Grade 6: Integrated Science

Unit 1: Overview
Unit 1: Ecology
Grade: 6
Content Area: Life Science
Pacing: 10 weeks
Essential Question
What can the introduction of a new species do to an ecosystem?
Student Learning Objectives (Performance Expectations)
MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
Unit Summary
Students will study the distribution and abundance of organisms, the interaction among organisms, and the interactions between organisms and their abiotic environment. Students will study and understand the inner workings of natural ecosystems and the species they contain. Students will be expected to play a major role in generating solutions to problems of applied interest, such as the use of predatory insects as agent of biological control, the dynamics of disease in human and other populations, the preservation of biodiversity and other current topics in Ecology.
Core Instructional Materials
Lab Aids: " Ecology " https://portals.lab-aids.com/mylibrary.htm
Supplemental Materials
NEWSELA: https://newsela.com/read/robots-battle-invasive-species/id/30082/ https://newsela.com/text-sets/75578 READWORKS: "Ecology Change Paired Text" (940L & 970L 4th & 6th gr) "The Ecosystem of the Forest" (5th gr 980L) READING A-Z: NSTA : https://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=10 Science News: https://www.sciencenewsforstudents.org Study Island: Physical Science Topics - NF Titles: Venn Diagram - compare and contrast the similarities and differences - Desert vs. Forests Marine vs. Terra
Formative Assessment Measures

SUBJECT: SCIENCE/Grade 6

Cliffside Park Public Schools

GRADE: 6

BOE APPROVAL: August 2018

Part A: How do changes in the availability of matter and energy affect populations in an ecosystem?

Students who understand the concepts are able to:

Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

Use cause-and-effect relationships to predict the effect of resource availability on organisms and populations in natural systems.

Part B: How do relationships among organisms, in an ecosystem, affect populations?

Summative Assessments

Ecology Unit Test
Group Project: studying numbers- native vs introduced over time

Benchmarks

Exotic Species Article Based Test - Students will be able to read scientific text and use text content to answer questions about the exotic species, introduction species, native species, disruption to systems

Culminating Lab: investigating introduced species
https://ngss.nsta.org/Resource.aspx?ResourceID=160

Common Core ELA/ Literacy:	.Common Core Mathematical Standards
RST.6-8.1 RST.6-8.3 RST.6-8.7 RST.6-8.8 WHST.6-8.1 WHST.6-8.9 SL.8.4 SL.8.5	• 6.EE.C.9 • 6.SP.B.5 • 6.RP.A.1 • 6.RP.A.3 Math Practices: MP.2

Core Instructional Materials	Can include: Textbooks Series, Lab Materials, etc.
21st Century Life and Careers	CRP 2, CRP 4, CRP 5, CRP 6, CRP 8 ,CRP 11,CRP 12
Technology Standards	8.1.8.A.1, 8.1.8.A.2, 8.1.8.D.5, 8.1.8.E.1, 8.2.8.A.2, 8.2.8.D.1

Modifications

Modifications to Support Our English Language Learners	Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)	Modifications to Support Our Gifted and Talented
"Ecology" - Spanish Edition Leveled Articles: Personal Vocabulary Log Intra-act Discussion Web	Word walls Visual aides Graphic organizers for graphing Measurement - change of populations due to various factors	Curriculum compacting Personal Vocabulary Log Discussion Web on weather trends

Scaffolding Sentence/paragraph frames Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aids: introduced Animal, native animals displaced Modeling- decline of native animals due to various factors Cognates	Personal Vocabulary Log Multimedia- illustrating the food web- disruption to food webs Leveled readers - leveled articles (newsela) Testing Accommodations: Assistive technology, Notes/summaries, Extended time, Answer masking, Answer eliminator, Highlighter, Color contrast	Challenge assignments- how to manage our resources and minimize ecological disruption. Enrichment activities - Investigating local exotic species Tiered activities Independent research/inquiry - introducing species for economic reasons Collaborative teamwork: Debate (assisting native species) Higher level questioning Critical/Analytical thinking tasks Self-directed activities- introduced species native habitat.

