacher

Key Vocabulary

Vascular, nonvascular, reproduction, behavior, pollination, hibernation, courtship, migration

Resources & Materials

Stemscopes website & kits

- Print and digital copies of textbook
- Lab write-ups
- SEP simulations
- Content videos
- PhET Interactive Simulations
- Reading articles
- Math connections
- Pre-assembled Kits

Technology Infusion

Teacher Technology:

- Chromebooks
- Stemscopes website
- SMARTBoard

Student Technology:

- Chromebooks
- Stemscopes website

Activities:

- Students will use Chromebooks to access the Stemscopes website to: activate prior knowledge, build schema, watch videos, complete labs, take assessments and collect data.

Standard	Standard Description
8.1.8.A.1	8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.

Interdisciplinary Integration

Activities:

- Students will be able to create a scientific explanation using evidence and reasoning from observation and informational text to support a scientific claim
- Students will be able to generate numerical data to represent observations and measurements used to write a scientific explanation.

Standard	Standard Description
NJSLSA.W1.	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
4.10.6.B.2	Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

21st Century Life Skills

Activities:

- Students will work in groups to collaborate, at times taking leadership roles to communicate project ideas to the whole class.

Standard	Standard Description
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career

Careers

Activities:

- Students will create scientific explanations to describe observable phenomena in order to communicate findings.

Standard	Standard Description
CRP4	Communicate clearly and effectively and with reason.

ELA Companion Standards

July 2022

Activities:

- Students will be able to create a scientific explanation using evidence and reasoning from observation and informational text to support a scientific claim.

Standard	**Standard Description**
WHST.6-8.1	Write arguments focused on *discipline-specific content.*

Standards			
Standard #	Standard Description	Student Learning Objectives	Clarification Statement
MS-LS1-4	From Molecules to Organisms: Structures and Processes	Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.	Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds, and creating conditions for seed germination and growth. Examples of plant structures could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.]
MS-LS1-5	From Molecules to Organisms: Structures and Processes	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include large breed cattle and species of grass affecting growth of organisms. Examples of evidence could include drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds.] [Assessment Boundary: Assessment does not include genetic mechanisms, gene regulation, or biochemical processes.]

Differentiation

July 2022

Special Education	English Language Learners (ELL)	Response to Intervention (RTI)	Enrichment
• Provide modifications & accommodations as listed in the student's IEP • Position student near helping peer or have quick access to teacher • Modify or reduce assignments/tasks • Reduce length of assignment for different mode of delivery • Increase one-to-one time • Prioritize tasks • Use graphic organizers • Use online resources for skill building • Provide teacher notes • Use collaborative grouping strategies such as small groups • NJDOE resources - http://www.state.nj.us/education/specialed/	• Provide text-to-speech • Use of translation dictionary or software • Provide graphic organizers • NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm • Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm	• Tiered interventions following RTI framework • Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/ • Interventional Central - http://www.interventioncentral.org/	• Process should be modified: higher order thinking skills, open-ended thinking, discovery • Utilize project-based learning for greater depth of knowledge • Utilize exploratory connections to higher grade concepts • Contents should be modified: real world problems, audiences, deadlines, evaluations, transformations • Learning environments should be modified: student-centered learning, independence, openness, complexity, groups varied • NJDOE resources - http://www.state.nj.us/education/aps/cccs/g_and_t_req.htm

July 2022

Califon Public School
Science Curriculum

Subject: Science	Grade: 6	Unit #: 2	Pacing: 21-24 days
Unit Title: Matter and Energy in Organisms and Ecosystems			

OVERVIEW OF UNIT*:*

In this unit, Students *analyze and interpret data, develop models, construct arguments*, and demonstrate a deeper understanding of the cycling of matter, the flow of energy, and resources in ecosystems. They are able to study patterns of interactions among organisms within an ecosystem. They consider biotic and abiotic factors in an ecosystem and the effects these factors have on populations. They also understand that the limits of resources influence the growth of organisms and populations, which may result in competition for those limited resources.

Unit References	
Big Ideas	Essential Questions
• Organisms and populations of organisms are dependent on their environmental interactions with other living things. • Organisms and populations of organisms are dependent on their environmental interactions with nonliving factors. • In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with others for limited resources. • Access to food, water, oxygen, or other resources constrain organisms' growth and reproduction. • Predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. • Mutually beneficial interactions may become so interdependent that each organism requires the other for survival.	*How do changes in the availability of matter and energy effect populations in an ecosystem?* *How do relationships among organisms, in an ecosystem, effect populations?* *How can you explain the stability of an ecosystem by tracing the flow of matter and energy?*

- The patterns of interactions of organisms with their environment, both its living and nonliving components, are shared.
- Interactions within ecosystems have patterns that can be used to identify cause-and-effect relationships.
- Patterns of interactions among organisms across multiple ecosystems can be predicted.
- Patterns of interactions can be used to make predictions about the relationships among and between organisms and abiotic components of ecosystems.
- Food webs are models that demonstrate how matter and energy are transferred among producers, consumers, and decomposers as the three groups interact within an ecosystem.
- Transfers of matter into and out of the physical environment occur at every level.
- Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments.
- Decomposers recycle nutrients from dead plant or animal matter back to the water in aquatic environments.
- The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem.
- The transfer of energy can be tracked as energy flows through an ecosystem.
- Science assumes that objects and events in ecosystems occur in consistent patterns that are understandable through measurement and observation.

