Science Enrichment 7

Unit Title: **Astronomy**

Stage 1: Desired Results

Standards & Indicators:

NJSLS for Science

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.

MS-PS2-4 Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

MS-PS2-5 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.

Science and Engineering Practices (SEP)

- **Engaging in Argument from Evidence** Engaging in argument from evidence in 6–8 builds from grades K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world. Construct and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-PS2-4)
- **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories. Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (MS-LS1-5), (MS-LS1-6) (MS-ESS1-4)
- **Developing and Using Models** Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. Develop and use a model to describe phenomena. (MS-ESS1- 1), (MS-ESS1-2)
- **Analyzing and Interpreting Data-** Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. Analyze and interpret data to determine similarities and differences in findings. (MS-ESS1-3)

Disciplinary Core Ideas (DCI)

- Gravitational forces are always attractive. 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—e.g., Earth and the sun. (MS-PS2-4)

- 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). (MS-PS2-5)

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- 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. (MS-ESS1-2), (MS-ESS1-3)

- This 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. (MS-ESS1-1)

- The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. (MS-ESS1-2)

Crosscutting Concepts (CCC)

- **Cause and Effect** - Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS2-3), (MS-PS2-5)

- **Scientific Knowledge is Based on Empirical Evidence** -Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS2-2), (MS-PS2-4)(MS-LS1-6)

- **Scale, Proportion, and Quantity-** Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (MS-ESS1-3), (MS-ESS1-4)

- **Interdependence of Science, Engineering, and Technology** -Engineering advances have led to important discoveries in virtually every field of science and scientific discoveries have led to the development of entire industries and engineered systems. (MS-ESS1-3)

- **Scientific Knowledge Assumes an Order and Consistency in Natural Systems -** Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-ESS1-1), (MS-ESS1-2)

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
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).	Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
9.4.8.CI.4	Explore the role of creativity and innovation in career pathways and industries.	
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).	Multiple solutions often exist to solve a problem.
9.4.8.DC.1	Analyze the resource citations in online materials for proper use.	Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own

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9.4.8.DC.2	Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).	work.
9.4.8.DC.7	Collaborate within a digital community to create a digital artifact using strategies such as crowdsourcing or digital surveys.	Digital communities are used by individuals to share information, organize, and engage around issues and topics of interest.
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).	Digital technology and data can be leveraged by communities to address effects of climate change.
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).	Sources of information are evaluated for accuracy and relevance when considering the use of information.
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).	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.3	Select appropriate tools to organize and present information digitally.	

Central Idea/Enduring Understanding:

- Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models.
- 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.

Essential/Guiding Question:

- How is the universe structured?
- What properties of the solar system and its objects help explain why Earth is habitable for life?
- What objects are in the solar system?
- How does Earth compare with other objects in the solar system?
- Why do the solar system and its objects move like they do?
- Can you apply a force on something without touching it?
- How does gravity influence the shape and the motion of objects in the solar system?

Content:

iScience course 1, Chapter 2:

- Lesson 1: The Sun-Earth-Moon System
- Lesson 2: The Solar System
- Lesson 3: Stars, Galaxies, and the Universe

Science Explorer: Astronomy

- Chapter 1: Earth, Moon, and Sun
- Chapter 2: Exploring Space
- Chapter 3: The Solar System
- Chapter 4 : Stars, Galaxies, and the Universe

Skills(Objectives):

- Describe the big bang theory
- Explain astronomers predictions about the future of the universe
- Analyze mathematical equations to predict the amount of life outside of our atmosphere
- Design the characteristics of the inner planets
- Describe the characteristics of the outer planets
- Design, test, and refine a prototype to land on another planet
- Identify how stars are classified
- Explain the factors used to determined how long a star will exist
- Analyze the life cycle of stars
- Describe the major types of galaxies

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	• Explain how astronomers determine the scale of the universe

Interdisciplinary Connections:

ELA/Literacy -NJSLS
RST.6-8.1-Cite specific textual evidence to support analysis of science and technical texts.
RST.6-8.7-Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
RST.6-8.9-Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
WHST.6-8.2-Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
WHST.6-8.9-Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.
SL.8.4-Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.