5E Model	
Ecology Unit	
Engage Anticipatory Set	**Talking it Over** - The Miracle Fish- This activity introduces students to the concept of ecology, the study of organisms and their interactions with other organisms and the environment through a reading about the introduction of Nile Perch into Lake Victoria in Africa. Students consider how this change to the biological component of the ecosystem has affected populations of other species of fish. After obtaining empirical evidence about past changes in the ecosystem, students construct arguments to predict what will happen in the future. Students then examine trade-offs and decide whether humans should have introduced Nile perch into Lake Victoria—a decision that is informed but not prescribed by science. This activity provides an opportunity to assess student work related to the crosscutting concept of connections to nature of science: Science addresses questions about the natural and material world, but while scientific knowledge can describe the consequences of actions, it does not necessarily prescribe the decisions that society takes.
Exploration Student Inquiry	**Conduct a project** - Introduced Species - Students obtain information about a number of introduced species and use their growing knowledge and understanding about ecology to investigate the effects of one of these introduced species on an ecosystem. When communicating the results of their investigation, they explain how this species interacts with other species in the ecosystem,and how this introduced species effects (or could affect) the flow of energy in the ecosystem. **Investigation** - Data Transects - Students engage in the practice of analyzing and interpreting data to look for patterns among living and nonliving components in ecosystems, they hypothesize what might be causing those patterns. They **explore** how ecologist use the transect

	method to collect ecological data, which gives them an opportunity to become familiar with the nature of science concepts that scientific disciplines share common rules of obtaining and evaluating empirical evidence. Students also **explore** the core idea of populations of organisms being dependent on their environmental interactions both with other living things and with nonliving factors. **Field Study -** Taking a Look Outside - Students explore patterns and relationships in their local environment by planning and carrying out an investigation using the transect method learned in the previous activity. Students must decide how to organize their data to allow them to look for patterns among biotic and abiotic. **Laboratory -** Coughing Up Clues - Students investigate and collect data on an owl's diet to determine the owl's place and role in a food web. They construct a simple model of a food web to begin understanding how matter and energy move in, through, and out of an ecosystem. In subsequent activities, students continue to develop their model. **Laboratory -** Population Growth - Students plan and carry out an investigation to determine the effects of resource availability on population growth in Paramecium. They collect, analyze, interpret data to provide evidence that greater food availability results in greater population growth. **Investigation** - Interactions in Ecosystems - Students explore and explain the types of interactions among biotic and abiotic components in ecosystems. They consider the causes and effects of these interactions and learn that these types of interactions occur as patterns across all to assess student work related to Performance Expectation MS-LS2-2 **Laboratory -** Cycling of Matter - Students carry out an investigation on decomposers to explore how matter cycles in an ecosystem. They add to their understanding how the biotic abiotic components of an ecosystem interact. They revise and expand their food web models, which already capture how energy flows through an ecosystem, to explain how matter cycles from the abiotic components, and back to the abiotic components. **Investigation -** Abiotic Impacts on Ecosystems - Students explore how abiotic changes in the environment can impact ecosystems. They explain how these abiotic disruptions affect the flow of energy and cycling of matter in ecosystems. These disruptions can lead to cycles of stability and change over time and at different scales. Students are assessed on the their abilities to construct an explanation for why a top predator is last organism to arrives in a disrupted ecosystem. **Investigation** - Effects of an Introduced Species - Students use computers to analyze a large data set on the effects of the zebra mussel on the Hudson River ecosystem. They analyze and interpret data to argue how the introduction of the zebra mussel affected populations of other organisms well as the abiotic environment. Students are assessed on how well they use empirical evidence to construct an argument for how a change to biological component of an ecosystem affects other populations.