Objectives

- Students will be able to determine how changes in the availability of matter and energy affect populations within an ecosystem.
- Students will be able to classify organism relationships and how they affect populations.
- Students will be able to trace the flow of matter and energy to explain the stability of an ecosystem.

Assessment

July 2022

Formative Assessment:

- Labs
- Claim-Evidence- Reasoning
- Class Discussions

Summative Assessment:

- Multiple Choice Assessment
- Open Ended Response
- Claim-Evidence- Reasoning

Benchmark:

- Unit Assessments

Alternative:

- Performance Assessments
- Projects
- Models
- Modified Tests Independently Developed by Teacher

Key Vocabulary

Ecosystem, abiotic, biotic, energy pyramid, food chain, food web, limiting factors, competition, populations, communities, predator, prey, consumer, producer, herbivore, carnivore, omnivore, decomposer

Resources & Materials

Stemscopes website & kits

- Print and digital copies of textbook
- Lab write-ups
- SEP simulations
- Content videos
- PhET Interactive Simulations
- Reading articles
- Math connections
- Pre-assembled Kits

Technology Infusion
Teacher Technology: ● Chromebooks ● Stemscopes website ● SMARTBoard **Student Technology:** ● Chromebooks ● Stemscopes website **Activities:** ● Students will use Chromebooks to access the Stemscopes website to: activate prior knowledge, build schema, watch videos, complete labs, take assessments and collect data.

Standard	Standard Description
8.1.8.A.1	8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.

Interdisciplinary Integration
Activities: ● Students will be able to create a scientific explanation using evidence and reasoning from observation and informational text to support a scientific claim ● Students will be able to generate numerical data to represent observations and measurements used to write a scientific explanation.

Standard	Standard Description
NJSLSA.W1.	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
4.10.6.B.2	Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in

	which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

21st Century Life Skills	
Activities: ● Students will work in groups to collaborate, at times taking leadership roles to communicate project ideas to the whole class.	
Standard	**Standard Description**
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career

Careers	
Activities: ● Students will create scientific explanations to describe observable phenomena in order to communicate findings.	
Standard	**Standard Description**
CRP4	Communicate clearly and effectively and with reason.

ELA Companion Standards	
Activities: ● Students will create scientific explanations to describe observable phenomena in order to communicate findings.	
Standard	**Standard Description**
RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.

July 2022

Standards			
Standard #	Standard Description	Student Learning Objectives	Clarification Statement
MS-LS2-1	Ecosystems: Interactions, Energy, and Dynamics	Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]
MS-LS2-2	Ecosystems: Interactions, Energy, and Dynamics	Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.]
MS-LS2-3	Ecosystems: Interactions, Energy, and Dynamics	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]

Differentiation			
Special Education	English Language Learners (ELL)	Response to Intervention (RTI)	Enrichment
• Provide modifications & accommodations as listed in the student's IEP • Position student near helping peer or have quick access to teacher • Modify or reduce assignments/tasks	• Provide text-to-speech • Use of translation dictionary or software • Provide graphic organizers • NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm • Adapt a Strategy – Adjusting strategies for ESL	• Tiered interventions following RTI framework • Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/	• Process should be modified: higher order thinking skills, open-ended thinking, discovery • Utilize project-based learning for greater depth of knowledge

• Reduce length of assignment for different mode of delivery • Increase one-to-one time • Prioritize tasks • Use graphic organizers • Use online resources for skill building • Provide teacher notes • Use collaborative grouping strategies such as small groups • NJDOE resources - http://www.state.nj.us/education/specialed/	students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm	• Interventional Central - http://www.interventioncentral.org/	• Utilize exploratory connections to higher grade concepts • Contents should be modified: real world problems, audiences, deadlines, evaluations, transformations • Learning environments should be modified: student-centered learning, independence, openness, complexity, groups varied • NJDOE resources - http://www.state.nj.us/education/aps/cccs/g_and_t_req.htm

July 2022

Califon Public School
Science Curriculum

Subject: Science	Grade: 6	Unit #: 3	Pacing: 25 days
Unit Title: Interdependent Relationships in Ecosystems			

OVERVIEW OF UNIT:

What happens to ecosystems when the environment changes?

Students build on their understandings of the transfer of matter and energy as they study patterns of interactions among organisms within an ecosystem. They consider biotic and abiotic factors in an ecosystem and the effects these factors have on a population. They construct explanations for the interactions in ecosystems and the scientific, economic, political, and social justifications used in making decisions about maintaining biodiversity in ecosystems. The crosscutting concept of *stability and change* provide a framework for understanding the disciplinary core ideas.