Mathematics -NJSLS
MP.2-Reason abstractly and quantitatively.
7.EE.3-Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
6.RP.A.3-Use ratio and rate reasoning to solve real-world and mathematical problems.
6.SP.B.5-Summarize numerical data sets in relation to their context

Stage 2: Assessment Evidence

Performance Task(s):
Big Bang Balloon:
Students will model the inflation of the early universe using a balloon to scale growing distances between early forming galaxies.
Big Bang Balloon

Gravity and Orbits:
Students will identify the variables that affect the strength of gravity and predict how motion would change if gravity was stronger or weaker.
https://phet.colorado.edu/en/simulations/gravity-and-orbits

Life Cycle of a Star:
Students will create a visual representation of a star's life cycle.
https://elementalscience.com/blogs/science-activities/119870275-the-life-cycle-of-a-star-poster

Egg-cellent Landing:

Other Evidence:
Do Nows
Classwork
Interactive Notebook
Class discussions
Closure activities (ex. exit tickets, kahoots, KWL charts)
Personal digital responses (Kahoot, Quizizz, Quizlet, etc.)
Homework
On-the-fly assessment
Graphic Organizers
Scientific inquiry analysis
Common Formative Assessments
Summative Unit Assessments

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Design and build a Mars lander within a predetermined materials budget to help reinforce a real-world design scenario. Students will be introduced to the concept of terminal velocity. https://www.teachengineering.org/activities/view/cub_mars_lesson05_activity1	

Stage 3: Learning Plan

Learning Opportunities/Strategies:

- Astronomy vs. Astrology
- Big Bang Theory
- Create a geocentric and heliocentric model out of clay
- Inner Planets Graphic Organizer
- Outer Planets Graphic Organizer
- "To go to Mars or not" debate
- Mars Activities
- "Facebook page" for star
- Star Luminosity Glow Stick activity
- Your Galactic Address Project

Teaching Scientific Practices

- Guide students through appropriate laboratory techniques (safety, accuracy, frequency, data collection, etc.)
- Students will utilize the engineering and design process to ask questions, plan and carry out investigations, refine models, design solutions, construct explanations, and design solutions.

Literacies

- Use reading strategies to read non-fiction text (preview, question, reflect, highlight, recite, review, utilize text structure, etc.)
- Digital tools - utilize features available on ebooks such as highlighting, bookmarking, linking to more information, etc.
- Digital literacy - Find and evaluate digital sources. Communicate clearly using digital platforms

Questioning - Present guiding leveled questions to students. See differentiation section for specific questions.

Formative assessment response modalities

- Teacher/student question discussion
- Thumbs up/thumbs down
- Rate yourself on understanding on a fist to five scale
- Google Forms

Resources:

- McGraw Hill Integrated iScience Course 1
- Science Explorer: Astronomy
- Get Ready to Read
- Launch Labs
- Content Vocabulary
- MiniLabs
- Content Practice worksheets
- Math Skills
- Enrichment
- Challenge
- Lesson Quizzes
- Kessler Science
- Labs
- Key Concept Builder activities
- Chapter Tests
- Online quiz
- Online Standardized Test Practice
- YouTube videos
- BrainPop videos
- Flocabulary
- Newsela
- Readworks.org
- Scholastic Science World magazine
- NGSS Phenomena: https://www.ngssphenomena.com
- Edulastic
- IXL

LGBT and Disabilities Resources:

- LGBTQ-Inclusive Lesson & Resources by Garden State Equality and Make it Better for Youth
- LGBTQ+ Books

DEI Resources:

- Learning for Justice
- GLSEN Educator Resources
- Supporting LGBTQIA Youth Resource List
- Respect Ability: Fighting Stigmas, Advancing Opportunities
- NJDOE Diversity, Equity & Inclusion Educational Resources
- Diversity Calendar