Explanation Concepts and Practices	**Investigation-** Ups and Downs- Students analyze data on population size to detect patterns over periods of time, and discover that there can be periods of relative stability and periods of small and large changes in population size. They consider what might cause changes in population size, including both biotic and abiotic changes in the environment. **Modeling-** Modeling the Introduction of a New Species- Students develop a model for an ecosystem and then introduce a new species to explain how this new component in the system affects flow of energy and cycling of matter throughout the ecosystem.
Elaboration Extension Activity	**Reading-** Eating for Matter and Energy- Students deepen their understanding of food webs and the roles that different kinds of organisms play in an ecosystem. Students continue revising their owl food webs to model the flow of energy and to explain how disruptions to the ecosystem affect the food web. They also incorporate their initial understandings of the cycling of matter into their models. Student groups then create models to account for the fact that only 10% of the energy remains in an ecosystem from on level of the food web to the next. **Talking it Over-** Too Many Mussels- Students explore potential solutions to the invasive zebra mussel problem. Students engage in the design process by developing initial criteria and constraints by which to evaluate solutions. After reading about several actual solutions, they revise their criteria and constraints, and then arguer for their best solution(s) to maintain the natural ecosystem. The activity provides an opportunity to assess student work related to Performance Expectation MS- LS2-5.
Evaluation Assessment Tasks	**Investigation -** Abiotic Impacts on Ecosystems- Students are assessed on the their abilities to construct an explanation for why a top predator is last organism to arrives in a disrupted ecosystem. **Investigation** - Effects of an Introduced Species Students are assessed on how well they use empirical evidence to construct an argument for how a change to biological component of an ecosystem affects other populations. **Project-** Presenting the Facts- Students explore how abiotic changes in the environment can impact ecosystems. They explain how these abiotic disruptions affect the flow of energy and cycling of matter in ecosystems. These disruptions can lead to cycles of stability and change over time and at different scales. Students are assessed on their abilities to construct an explanation for why a top predator is the last organism to arrive in a disrupted ecosystem.

Cliffside Park Public Schools

Unit 2: Overview
Unit 2: Weather and Atmosphere
Grade: 6
Content Area: Earth and Space Science
Pacing: 10 weeks
Essential Question
What factors interact and influence weather and atmosphere?
Student Learning Objectives (Performance Expectations)
MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.
MS-ESS2-6. 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.
Core Instructional Materials
Lab Aids: "Weather and Atmosphere" https://portals.lab-aids.com/mylibrary.htm
Supplemental Materials
NEWSELA: READWORKS: READING A-Z: NSTA : https://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=10 Science News: https://www.sciencenewsforstudents.org Study Island: Physical Science Topics - NF Titles:: NSTA: https://ngss.nsta.org/Classroom-Resources.aspx
Unit Summary
Relationships between weather and climate are explored as students take on the STEM roles of a climatologist, hydrologist, meteorologist, or atmospheric scientist. The factors that cause weather and climate, including energy from the sun, the water cycle, and global ocean currents are experienced and explored. Students consider the present composition of the Earth's atmosphere and how it has changed over time. They also explore a possible connection between changing weather patterns in an urban area with increasing population growth.
Technical Terms
Atmosphere, stratosphere, air pressure, troposphere, mesosphere, thermosphere, radiation, thermal conduction, convection, global warming, wind, Coriolis effect, Polar Easterlies, water cycle, clouds, global patterns.
Formative Assessment Measures
Part A: What are the processes involved in the cycling of water through Earth's systems?
Students who understand the concepts are able to:

Students simulate traveling with water molecules through the water cycle. After first choosing a starting point in the water cycle, students role a numbered cube to determine where the water will go next. After making at least six stops, students write a story that describes traveling with their water.
https://www.weather.gov/jetstream/ll_whatacycle

Part B: What is the relationship between the complex interactions of air masses and changes in weather conditions?

Students who understand the concepts are able to:
Students will design and conduct a survey to learn about the history of weather disasters in the local area, then compare the level of risk indicated by risk maps to local weather history.

Part C: What are the major factors that determine regional climates?

Students who understand the concepts are able to:
Students learn how oceans affect climates by participating in a role-play that discusses the history of the identification of the gulf stream and how modern technology is used to gather ocean data.

Summative Assessments

Weather and Atmosphere Unit Test
Group Project: Weather of a location for a week. Compare and contrast with a difference location.