Unit References	
Big Ideas	Essential Questions
• Ecosystems are dynamic in nature. • The characteristics of ecosystems can vary over time. • Disruptions to any physical or biological component of an ecosystem can lead to shifts in all the ecosystem's populations. • Small changes in one part of an ecosystem might cause large changes in another part. • Patterns in data about ecosystems can be recognized and used to make warranted inferences about changes in populations. • Evaluating empirical evidence can be used to support arguments about changes to ecosystems.	*How can a single change to an ecosystem disrupt the whole system?* *What limits the number and variety of living things in an ecosystem?*

- Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems.
- The completeness, or integrity, of an ecosystem's biodiversity is often used as a measure of its health.
- Changes in biodiversity can influence humans' resources, such as food, energy, and medicines.
- Changes in biodiversity can influence ecosystem services that humans rely on.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
- A solution needs to be tested and then modified on the basis of the test results, in order to improve it.
- Models of all kinds are important for testing solutions.
- The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution.
- Small changes in one part of a system might cause large changes in another part.
- Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes.

Objectives

- Students will be able to describe how a single change to an ecosystem can disrupt the whole system.
- Students will be able to illustrate what limits the number and variety of living things in an ecosystem.

Assessment

Formative Assessment:

- Labs
- Claim-Evidence- Reasoning
- Class Discussions

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Summative Assessment:

- Multiple Choice Assessment
- Open Ended Response
- Claim-Evidence- Reasoning
- Ecosystem Jar observations and construction

Benchmark:

- Unit Assessments

Alternative:

- Performance Assessments
- Projects
- Models
- Modified Tests Independently Developed by Teacher

Key Vocabulary

Ecosystem, biotic, abiotic, limiting factors, population, community, extinction, biodiversity

Resources & Materials

Stemscopes website & kits

- Print and digital copies of textbook
- Lab write-ups
- SEP simulations
- Content videos
- PhET Interactive Simulations
- Reading articles
- Math connections
- Pre-assembled Kits

Technology Infusion

Teacher Technology:

- Chromebooks
- Stemscopes website

- SMARTBoard

Student Technology:

- Chromebooks
- Stemscopes website

Activities:

- Students will use Chromebooks to access the Stemscopes website to: activate prior knowledge, build schema, watch videos, complete labs, take assessments and collect data.

Standard	Standard Description
8.1.8.A.1	8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.

Interdisciplinary Integration

Activities:

- Students will be able to create a scientific explanation using evidence and reasoning from observation and informational text to support a scientific claim
- Students will be able to generate numerical data to represent observations and measurements used to write a scientific explanation.

Standard	Standard Description
NJSLSA.W1.	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
4.10.6.B.2	Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

21st Century Life Skills	
Activities: ● Students will work in groups to collaborate, at times taking leadership roles to communicate project ideas to the whole class.	
Standard	**Standard Description**
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career

Careers	
Activities: ● Students will create scientific explanations to describe observable phenomena in order to communicate findings.	
Standard	**Standard Description**
CRP4	Communicate clearly and effectively and with reason.

ELA Companion Standards	
Activities: ● Students will be able to create a scientific explanation using evidence and reasoning from observation and informational text to support a scientific claim.	
Standard	**Standard Description**
RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.

July 2022

Standards			
Standard #	Standard Description	Student Learning Objectives	Clarification Statement
MS-LS2-4	Ecosystems: Interactions, Energy, and Dynamics	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]
MS-LS2-5	Ecosystems: Interactions, Energy, and Dynamics	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]
MS-ETS1-1	Engineering Design	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	N/A
MS-ETS1-3	Engineering Design	Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	N/A

July 2022

Differentiation			
Special Education	English Language Learners (ELL)	Response to Intervention (RTI)	Enrichment
-Provide modifications & accommodations as listed in the student's IEP -Position student near helping peer or have quick access to teacher -Modify or reduce assignments/tasks – research -Reduce length of assignment for different mode of delivery -Increase one-to-one time -Prioritize tasks- checklist -Use graphic organizers Use online resources for skill building -Provide teacher notes - scaffold Use collaborative grouping strategies such as small groups NJDOE resources - http://www.state.nj.us/education/specialed/	• Provide text-to-speech • Use of translation dictionary or software • Provide graphic organizers • NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm • Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm	• Tiered interventions following RTI framework • Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/ • Interventional Central - http://www.interventioncentral.org/	• Process should be modified: higher order thinking skills, open-ended thinking, discovery • Utilize project-based learning for greater depth of knowledge • Utilize exploratory connections to higher grade concepts • Contents should be modified: real world problems, audiences, deadlines, evaluations, transformations • Learning environments should be modified: student-centered learning, independence, openness, complexity, groups varied • NJDOE resources - http://www.state.nj.us/education/aps/cccs/g_and_t_req.htm

July 2022

Califon Public School
Science Curriculum

Subject: Science	Grade: 6	Unit #: 4	Pacing: 25 days
Unit Title: Forces and Motion			

OVERVIEW OF UNIT:

Students use *system and system models* and *stability and change* to understanding ideas related to why some objects will keep moving and why objects fall to the ground. Students apply Newton's third law of motion to related forces to explain the motion of objects. Students also apply an engineering practice and concept to solve a problem caused when objects collide. The crosscutting concepts of *system and system models* and *stability and change* provide a framework for understanding the disciplinary core ideas. Students demonstrate proficiency in *asking questions*, *planning and carrying out investigations, designing solutions, engaging in argument from evidence*, *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.

