MOORESTOWN TOWNSHIP PUBLIC SCHOOLS
MOORESTOWN, NEW JERSEY

Moorestown Upper Elementary School
Science Department

Grade 6 Science

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Prepared by: Nikki Schollins
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Updated by: Nikki Schollins
Supervisor: Gavin Quinn

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Course Description and Fundamental Concepts

Sixth grade science classes explore four areas of study.

Space and Technology: An area where students will see the cause and effect of the Earth, Sun, and Moon rotation and revolution. They will also explore Earth's place in the Universe.

Earth Science: an area of science where students will explore and interpret data based on the geologic and biological events which created an evolution and diversity of organisms throughout Earth's history. Students also explore geographical events such as volcanic eruptions and earthquakes which have occurred from the earliest times in Earth's history as well as currently, in modern day.

Physical Science: Students will facilitate ways of energy transfer and understand that energy is not lost or destroyed, just changed.

Life Science: Students will develop an understanding of how all living and nonliving organisms work together to create ecosystems.

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New Jersey Student Learning Standards (NJSLS)

Subject/Content Standards
Include grade appropriate subject/content standards that will be addressed

Standard #	Standard Description
MS-PS3-2	Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
MS-PS3-3	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
MS-PS4-1	Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave
MS-PS4-2	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
MS-PS4-3	Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.
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.
MS-LS4-1	Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
MS-LS4-2	Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
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-ESS1-4	Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
MS-ESS2-1	Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
MS-ESS2-2	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

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MS-ESS2-3	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
MS-ESS3-1	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
MS-ESS3-2	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects
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-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.

English Companion Standards

List grade-level appropriate companion standards for History, Social Studies, Science and Technical Subjects (CTE/Arts) 6-12. English Companion Standards are required in these subject/content areas.

Unit Addressed	Standard #	Standard Description
#1, 2, 3, 4, 5	RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions
#1, 2, 3, 4, 5	RST.6.8-2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
#1, 2, 3, 4, 5	RST.6.8-3	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

Career Awareness, Exploration, Preparation, and Training (Standard 9.2)

List appropriate units below for which standards will be addressed

By Grade 8		
Unit Addressed	**Core Idea**	**Standard / Description**

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#1, 2, 5	An individual's strengths, lifestyle goals, choices, and interests affect employment and income	***9.2.8.CAP.1****: Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest.* ***9.2.8.CAP.2****: Develop a plan that includes information about career areas of interest.* ***9.2.8.CAP.3****: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.* ***9.2.8.CAP.4****: Explain how an individual's online behavior (e.g., social networking, photo exchanges, video postings) may impact opportunities for employment or advancement.*
# 2, 3, 4,	Developing and implementing an action plan is an essential step for achieving one's personal and professional goals.	***9.2.8.CAP.5****: Develop a personal plan with the assistance of an adult mentor that includes information about career areas of interest, goals and an educational plan.*
# 2, 3, 4, 5	Early planning can provide more options to pay for postsecondary training and employment.	***9.2.8.CAP.6****: Compare the costs of postsecondary education with the potential increase in income from a career of choice.* ***9.2.8.CAP.7****: Devise a strategy to minimize costs of postsecondary education.* ***9.2.8.CAP.8****: Compare education and training requirements, income potential, and primary duties of at least two jobs of interest.* ***9.2.8.CAP.9****: Analyze how a variety of activities related to career preparation (e.g., volunteering, apprenticeships, structured learning experiences, dual enrollment, job search, scholarships) impacts postsecondary options.*
# 1, 2, 3	There are a variety of resources available to help navigate the career planning process.	***9.2.8.CAP.10****: Evaluate how careers have evolved regionally, nationally, and globally.* ***9.2.8.CAP.11****: Analyze potential career opportunities by considering different types of resources, including occupation databases, and state and national labor market statistics.* ***9.2.8.CAP.12****: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.*

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# 2, 3, 4,	Employee benefits can influence your employment choices.	***9.2.8.CAP.13****: Compare employee benefits when evaluating employment interests and explain the possible impact on personal finances.* ***9.2.8.CAP.14****: Evaluate sources of income and alternative resources to accurately compare employment options.*
# 1, 2, 3,	Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income	***9.2.8.CAP.15****: Present how the demand for certain skills, the job market, and credentials can determine an individual's earning power.* ***9.2.8.CAP.16****: Research different ways workers/ employees improve their earning power through education and the acquisition of new knowledge and skills.* ***9.2.8.CAP.17****: Prepare a sample resume and cover letter as part of an application process.* ***9.2.8.CAP.18****: Explain how personal behavior, appearance, attitudes, and other choices may impact the job application process.* ***9.2.8.CAP.19****: Relate academic achievement, as represented by high school diplomas, college degrees, and industry credentials, to employability and to potential level*
	There are resources to help an individual create a business plan to start or expand a business.	***9.2.8.CAP.20****: Identify the items to consider when estimating the cost of funding a business.*