Alternative Assessments

Lab Aids Adaptive Tests:

Benchmarks

ReadWorks Article Based Test - Students will be able to read scientific text and use text content to answer questions about weather and climate, how change of weather and climate is gradual and instantaneous based on conditions.

Culminating Lab: interpreting weather/ climate charts
https://ngss.nsta.org/Resource.aspx?ResourceID=160

Interdisciplinary Connections

NJSLS- ELA	NJSLS- Mathematics
Common Core ELA Standards: RST.6-8.1 RST.6-8.7 WHST.6-8.1 WHST.6-8.2 WHST.6-8.7 SL.8.5	Common Core Mathematics Standards: 6.NS.C.5 6.RP.A.1 7.RP.A.2 Mathematics Practices: MP.2 MP.4

Core Instructional Materials	Can include: Textbooks Series, Lab Materials, etc.
21st Century Life and Careers	Speaker from Suez water: CRP2, CRP4, CRP5, CRP 6, CRP 7, CRP8 ,CRP11,CRP12
Technology Standards	8.1.8.A.1, 8.1.8.A.2, 8.1.8.D.2, 8.1.8.D.4, 8.1.8.D.5

Modifications

Modifications to Support Our English Language Learners	Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)	Modifications to Support Our Gifted and Talented
"Weather and Atmosphere" - Spanish Edition Leveled Articles: Personal Vocabulary Log Intra-act Discussion Web Scaffolding Sentence/paragraph frames Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aids: Weather types; phenomena Modeling- weather fronts Cognates	Word walls Visual aides Graphic organizers for graphing Measurement Conversion Charts for Temperature Personal Vocabulary Log Multimedia- illustrating the water cycle Leveled readers - newsela based leveled reading Testing Accommodations: Assistive technology, Notes/summaries, Extended time, Answer masking, Answer eliminator, Highlighter, Color contrast	Curriculum compacting Personal Vocabulary Log Discussion Web on weather trends Challenge assignments- NOAA Weather Radio Enrichment activities - Investigating local weather trends Tiered activities Independent research/inquiry - Vanishing Islands Collaborative teamwork: Debate (Global Warming) Higher level questioning Critical/Analytical thinking tasks Self-directed activities- Interview family members on experienced major weather phenomena

5E MODEL	
Weather and Climate	
Engage Anticipatory Set	**Talking it Over-** Weather Effects- A fictional story focuses on how weather affects people's plans and activities. Students are introduced to four kinds of careers related to the science of weather. They then examine maps that show the relative level of risk of different weather disasters. **Reading-** The Causes of Climate- Students read about more factors affecting climate, including the sun's energy. A literacy strategy helps students comprehend the ideas presented in the text. **Reading-** Changing States of Water- Students are introduced to the different forms of water and how they change from one to another. Teacher model in changes in states of water, including demonstrations of evaporation and condensation. The class discusses the relationship between the changing states of water and the water cycle. **Reading-** Atmosphere and Climate- Students read about the relationship between earth's atmosphere and its weather and climate. A literacy strategy helps them comprehend the ideas presented in the text.