Unit References	
Big Ideas	Essential Questions

• For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law).
• Models can be used to represent the motion of objects in colliding systems and their interactions, such as inputs, processes, and outputs, as well as energy and matter flows within systems.
  • The change in an object's motion depends on balanced (Newton's first law) and unbalanced forces in a system Evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object includes qualitative comparisons of forces, mass, and changes in motion (Newton's second law); frame of reference; and specification of units
  • The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change.
	How does a sailboat work?
	
	Who can build the fastest sailboat?

• The greater the mass of the object, the greater the force needed to achieve the same change in motion. • For any given object, a larger force causes a larger change in motion. • Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales.	

Objectives

- Students will be able to synthesize a working sailboat.
- Students will be able to construct and compare the fastest sailboat.

Assessment

Formative Assessment:

- Labs
- Claim-Evidence- Reasoning
- Class Discussions

Summative Assessment:

- Multiple Choice Assessment
- Open Ended Response
- Claim-Evidence- Reasoning

Benchmark:

- Unit Assessments

Alternative:

- Performance Assessments
- Projects
- Models
- Modified Tests Independently Developed by Teacher

Key Vocabulary

July 2022

Newton's Laws of Motion, gravity, acceleration, mass, velocity, friction
Resources & Materials
Stemscopes website & kits • Print and digital copies of textbook • Lab write-ups • SEP simulations • Content videos • PhET Interactive Simulations • Reading articles • Math connections • Pre-assembled Kits

Technology Infusion

Teacher Technology:

- Chromebooks
- Stemscopes website
- SMARTBoard

Student Technology:

- Chromebooks
- Stemscopes website

Activities:

- Students will use Chromebooks to access the Stemscopes website to: activate prior knowledge, build schema, watch videos, complete labs, take assessments and collect data.

Standard	Standard Description
8.1.8.A.1	8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.

Interdisciplinary Integration

Activities:

- Students will be able to create a scientific explanation using evidence and reasoning from observation and informational text to support a scientific claim

- Students will be able to generate numerical data to represent observations and measurements used to write a scientific explanation.

Standard	Standard Description
NJSLSA.W1.	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
4.10.6.B.2	Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

21st Century Life Skills

Activities:

- Students will work in groups to collaborate, at times taking leadership roles to communicate project ideas to the whole class.

Standard	Standard Description
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career

Careers

Activities:

- Students will create scientific explanations to describe observable phenomena in order to communicate findings.

Standard	Standard Description
CRP4	Communicate clearly and effectively and with reason.

ELA Companion Standards

Activities:

- Students will be able to generate numerical data to represent observations and measurements used to write a scientific explanation.

July 2022

Standard	Standard Description
WHST.6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

Standards			
Standard #	Standard Description	Student Learning Objectives	Clarification Statement
MS-PS2-1	Motion and Stability: Forces and Interactions	Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.	Examples of practical problems could include the impact of collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle.] [Assessment Boundary: Assessment is limited to vertical or horizontal interactions in one dimension.]
MS-PS2-2	Motion and Stability: Forces and Interactions	Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	Emphasis is on balanced (Newton's First Law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton's Second Law), frame of reference, and specification of units.] [Assessment Boundary: Assessment is limited to forces and changes in motion in one-dimension in an inertial reference frame and to change in one variable at a time. Assessment does not include the use of trigonometry.]
MS-ETS1-1	Engineering Design	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	N/A
MS-ETS1-2	Engineering Design	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	N/A
MS-ETS1-3	Engineering Design	Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	N/A
MS-ETS1-4	Engineering Design	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.	N/A

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Differentiation			
Special Education	English Language Learners (ELL)	Response to Intervention (RTI)	Enrichment
• Provide modifications & accommodations as listed in the student's IEP • Position student near helping peer or have quick access to teacher • Modify or reduce assignments/tasks • Reduce length of assignment for different mode of delivery • Increase one-to-one time • Prioritize tasks • Use graphic organizers • Use online resources for skill building • Provide teacher notes • Use collaborative grouping strategies such as small groups • NJDOE resources - http://www.state.nj.us/education/specialed/	• Provide text-to-speech • Use of translation dictionary or software • Provide graphic organizers • NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm • Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm	• Tiered interventions following RTI framework • Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/ • Interventional Central - http://www.interventioncentral.org/	• Process should be modified: higher order thinking skills, open-ended thinking, discovery • Utilize project-based learning for greater depth of knowledge • Utilize exploratory connections to higher grade concepts • Contents should be modified: real world problems, audiences, deadlines, evaluations, transformations • Learning environments should be modified: student-centered learning, independence, openness, complexity, groups varied • NJDOE resources - http://www.state.nj.us/education/aps/cccs/g_and_t_req.htm