Life Literacies and Key Skills (Standard 9.4)
List appropriate units below for which standards will be addressed

By Grade 8		
Unit Addressed	**Core Idea**	**Standard / Description**
1, 2, 3	**Creativity and Innovation**: Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.	***9.4.8.CI.1****: Assess data gathered on varying perspectives on causes of climate change (e.g., cross cultural, gender-specific, generational), and determine how the data can best be used to design multiple potential solutions (e.g., RI.7.9, 6.SP.B.5, 7.1.NH.IPERS.6, 8.2.8.ETW.4).* ***9.4.8.CI.2****: Repurpose an existing resource in an innovative way (e.g., 8.2.8.NT.3).*

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		9.4.8.CI.3*: Examine challenges that may exist in the adoption of new ideas (e.g., 2.1.8.SSH, 6.1.8.CivicsPD.2).* ***9.4.8.CI.4****: Explore the role of creativity and innovation in career pathways and industries*
1, 2, 5	**Critical Thinking and Problem-solving:** Multiple solutions often exist to solve a problem.	***9.4.8.CT.1****: Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).* ***9.4.8.CT.2****: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1).*
1, 2, 5	**Critical Thinking and Problem-solving:** An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.	***9.4.8.CT.3:*** *Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome.*
1, 2.	**Digital Citizenship:** Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work.	***9.4.8.DC.1****: Analyze the resource citations in online materials for proper use.* ***9.4.8.DC.2****: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).*
1, 2. 4	**Digital Citizenship:** There are tradeoffs between allowing information to be public and keeping information private and secure.	***9.4.8.DC.3****: Describe tradeoffs between allowing information to be public (e.g., within online games) versus keeping information private and secure.*
1, 2. 4	**Digital Citizenship:** Digital footprints are publicly accessible, even if only shared with a select group. Appropriate measures such as proper interactions can protect online reputations.	***9.4.8.DC.4****: Explain how information shared digitally is public and can be searched, copied, and potentially seen by public audiences.* ***9.4.8.DC.5****: Manage digital identity and practice positive online behavior to avoid inappropriate forms of self-disclosure.* ***9.4.8.DC.6****: Analyze online information to distinguish whether it is helpful or harmful to reputation.*

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1, 2. 3. 4. 5	**Digital Citizenship:** Digital communities are used by individuals to share information, organize, and engage around issues and topics of interest.	***9.4.8.DC.7****: Collaborate within a digital community to create a digital artifact using strategies such as crowdsourcing or digital surveys.*
2. 5	**Digital Citizenship:** Digital technology and data can be leveraged by communities to address effects of climate change.	***9.4.8.DC.8****: Explain how communities use data and technology to develop measures to respond to effects of climate change (e.g., smart cities).*
2. 3. 5	**Global and Cultural Awareness:** Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.	***9.4.8.GCA.1:*** *Model how to navigate cultural differences with sensitivity and respect (e.g., 1.5.8.C1a).* ***9.4.8.GCA.2:*** *Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.*
1, 2. 3. 4. 5	**Information and Media Literacy:** Increases in the quantity of information available through electronic means have heightened the need to check sources for possible distortion, exaggeration, or misrepresentation.	***9.4.8.IML.1****: Critically curate multiple resources to assess the credibility of sources when searching for information.* ***9.4.8.IML.2****: Identify specific examples of distortion, exaggeration, or misrepresentation of information.*
1, 2. 3. 4. 5	**Information and Media Literacy:** Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.	***9.4.8.IML.3****: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b).* ***9.4.8.IML.4****: Ask insightful questions to organize different types of data and create meaningful visualizations.* ***9.4.8.IML.5****: Analyze and interpret local or public data sets to summarize and effectively communicate the data.*
2. 3. 4.	**Information and Media Literacy:** The mode of information can convey a message to consumers or an audience.	***9.4.8.IML.6:*** *Identify subtle and overt messages based on the method of communication.*