Exploration Student Inquiry	**Computer Investigation** : Investigating Local Weather - Students record and analyze five days of daily weather data. They then record and graph local monthly weather averages. They compare daily weather conditions to the monthly weather data. **Problem Solving :** Weather and Climate - Students examine a climate map along with photos and descriptions of different climates. They identify their climate as well as the climate for three different regions based on the climate graphs. **Laboratory:** Heating Earth Surfaces - Students design an experiment to measure how the sun's energy heats land and water, as well as how quickly both of those substances cool. An Anticipation Guide reinforces the idea that differences in heating and cooling of land and water are important factors in determining climate. **Laboratory:** Water as a Solvent - Students compare the solubility of solids in three different solvents. The concept of water as the universal solvent is introduced, which helps students grasp the idea that most of the water on earth contains dissolved salts. **Laboratory:** Investigating Groundwater - Students investigate the ability of water to filter through gravel and sand. The concept of groundwater is introduced. **Laboratory:** Investigating Air - Students explore the nature of air by making on air pressure and on the interaction of air and a chemical indicator. This gives them direct evidence that, although air can be invisible in their everyday experience, it is made up of gases that have distinct properties. **Investigation:** History of Earth's Atmosphere - Students place in chronological order eight cards describing the history of earth's atmosphere. With these cards they examine the relative amounts of carbon dioxide and oxygen gases at different times in earth's history, and the role of living organisms in determining the composition of the atmosphere. **Laboratory:** Measuring Wind Speed and Direction - Students are introduced to the Beaufort wind scale and its development. They work in groups to design, build and test instruments for measuring wind speed and direction. After improving their instruments, they use them to collect wind data.
Explanation Concepts and Practices	**Modeling-** Traveling on the Water Cycle- Students simulate traveling with water molecules through the water cycle. After first choosing a starting point in the water cycle, students role a numbered cube to determine where the water will go next. After making at least six stops, students write a story that describes traveling with their water.
Elaboration Extension Activity	**Problem Solving-** The Earth's Surface- Students use a gridded world map to estimate the amounts of Earth's surface covered by water and land. As a class, they calculate the mean, median, and mode of their estimates to help determine an "accepted value" for the class. **Problem Solving-** Ocean Temperatures- Students investigate the range of mean ocean surface temperatures around the globe. They map and discuss patterns of surface temperatures in particular regions of the oceans. The members of each small group then merge their findings and summarize global patterns.

	Computer Simulation- Earth's Atmosphere- Students use a computer simulation to sample air composition, temperature, and pressure at different altitudes above Earth's surface. They take three sample within each atmospheric layer and calculate the average values. They then compare the properties of the different atmospheric layers. **Computer Simulation-** Worldwide Wind- Students use a computer simulation to identify the most common wind direction in a particular location. They share the data with their class and construct a map of global wind patterns. **Talking it Over-** People and Weather- Students analyze reports from a hydrologist, climatologist, atmospheric scientist, and meteorologist about the fictional town of Sunbeam City. They consider what role people play in affecting a region's weather and atmosphere.
Evaluation Assessment Tasks	**Project:** Local Weather History - Students design and conduct a survey to learn about the history of weather disasters in the local area, and then compare the level of risk indicated by risk maps to local weather history. **Role Play:** Oceans and Climate - Students learn more about how oceans affect climate. They participate in a role-play that discusses the history of the identification of the Gulf Stream and how modern technology is used to gather ocean data. **Modeling:** Traveling on the Water Cycle - Students simulate traveling with water molecules through the water cycle. After first choosing a starting point in the water cycle, students roll a number cube to determine where the water will go next. After making at least six stops, students write a story that describes traveling with their water. **Investigation:** Forecasting Weather - Students work together to interpret a weather map and construct a weather report. Each group then presents a weather report to the class. Students use this information to forecast the next day's weather.

Unit 3: Overview
Unit 3: Force and Motion
Grade: 6
Content Area: Physical Science
Pacing: 10 weeks
Essential Question
How can we reduce the risks of motor vehicle accidents?
Core Instructional Material:
- Lab Aids; "Force and Motion" - https://portals.lab-aids.com/mylibrary.htm
Supplemental Material:
NEWSELA: READWORKS: READING A-Z: NSTA : https://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=10 Science News: https://www.sciencenewsforstudents.org Study Island: Physical Science Topics - NF Titles: PearsonRealize.com https://www.pearsonrealize.com/index.html#/
Student Learning Objectives (Performance Expectations)
MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
MS-ETS1-1. 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.
MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
MS-ETS1-3. 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.
MS-PS2-2. 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.
MS-ETS1-4. 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.
MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.
Unit Summary

Relationships between weather and climate are explored as students take on the STEM roles of a climatologist, hydrologist, meteorologist, or atmospheric scientist. The factors that cause weather and climate, including energy from the sun, the water cycle, and global ocean currents are experienced and explored. Students consider the present composition of the Earth's atmosphere and how it has changed over time. They also explore a possible connection between changing weather patterns in an urban area with increasing population growth.