July 2022

Califon Public School
Science Curriculum

Subject: Science	Grade: 6	Unit #: 5	Pacing: 25 days
Unit Title: Types of Interactions			

OVERVIEW OF UNIT:

Students use *cause and effect*; *system and system models*; and *stability and change* to understand ideas that explain why some materials are attracted to each other while others are not. Students apply ideas about gravitational, electrical, and magnetic forces to explain a variety of phenomena including beginning ideas about why some materials attract each other while others repel. In particular, students develop understandings that gravitational interactions are always attractive but that electrical and magnetic forces can be both attractive and negative. Students also develop ideas that objects can exert forces on each other even though the objects are not in contact, through fields. Students are expected to consider the influence of science, engineering, and technology on society and the natural world. Students are expected to demonstrate proficiency in *asking questions*, *planning and carrying out investigations*, *designing solutions*, and *engaging in argument*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Unit References	
Big Ideas	Essential Questions
• Fields exist between objects that exert forces on each other even though the objects are not in contact. • The interactions of magnets, electrically charged strips of tape, and electrically charged pith balls are examples of fields that exist between objects exerting forces on each other, even though the objects are not in contact. • Forces that act at a distance (electric, magnetic, and gravitational) can be explained by fields that extend through space and can be mapped by their effect on a test object (a charged object or a ball, respectively).	• Can you apply a force on something without touching it? • How does a Maglev train work? • If I were able to eliminate air resistance and dropped a feather and a hammer at the same time, which would land first?

- Cause-and-effect relationships may be used to predict phenomena in natural or designed systems.
- Factors that affect the strength of electrical and magnetic forces
- Devices that use electric and magnetic forces could include electromagnets, electric motors, and generators.
- Electric and magnetic (electromagnetic) forces can be attractive or repulsive.
- The size of an electric or magnetic (electromagnetic) force depends on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects.
- Cause-and-effect relationships may be used to predict the factors that affect the strength of electrical and magnetic forces in natural or designed systems
- Gravitational interactions are always attractive and depend on the masses of interacting objects.
- There is a gravitational force between any two masses, but it is very small except when one or both of the objects have large mass.
- Evidence supporting the claim that gravitational interactions are attractive and depend on the masses of interacting objects could include data generated from simulations or digital tools and charts displaying mass, strength of interaction, distance from the sun and orbital periods of objects within the solar system.

Objectives

- Students will be able to determine the factors that move objects

Assessment

Formative Assessment:

- Labs

- Claim-Evidence- Reasoning
- Class Discussions

Summative Assessment:

- Multiple Choice Assessment
- Open Ended Response
- Claim-Evidence- Reasoning

Benchmark:

- Unit Assessments

Alternative:

- Performance Assessments
- Projects
- Models
- Modified Tests Independently Developed by Teacher

Key Vocabulary

forces, Newton's laws of motion, gravity, interactions, electricity, magnets, electromagnet

Resources & Materials

Stemscopes website & kits

- Print and digital copies of textbook
- Lab write-ups
- SEP simulations
- Content videos
- PhET Interactive Simulations
- Reading articles
- Math connections
- Pre-assembled Kits

Technology Infusion

Teacher Technology:

- Chromebooks

- Stemscopes website
- SMARTBoard

Student Technology:

- Chromebooks
- Stemscopes website

Activities:

- Students will use Chromebooks to access the Stemscopes website to: activate prior knowledge, build schema, watch videos, complete labs, take assessments and collect data.

Standard	Standard Description
8.1.8.A.1	8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.

Interdisciplinary Integration

Activities:

- Students will be able to create a scientific explanation using evidence and reasoning from observation and informational text to support a scientific claim
- Students will be able to generate numerical data to represent observations and measurements used to write a scientific explanation.

Standard	Standard Description
NJSLSA.W1.	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
4.10.6.B.2	Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

21st Century Life Skills

Activities:

- Students will work in groups to collaborate, at times taking leadership roles to communicate project ideas to the whole class.

Standard	Standard Description
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career

Careers

Activities:

- Students will create scientific explanations to describe observable phenomena in order to communicate findings.

Standard	Standard Description
CRP4	Communicate clearly and effectively and with reason.

ELA Companion Standards

Activities:

- Students will be able to create a scientific explanation using evidence and reasoning from observation and informational text to support a scientific claim.