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1, 2. 3. 5	**Information and Media Literacy:** Sources of information are evaluated for accuracy and relevance when considering the use of information.	***9.4.8.IML.7****: Use information from a variety of sources, contexts, disciplines, and cultures for a specific purpose (e.g., 1.2.8.C2a, 1.4.8.CR2a, 2.1.8.CHSS/IV.8.AI.1, W.5.8, 6.1.8.GeoSV.3.a, 6.1.8.CivicsDP.4.b, 7.1.NH. IPRET.8).* ***9.4.8.IML.8****: Apply deliberate and thoughtful search strategies to access high-quality information on climate change (e.g., 1.1.8.C1b).*
1, 2.	**Information and Media Literacy:** There are ethical and unethical uses of information and media.	***9.4.8.IML.9:*** *Distinguish between ethical and unethical uses of information and media (e.g., 1.5.8.CR3b, 8.2.8.EC.2).* ***9.4.8.IML.10:*** *Examine the consequences of the uses of media (e.g., RI.8.7).* ***9.4.8.IML.11:*** *Predict the personal and community impact of online and social media activities*
1, 2.	**Information and Media Literacy:** There is a need to produce and publish media that has information supported with quality evidence and is intended for authentic audiences.	***9.4.8.IML.12:*** *Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.* ***9.4.8.IML.13:*** *Identify the impact of the creator on the content, production, and delivery of information (e.g., 8.2.8.ED.1).* ***9.4.8.IML.14:*** *Analyze the role of media in delivering cultural, political, and other societal messages.* ***9.4.8.IML.15:*** *Explain ways that individuals may experience the same media message differently.*
1, 2. 3. 4. 5	**Technology Literacy:** Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.	***9.4.8.TL.1****: Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making.* ***9.4.8.TL.2****: Gather data and digitally represent information to communicate a real-world problem (e.g., MS-ESS3-4, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).* ***9.4.8.TL.3****: Select appropriate tools to organize and present information digitally.* ***9.4.8.TL.4****: Synthesize and publish information about a local or global issue or event (e.g., MSLS4-5, 6.1.8.CivicsPI.3).*
2. 3	**Technology Literacy:** Digital tools allow for remote collaboration and rapid sharing of ideas unrestricted by geographic location or time.	***9.4.8.TL.5****: Compare the process and effectiveness of synchronous collaboration and asynchronous collaboration.*

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		***9.4.8.TL.6**: Collaborate to develop and publish work that provides perspectives on a real-world problem.*

Interdisciplinary Connections (2020 NJSLS)
List any other content standards addressed as well as appropriate units. All arts integration connections may be listed within this chart.

Visual & Performing Arts Integration (Standard 1)
List appropriate units below for which standards (1.1 through 1.5) may be addressed

Unit Addressed	Artistic Process	Anchor Standard
1, 2, 3, 4, 5	**Creating**	*Anchor Standard 1: Generating and conceptualizing ideas.* *Anchor Standard 2: Organizing and developing ideas.* *Anchor Standard 3: Refining and completing products.*
1, 2, 3, 4, 5	**Connecting**	*Anchor Standard 10: Synthesizing and relating knowledge and personal experiences to create products.* *Anchor Standard 11: Relating artistic ideas and works within societal, cultural, and historical contexts to deepen understanding.*
1, 2, 3, 4, 5	**Performing/ Presenting/ Producing**	*Anchor Standard 4: Selecting, analyzing, and interpreting work.* *Anchor Standard 5: Developing and refining techniques and models or steps needed to create products.* *Anchor Standard 6: Conveying meaning through art.*
1, 2, 3, 4, 5	**Responding**	*Anchor Standard 7: Perceiving and analyzing products.* *Anchor Standard 8: Applying criteria to evaluate products.* *Anchor Standard 9: Interpreting intent and meaning.*

Unit Addressed	Content / Standard #	Standard Description
2, 3, 5	Math / MP-4	Model with mathematics.
2 & 4	Math / 7.RP.A.2	Recognize and represent proportional relationships between quantities.

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5	Math / 6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
2	Math / MP.2	Reason abstractly and quantitatively.

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Pacing Guide (All Dates are approximate based on the school calendar)

Unit/ Topic	Month (w/Approx number of Teaching Days)
Introduction to grade 6 Science Discover Earth's History	September (~19 days)
Earth's Place In Space	October (~19 days)
Earth's Place In Space & Earth Science	November (~16 days)
Earth Science	December (~15 days)
Earth Science	January (~18 days)
Energy (Physical Science)	February (~18 days)
Energy (Physical Science)	March (~15-20 days)
Energy (Physical Science)	April (~15-20 days)
Ecosystems (Life Science)	May (~18 days)
Ecosystems (Life Science)	June (~15 days)

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Units Scope and Sequence

Unit 1: Exploring the World and Uncovering Earth's History Through Science and Engineering.

Learning Goals: What do I want my students to learn?

Standards

NJSLS -

MS-LS4-1

Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

MS-LS4-2

Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

MS-ESS1-4

Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

MS-ESS2-2

Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

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-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.

NJSLS - Career Awareness, Exploration, Preparation, and Training

NJSLS - Life Literacies and Key Skills

NJSLS - Interdisciplinary Standards

Fundamental Concepts / Big Ideas

- Science is a way of organizing and describing the natural world.
- How do people figure out that Earth and life on Earth have changed over time?