Technical Terms

Newton's Laws of Motion, friction, force, potential energy, kinetic energy, gravity, transfer, incline/decline, balanced/unbalanced forces, net force, momentum, velocity, weight, inertia, mass, acceleration, speed, distance, reference point, resistance force, air resistance

Formative Assessment Measures

Part A: Write a letter to the head of the United States Senate Committee for Highway Safety, explaining your position on whether cars should be required by law to be alike.

Students who understand the concepts are able to:

Students can use evidence to support their position and describe at least one trade-off of their decision on whether cars should be alike.

Part B: Investigate, analyze data, problem solve and draw a conclusion.

Students who understand the concepts are able to:

Students will design and carry out investigations to discover the effect of mass on the severity of accidents. Students will analyze data and draw conclusions on the relationship between force, mass acceleration and how these affect car safety.

Summative Assessment Measures

- Scoring rubric
- Analysis questions
- Student lab reports

Alternative Assessments

- Lab Aids- Adaptive tests

Benchmarks

- Force and motion Article Based Test - Students will be able to read scientific text and use text content to answer questions about the Forces and objects in motion, constant and varying.
- Culminating Lab: interpreting force graphs, crash data and speed as it relates to force.
- https://ngss.nsta.org/Resource.aspx?ResourceID=160

Interdisciplinary Connections

NJSLS- ELA	NJSLS- Mathematics
Common Core ELA Standards: RST.6-8.1	Common Core Mathematics Standards: 6.RP.A.1

RST.6-8.3 RST.6-8.7 RST.6-8.9 WHST.6-8.1 WHST.6-8.9 SL.6.1 SL.8.5	6.RP.A.2 6.RP.A.3 6.SP.B.4 6.SP.B.5 6.NS.C.5 6.EE.A.2 7.RP.A.2 7.EE.B.3 Mathematical Practices: MP.2 MP.4
Core Instructional Materials	Can include: Textbooks Series, Lab Materials, etc.
21st Century Life and Careers	CRP2, CRP4, CRP5, CRP 6, CRP7, CRP8 ,CRP11,CRP12
Technology Standards	8.1.8.A.1, 8.1.8.A.2, 8.1.8.D.4, 8.1.8.E.1, 8.2.8.D.1,

Modifications

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"Force and Motion" - Spanish Edition Leveled Articles: Personal Vocabulary Log Intra-act Discussion Web Scaffolding Sentence/paragraph frames Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aids:Force karts Modeling- collisions Cognates	Word walls Visual aides Graphic organizers for graphing Measurement speed and object movement Personal Vocabulary Log Multimedia- illustrating forces on objects in motion Leveled readers - Newsela based articles Testing Accommodations: Assistive technology, Notes/summaries, Extended time, Answer masking, Answer eliminator, Highlighter, Color contrast	Curriculum compacting Personal Vocabulary Log Discussion Web seat belts and collisions Challenge assignments- designing safer cars Enrichment activities - Investigating elevators, rockets and planes Tiered activities Independent research/inquiry -planet movement Collaborative teamwork: weight on different planets due to gravitational force Higher level questioning Critical/Analytical thinking tasks Self-directed activities-investigate friction