Standard	Standard Description
WHST.6-8.1	Write arguments focused on *discipline-specific content.*

Standards			
Standard #	Standard Description	Student Learning Objectives	Clarification Statement
MS-PS2-3	Motion and Stability: Forces and Interactions	Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.	Examples of devices that use electric and magnetic forces could include electromagnets, electric motors, or generators. Examples of data could include the effect of the number of turns of wire on the strength of an electromagnet, or the effect of increasing the number or strength of magnets on the speed of an electric motor.] [Assessment Boundary: Assessment about questions that require quantitative answers is limited to proportional reasoning and algebraic thinking.]
MS-PS2-4	Motion and Stability: Forces and Interactions	Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the Sun, and orbital periods of objects within the solar system.] [Assessment Boundary: Assessment does not include Newton's Law of Gravitation or Kepler's Laws.]
MS-PS2-5	Motion and Stability: Forces and Interactions	Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.	Examples of this phenomenon could include the interactions of magnets, electrically-charged strips of tape, and electrically-charged pith balls. Examples of investigations could include first-hand experiences or simulations.] [Assessment Boundary: Assessment is limited to electric and magnetic fields and limited to qualitative evidence for the existence of fields.]

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Differentiation			
Special Education	English Language Learners (ELL)	Response to Intervention (RTI)	Enrichment
• Provide modifications & accommodations as listed in the student's IEP • Position student near helping peer or have quick access to teacher • Modify or reduce assignments/tasks • Reduce length of assignment for different mode of delivery • Increase one-to-one time • Prioritize tasks • Use graphic organizers • Use online resources for skill building • Provide teacher notes • Use collaborative grouping strategies such as small groups • NJDOE resources - http://www.state.nj.us/education/specialed/	• Provide text-to-speech • Use of translation dictionary or software • Provide graphic organizers • NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm • Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm	• Tiered interventions following RTI framework • Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/ • Interventional Central - http://www.interventioncentral.org/	• Process should be modified: higher order thinking skills, open-ended thinking, discovery • Utilize project-based learning for greater depth of knowledge • Utilize exploratory connections to higher grade concepts • Contents should be modified: real world problems, audiences, deadlines, evaluations, transformations • Learning environments should be modified: student-centered learning, independence, openness, complexity, groups varied • NJDOE resources - http://www.state.nj.us/education/aps/cccs/g_and_t_req.htm

July 2022

Califon Public School
Science Curriculum

Subject: Science	Grade: 6	Unit #: 6	Pacing: 20 days
Unit Title: Astronomy			

OVERVIEW OF UNIT:

This unit is broken down into three sub-ideas: the universe and its stars, Earth and the solar system, and the history of planet Earth. Students examine the Earth's place in relation to the solar system, the Milky Way galaxy, and the universe. There is a strong emphasis on a systems approach and using models of the solar system to explain the cyclical patterns of eclipses, tides, and seasons. There is also a strong connection to engineering through the instruments and technologies that have allowed us to explore the objects in our solar system and obtain the data that support the theories explaining the formation and evolution of the universe. Students examine geosciences data in order to understand the processes and events in Earth's history.

Unit References	
Big Ideas	Essential Questions
• Patterns in the apparent motion of the sun, moon, and stars in the sky can be observed, described, predicted, and explained with models. • The Earth and solar system model of the solar system can explain eclipses of the sun and the moon. • Earth's spin axis is fixed in direction over the short term but tilted relative to its orbit around the sun. • The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year. • Patterns can be used to identify cause-and-effect relationships that exist in the apparent motion of the sun, moon, and stars in the sky. ◦ Science assumes that objects and events in the solar system systems occur in consistent patterns that are understandable through measurement and observation. • Gravity plays a role in the motions within galaxies and the solar system.	• *What pattern in the Earth–sun–moon system can be used to explain lunar phases, eclipses of the sun and moon, and seasons?* • *What is the role of gravity in the motions within galaxies and the solar system?* • *What are the scale properties of objects in the solar system?*

- Gravity is the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them.
- Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe.
- The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids, that are held in orbit around the sun by its gravitational pull on them.
- The solar system appears to have formed from a disk of dust and gas, drawn together by gravity.
- Models can be used to represent the role of gravity in the motions and interactions within galaxies and the solar system.
    - Science assumes that objects and events in the solar systems occur in consistent patterns that are understandable through measurement and observation.
- Objects in the solar system have scale properties.
- Data from Earth-based instruments, space-based telescopes, and spacecraft can be used to determine similarities and differences among solar system objects.
- The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them.
- • Time, space, and energy phenomena in the solar system can be observed at various scales, using models to study systems that are too large.
    - • Engineering advances have led to important discoveries in space science, and scientific discoveries have led to the development of entire industries and engineered systems.