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Learning Objectives
Students will be able to… ● Understand Lab Safety ● Use Claim Evidence and Reasoning to explain phenomenon and answer questions ● Construct and interpret a geologic timeline based on evidence from rock strata to organize Earth's 4.6 billion year old history.

Unit 2

Unit 2: Earth's Place in Space

Learning Goals: What do I want my students to learn?

Standards

NJSLS -

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-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-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.
NJSLS - Career Awareness, Exploration, Preparation, and Training
NJSLS - Life Literacies and Key Skills
NJSLS - Interdisciplinary Standards

Fundamental Concepts / Big Ideas

- What is Earth's place in the universe?
- What makes up our solar system?
- How can the revolution and rotation of the Earth, Sun and moon system explain day and night, seasons and eclipses?

Learning Objectives

Students will be able to…
- Understand Earth's place in our universe
- Explain that because our sun is our star and the center of our universe we are able to have life.

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- Identify the cyclic patterns of the moon phases.
- Develop and use a model to describe the eclipses of the sun and moon.
- Explain how the Earth's tilt is responsible for the different seasons.
- Demonstrate how the Earth's orbit causes day and night.
- Understand that the sun is one of the many stars in the universe and part of the Earth, Sun, Moon system.

Unit 3

Unit 3: Earth Science

Learning Goals: What do I want my students to learn?

Standards

NJSLS -

MS-LS4-1

Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

MS-LS4-2

Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

MS-ESS2-1

Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

MS-ESS2-2

Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

MS-ESS2-3

Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

MS-ESS3-1

Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

MS-ESS3-2

Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects

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

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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-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.

NJSLS - Career Awareness, Exploration, Preparation, and Training
NJSLS - Life Literacies and Key Skills
NJSLS - Interdisciplinary Standards

Fundamental Concepts / Big Ideas

- How do rocks and minerals affect me?
- Where do crystals come from?
- How are volcanoes created and why do they erupt?
- Can we predict an earthquake?

Learning Objectives

Students will be able to…

- Explain what crystals, rocks, and minerals are and the differences between them.
- Understand that they made up our Earth
- Discover the 3 different types of rocks.
- Analyze patterns in the fossil record to construct explanations between similarities and differences between modern organisms and fossil organisms to infer evolutionary relationships
- Analyze data representing fossils and rocks, continental drift which provides evidence of past plate motions.
- Analyze how the uneven distributions of Earth's mineral, energy and groundwater resources are the results of past and current geoscience processes.
- Analyze data from tests to determine similarities and differences among crystal formations to determine what best meets the criteria for success.
- Interpret data on natural hazards to forecast future catastrophic events linked to development of technologies.
- Develop a volcanic model based on data representing Earth's catastrophic events.
- Implement engineering strategies to build a building/tower structure following specific guidelines and use of materials.

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Unit 4

Unit 4: Energy

Learning Goals: What do I want my students to learn?

Standards

NJSLS -
MS-PS3-2
Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
MS-PS3-3
Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
MS-PS4-1
Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave
MS-PS4-2
Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
MS-PS4-3
Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.
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-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.
NJSLS - Career Awareness, Exploration, Preparation, and Training
NJSLS - Life Literacies and Key Skills
NJSLS - Interdisciplinary Standards

Fundamental Concepts / Big Ideas

- What is energy?
- What types of energy are there?
- What are the 3 types of therma energy and how are they used?
- How does energy move?
- Where does light come from?

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Learning Objectives
Students will be able to… • Discover that energy exists in many forms. • Develop a model to describe different amounts of potential energy due to the arrangement of objects interacting at various differences. • Understand that thermal energy is made up of potential and kinetic energy • Heat can be transferred through thermal energy • Develop and use a model to describe that waves are reflected, absorbed, refracted, or transmitted through various materials. • Use mathematical representations to describe a simple model for waves that include how the amplitude of a wave is related to the energy in a wave

Unit 5

Unit Name: Ecosystems

Learning Goals: What do I want my students to learn?

Standards

NJSLS -
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.
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

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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-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.

NJSLS - Career Awareness, Exploration, Preparation, and Training
NJSLS - Life Literacies and Key Skills
NJSLS - Interdisciplinary Standards

Fundamental Concepts / Big Ideas

- How do living and nonliving things affect each other?
- What adaptations allow living things to survive?

Learning Objectives

Students will be able to…

- Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- Recognize that abiotic and biotic factors shape the communities within an ecosystem,
- Evaluate how each organism is adapted to survive in its environment due to interactions, such as competition, predatory and symbiotic relationships.

Please contact the Content Supervisor for any questions.

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