SUBJECT: SCIENCE/Grade 6

BOE APPROVAL: August 2018

Cliffside Park Public Schools

GRADE: 6

5E Model	
Forces and Motion Unit	
Engage Anticipatory Set	**Talking it Over :** Choosing a Safe Vehicle - Students compare the specifications of two vehicles in order to choose the one they feel is safe. **Reading:** Laws of Motion - Students read about Newton's discoveries of the fundamental relationships between forces, including Newton's three laws and friction. **Reading:** Decelerating Safety - Students learn about vehicle safety features that decelerate the body more slowly than it would ordinarily experience in an accident.
Exploration Student Inquiry	**Laboratory:** Measuring Speed - Students use a cart, ramp, and track to calculate speed from distance and time measurements. Then students design an investigation that examines the effect of height of the ramp on the speed of the cart. **Laboratory:** Speed and Collision - To investigate the effect of vehicles speed on the severity of accidents, students use the ramp and cart to simulate vehicle collisions at different speeds. **Laboratory:** Mass and Collision - Students design and carry out investigations to discover the effect of mass on the severity of accidents. **Laboratory:** The Net Force Challenge - Students use force meters to investigate the effect of more than one force on a block. **Laboratory:** Braking Distance - To simulate the effect of speed on braking distance, students measure the distance that carts travel after encountering a high friction surface. **Investigation:** Fatal Accidents - Students investigate types of car accidents and fatality rates by analyzing actual accident data.
Explanation Concepts and Practices	**Investigation-** Crash Testing- Students design and present the specifications for a crash test dummy. They weigh the advantages and disadvantages of using different sized dummies. **Modeling-** Investigating Center of Mass- Students compare the stability of carts with different center of masses as they collide with a stationary barrier. **Investigation-** Interpreting Motion Graphs- Students construct and interpret distance vs. time graphs by matching a narrative to graph segments.
Elaboration Extension Activity	**Problem Solving-** Force, Acceleration, and Mass- Students analyze data and investigate the relationship between force, acceleration, and mass.

	Laboratory- Inertia around a Curve- Students first observe a marble moving around a circular track and then predict the path taken by the marble once a section of the track is removed.
Evaluation Assessment Tasks	**Role Play-** Safety for All- Students recommend a solution to the problem of increased injuries and damage related to vehicle incompatibility during collisions. **Project-**Write a letter to the head of the United States Senate Committee for Highway Safety, explaining your position on whether cars should be required by law to be alike. Students can use evidence to support their position and describe at least one trade-off of their decision.

Cliffside Park Public Schools

Unit 4: Overview
Unit 4: Astronomy: The Earth in Space
Grade: 6
Content Area: Earth and Space Science
Pacing: 10 Weeks
Student Learning Objectives (Performance Expectations)
MS-ESS1-1. 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.
MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system.
Essential Question
Would a different type of calendar be better? If so, why? How is the calendar based on the phases of the moon and the relationship of the solar and lunar cycles?
Core Instructional Materials
Lab Aids: "Astronomy: The Earth in Space" https://portals.lab-aids.com/mylibrary.htm
Supplemental Materials
NEWSELA: READWORKS: READING A-Z: NSTA : https://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=10 Science News: https://www.sciencenewsforstudents.org Study Island: Physical Science Topics - NF Titles:: NSTA: https://ngss.nsta.org/Classroom-Resources.aspx
Unit Summary
Relationships between weather and climate are explored as students take on the STEM roles of a climatologist, hydrologist, meteorologist, or atmospheric scientist. The factors that cause weather and climate, including energy from the sun, the water cycle, and global ocean currents are experienced and explored. Students consider the present composition of the Earth's atmosphere and how it has changed over time. They also explore a possible connection between changing weather patterns in an urban area with increasing population growth.
Technical Terms
Solar system, Earth, moon, moon phases, seasons, axial tilt, solar, lunar, gravity, solstice
Formative Assessment Measures
Part A: What pattern in the Earth–sun–moon system can be used to explain lunar phases, eclipses of the sun and moon, and seasons?
Students who understand the concepts are able to: Students will develop and use a physical, graphical, or conceptual model to describe patterns in the apparent motion of the sun, moon, and stars in the sky.

Part B: Based on your decision, would you recommend the world switch to a proposed international calendar or continue with the calendars already in use?
Students who understand the concepts are able to: Students will write an essay expressing their recommendation on the type of calendar which would best suit life on Earth.
Summative Assessments
Astronomy:The Earth in Space : Unit Test **Group Project: Weather of a location for a week. Compare and contrast with a difference location.**
Alternative Assessments
Lab Aids Adaptive Tests:
Benchmarks
- Earth and Space science Article Based Test - Students will be able to read scientific text and use text content to answer questions about the solar system, phases of the moon and seasons due to motion in the solar system - Culminating Lab: Planets in motion. - https://ngss.nsta.org/Resource.aspx?ResourceID=160
Interdisciplinary Connections