Objectives

- Students will be able to identify patterns in the Earth-sun-moon system to explain lunar phases, eclipses of the sun and moon, and seasons.
- Students will be able to determine the role of gravity in the motions within galaxies and the solar system.
- Students will be able to synthesize the scale properties of objects in the solar system

Assessment

Formative Assessment:

- Labs
- Claim-Evidence- Reasoning
- Class Discussions

Summative Assessment:

- Multiple Choice Assessment
- Open Ended Response
- Claim-Evidence- Reasoning

Benchmark:

- Unit Assessments

Alternative:

- Performance Assessments
- Projects
- Models
- Modified Tests Independently Developed by Teacher

Key Vocabulary
Solar system, lunar phases, gravity, galaxy, planets
Resources & Materials
Stemscopes website & kits • Print and digital copies of textbook • Lab write-ups • SEP simulations • Content videos • PhET Interactive Simulations • Reading articles • Math connections • Pre-assembled Kits

Technology Infusion

Teacher Technology:

- Chromebooks
- Stemscopes website
- SMARTBoard

Student Technology:

- Chromebooks
- Stemscopes website

Activities:

- Students will use Chromebooks to access the Stemscopes website to: activate prior knowledge, build schema, watch videos, complete labs, take assessments and collect data.

Standard	Standard Description
8.1.8.A.1	8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.

Interdisciplinary Integration

Activities:

- Students will be able to create a scientific explanation using evidence and reasoning from observation and informational text to support a scientific claim
- Students will be able to generate numerical data to represent observations and measurements used to write a scientific explanation.

Standard	Standard Description
NJSLSA.W1.	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
4.10.6.B.2	Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

21st Century Life Skills	
Activities: ● Students will work in groups to collaborate, at times taking leadership roles to communicate project ideas to the whole class.	
Standard	**Standard Description**
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career

Careers	
Activities: ● Students will explain the consequences of human movement and development on the Earth.	
Standard	**Standard Description**
CRP5.	Consider the environmental, social and economic impacts of decisions.

ELA Companion Standards	
Activities: ● Students will explain the consequences of human movement and development on the Earth.	
Standard	**Standard Description**
WHST.6-8.6	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

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Standards			
Standard #	Standard Description	Student Learning Objectives	Clarification Statement
MS-ESS1-1	Earth's Place in the Universe	Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.	Examples of models can be physical, graphical, or conceptual.
MS-ESS1-2	Earth's Place in the Universe	Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.	Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical (such as the analogy of distance along a football field or computer visualizations of elliptical orbits) or conceptual (such as mathematical proportions relative to the size of familiar objects such as students' school or state).] [Assessment Boundary: Assessment does not include Kepler's Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth.]
MS-ESS1-3	Earth's Place in the Universe	Analyze and interpret data to determine scale properties of objects in the solar system.	Emphasis is on the analysis of data from Earth-based instruments, spacebased telescopes, and spacecraft to determine similarities and differences among solar system objects. Examples of scale properties include the sizes of an object's layers (such as crust and atmosphere), surface features (such as volcanoes), and orbital radius. Examples of data include statistical information, drawings and photographs, and models.] [Assessment Boundary: Assessment does not include recalling facts about properties of the planets and other solar system bodies.]

July 2022

Differentiation			
Special Education	English Language Learners (ELL)	Response to Intervention (RTI)	Enrichment
• Provide modifications & accommodations as listed in the student's IEP • Position student near helping peer or have quick access to teacher • Modify or reduce assignments/tasks • Reduce length of assignment for different mode of delivery • Increase one-to-one time • Prioritize tasks • Use graphic organizers • Use online resources for skill building • Provide teacher notes • Use collaborative grouping strategies such as small groups • NJDOE resources - http://www.state.nj.us/education/specialed/	• Provide text-to-speech • Use of translation dictionary or software • Provide graphic organizers • NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm • Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm	• Tiered interventions following RTI framework • Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/ • Interventional Central - http://www.interventioncentral.org/	• Process should be modified: higher order thinking skills, open-ended thinking, discovery • Utilize project-based learning for greater depth of knowledge • Utilize exploratory connections to higher grade concepts • Contents should be modified: real world problems, audiences, deadlines, evaluations, transformations • Learning environments should be modified: student-centered learning, independence, openness, complexity, groups varied • NJDOE resources - http://www.state.nj.us/education/aps/cccs/g_and_t_req.htm

July 2022

Califon Public School
Science Curriculum

Subject: Science	Grade: 6	Unit #: 7	Pacing: 20 days
Unit Title: Weather and Climate			

OVERVIEW OF UNIT:

What factors interact and influence weather and climate?

This unit is broken down into three sub-ideas: Earth's large-scale systems interactions, the roles of water in Earth's surface processes, and weather and climate. Students make sense of how Earth's geosystems operate by modeling the flow of energy and cycling of matter within and among different systems. A systems approach is also important here, examining the feedbacks between systems as energy from the Sun is transferred between systems and circulates though the ocean and atmosphere.

Unit References	
Big Ideas	Essential Questions
• Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. • Global movements of water and its changes in form are propelled by sunlight and gravity. • The cycling of water through Earth's systems is driven by energy from the sun and the force of gravity. • Within Earth's systems, the transfer of energy drives the motion and/or cycling of water. • The motions and complex interactions of air masses result in changes in weather conditions. • The complex patterns of the changes in and movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns.	• *What are the processes involved in the cycling of water through Earth's systems?* • *What is the relationship between the complex interactions of air masses and changes in weather conditions?* • *What are the major factors that determine regional climates?*

● Examples of data that can be used to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions include weather maps, diagrams, and visualizations; other examples can be obtained through laboratory experiments. ● Air masses flow from regions of high pressure to regions of low pressure, causing weather (defined by temperature, pressure, humidity, precipitation, and wind) at a fixed location to change over time. ● Because patterns of the changes and the movement of water in the atmosphere are so complex, weather can only be predicted probabilistically. ● Sudden changes in weather can result when different air masses collide. ● Weather can be predicted within probabilistic ranges. ● Cause-and effect-relationships may be used to predict changes in weather. ● Unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. ● Patterns of atmospheric and oceanic circulation that determine regional climates vary by latitude, altitude, and geographic land distribution. ● Atmospheric circulation that, in part, determines regional climates is the result of sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds. ● Ocean circulation that, in part, determines regional climates is the result of the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. ● Models that can be used to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates can be diagrams, maps and globes, or digital representations.	

Objectives

- Students will be able to identify the processes involved in the cycling of water through Earth's systems?
- Students will be able to construct relationships between the complex interactions of air masses and changes in weather conditions?
- Students will be able to determine the major factors of regional climates.

Assessment

Formative Assessment:

- Labs
- Claim-Evidence- Reasoning
- Class Discussions

Summative Assessment:

- Multiple Choice Assessment
- Open Ended Response
- Claim-Evidence- Reasoning

Benchmark:

- Unit Assessments

Alternative:

- Performance Assessments
- Projects
- Models
- Modified Tests Independently Developed by Teacher

Key Vocabulary
Weather, climate. Air masses
Resources & Materials
Stemscopes website & kits • Print and digital copies of textbook • Lab write-ups • SEP simulations • Content videos • PhET Interactive Simulations • Reading articles • Math connections • Pre-assembled Kits

Technology Infusion
Teacher Technology: • Chromebooks

- Stemscopes website
- SMARTBoard

Student Technology:

- Chromebooks
- Stemscopes website

Activities:

- Students will use Chromebooks to access the Stemscopes website to: activate prior knowledge, build schema, watch videos, complete labs, take assessments and collect data.

Standard	Standard Description
8.1.8.A.1	8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.

Interdisciplinary Integration

Activities:

- Students will be able to create a scientific explanation using evidence and reasoning from observation and informational text to support a scientific claim
- Students will be able to generate numerical data to represent observations and measurements used to write a scientific explanation.

Standard	Standard Description
NJSLSA.W1.	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
4.10.6.B.2	Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

21st Century Life Skills

Activities:

- Students will work in groups to collaborate, at times taking leadership roles to communicate project ideas to the whole class.

Standard	Standard Description
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career

Careers

Activities:

- Students will create scientific explanations to describe observable phenomena in order to communicate findings.

Standard	Standard Description
CRP4	Communicate clearly and effectively and with reason.

ELA Companion Standards

Activities:

- Students will be able to create a scientific explanation using evidence and reasoning from observation and informational text to support a scientific claim

Standard	Standard Description
WHST.6-8.9	Draw evidence from informational texts to support analysis, reflection, and research.

Standards			
Standard #	Standard Description	Student Learning Objectives	Clarification Statement
MS-ESS2-4	Earth's Systems	Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.	Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.] [Assessment Boundary: A quantitative understanding of the latent heats of vaporization and fusion is not assessed.]
MS-ESS2-5	Earth's Systems	Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.	Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather (defined by temperature, pressure, humidity, precipitation, and wind) at a fixed location to change over time, and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within probabilistic ranges. Examples of data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through laboratory experiments (such as with condensation).] [Assessment Boundary: Assessment does not include recalling the names of cloud types or weather symbols used on weather maps or the reported diagrams from weather stations.]
MS-ESS2-6	Earth's Systems	Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.] [Assessment Boundary:

			Assessment does not include the dynamics of the Coriolis effect.]

July 2022

Differentiation			
Special Education	English Language Learners (ELL)	Response to Intervention (RTI)	Enrichment
• Provide modifications & accommodations as listed in the student's IEP • Position student near helping peer or have quick access to teacher • Modify or reduce assignments/tasks • Reduce length of assignment for different mode of delivery • Increase one-to-one time • Prioritize tasks • Use graphic organizers • Use online resources for skill building • Provide teacher notes • Use collaborative grouping strategies such as small groups • NJDOE resources - http://www.state.nj.us/education/specialed/	• Provide text-to-speech • Use of translation dictionary or software • Provide graphic organizers • NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm • Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm	• Tiered interventions following RTI framework • Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/ • Interventional Central - http://www.interventioncentral.org/	• Process should be modified: higher order thinking skills, open-ended thinking, discovery • Utilize project-based learning for greater depth of knowledge • Utilize exploratory connections to higher grade concepts • Contents should be modified: real world problems, audiences, deadlines, evaluations, transformations • Learning environments should be modified: student-centered learning, independence, openness, complexity, groups varied • NJDOE resources - http://www.state.nj.us/education/aps/cccs/g_and_t_req.htm