NJSLS- ELA	**NJSLS- Mathematics**
Common Core ELA Standards: RST.6-8.7 RST.6-8.9 WHST.6-8.2 WHST.6-8.9 SL.8.5	Common Core Mathematical Standards: 6.RP.A.1 6.MS.C.5 7.RP.A.2 Mathematical Practices: MP.2 MP.4

Core Instructional Materials	Can include: Textbooks Series, Lab Materials, etc.
21st Century Life and Careers	CRP2, CRP4, CRP5, CRP 6, CRP7, CRP8 ,CRP11,CRP12
Technology Standards	8.1.8.A.1, 8.1.8.A.3, 8.1.8.A.4, 8.1.8.D.4, 8.1.8.D.5

Modifications

Modifications to Support Our English Language Learners	**Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)**	**Modifications to Support Our Gifted and Talented**
"Astronomy: The Earth in Space" - Spanish Edition Leveled Articles: Personal Vocabulary Log Intra-act Discussion Web Scaffolding Sentence/paragraph frames Bilingual dictionaries/translation	Word walls Visual aides Graphic organizers for graphing Measurement distances of objects in space Personal Vocabulary Log Multimedia- illustrating movement of planets and moons Leveled readers - newsela based articles Testing Accommodations: Assistive technology, Notes/summaries,	Curriculum compacting Personal Vocabulary Log Discussion EXoplanets Challenge assignments-asteroid mining is it worth it Enrichment activities - the international space station Tiered activities Independent research/inquiry - Mars colony

Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aids: planets; solar system models Modeling- building the solar system Cognates	Extended time, Answer masking, Answer eliminator, Highlighter, Color contrast	Collaborative teamwork:reviewing the history of the space race Higher level questioning Critical/Analytical thinking tasks Self-directed activities- satellites and putting objects in orbit

5E Model	
Astronomy: The Earth in Space Unit	
Engage Anticipatory Set	**Talking it Over:** Sunlight and Shadows - Students read about and propose explanations for the changing positions of the shadow from a tree over a day. They also critique a fictional student's notebook. **Reading:** As Earth Rotates- Students complete a reading about Earth's rotation, day-night cycle, and time. **Reading:** The Earth on the Move - Students read about Earth's tilt and its effects on the light hitting Earth and on seasons.
Exploration Student Inquiry	**Investigation:** Measuring Shadows , Measuring Time - Students design an investigation to observe changing shadows during the day. As an extension, they observe the shadows over several weeks. **Investigation:** Sunlight and Seasons - Students graph data on the length of daylight and highest angle of the Sun for the 21st of each month and correlate changes in the Sun's position and day length with the seasons. **Modeling:** Explaining the Seasons - Students explore the effects of direct and indirect sunlight on the solar energy striking Earth's surface. They learn that the directness of the Sun's rays is one of two factors that result in hotter summers. **Field Study:** The Predictable Moon - Students predict the phase of the Moon based on the lunar cycle. **Modeling:** Phases of the Moon - Students investigate physical models of the phases of the Moon. **Investigation:** Tides and the Moon - Students analyze the relationship between the Moon's phase and the occurrence of extreme tides.
Explanation Concepts and Practices	**Modeling:** A Day on Earth- Students propose an explanation for night and day and view a model of Earth's rotation. **Computer Simulation:** A Year Seen From Space- Student's use observations of Earth's position relative to the SUn over a year to develop an explanation of the basis for Earth's year and seasons.

Elaboration Extension Activity	**Computer Simulation:** Moon Phase Simulator- Students investigate a computer simulation of the Moon's phases and connect it to the previous activities.
Evaluation Assessment Tasks	**Talking it Over:** Marking Time- Students decide on the best calendar for different locations based on each community's needs in relation to the solar year and lunar cycle. **Investigation:** Planets in Motion- Students model and present the day length, year length, seasons, and tides of eight fictional planets.

Resources:
NSTA
Model Curriculum
Lab Aids