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- Digital polling devices (Kahoot, Quizizz, etc.) - Exit tickets/responses - Whiteboards Learning Strategies - Think, Pair, Share - Direct instruction - Jigsaw - Cooperative groups - Discussion in class and discussion boards - Socratic Seminar Learning Management - Google Classroom - share information with students, post assignments, collect feedback - Google Docs & Google Slides - creation and presentation tools	

Differentiation

*Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	**On Grade Level Students**	**Struggling Students**	**Special Needs/ELL**
Page Keeley Science Probes Interactive Science notebooks - higher level of Costa's questions created Scaffolded guiding questions - above level Less structure provided for assignments/assessments Heterogeneous grouping Research independently or collaboratively with minimal teacher guidance Laboratory investigations designed and carried out by students	Interactive Science notebooks Scaffolded guiding questions - on level Provide challenging tasks with support to allow students to experience success Moderate amount of scaffold on assignments Heterogeneous grouping Laboratory investigations designed by students with teacher assistance and carried out by students	Interactive Science notebooks - templates provided by teacher Scaffolded guiding questions - below level Break down assignments into smaller tasks Structured, predictable classroom Graphic organizers/Study guides provided Copy of class notes/presentation provided to student Utilize student's best personal learning modality (auditory, visual, kinesthetic)	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

		Heterogeneous grouping Laboratory investigations provided by teacher for students to carry out	

Unit Title: Geology and Weather

Stage 1: Desired Results

Standards & Indicators:

NJSLS for Science

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-ESS2-1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

MS-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.

MS-ESS3-5 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

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.

Science and Engineering Practices (SEP)

- **Constructing Explanations and Designing Solutions-** Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories. Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (MS-ESS2-2)

- **Planning and Carrying Out Investigations-** Planning and carrying out investigations in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions. Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions. (MS-ESS2-5)

- **Analyzing and Interpreting Data** Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. Analyze and interpret data to determine similarities and differences in findings. (MS-ESS3-2)

Disciplinary Core Ideas (DCI)

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- The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. (MS-ESS2-2)
- All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (MS-ESS2-1)
- The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. (MS-ESS2-5)
- Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2)
- Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding human behavior and on applying that knowledge wisely in decisions and activities. (MS-ESS3-5)

Crosscutting Concepts (CCC)

- **Cause and Effect** - Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS2-5)
- **Patterns -** Graphs, charts, and images can be used to identify patterns in data. (MS-ESS3-2)
- **Influence of Science, Engineering, and Technology on Society and the Natural World-**The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus, technology use varies from region to region and over time. (MS-ESS3-2)
- **Stability and Change-** Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale. (MS-ESS2-1)
- **Scale, Proportion, and Quantity-** Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (MS-ESS2-2)

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
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).	Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
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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	Multiple solutions often exist to solve a problem.

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	to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).	
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9.4.8.TL.3	Select appropriate tools to organize and present information digitally.	

Central Idea/Enduring Understanding:

- Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart.
- Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns.
- Because these patterns are so complex, weather can only be predicted probabilistically.
- Mapping the history of natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihood of future events.
- Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human

Essential/Guiding Question:

- What is the composition and structure of the atmosphere?
- What is the composition and structure of the geosphere?
- What is the theory of plate tectonics?
- What are the differences between divergent, convergent, and transform plate boundaries?
- What causes tectonic plates to move on Earth's surface?
- Where do most earthquakes and volcanoes occur?
- 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?
- How can we predict and prepare for natural disasters?

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vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities.	
Content: iScience course 1, Chapter 3: - Lesson 1: Earth Systems - Lesson 2: Interactions With Earth Systems iScience course 1, Chapter 4: - Lesson 1: Earth's Moving Surface - Lesson 2: Shaping Earth's Surface - Lesson 3: Changing Earth's Surface Science Explorer: Inside Earth - Chapter 1: Plate Tectonics - Chapter 2: Earthquakes - Chapter 3: Volcanoes Science Explorer: Weather and Climate - Chapter 1: The Atmosphere - Chapter 2: Weather Factors - Chapter 3: Weather Patterns - Chapter 4: Climate and Climate Change	**Skills(Objectives):** ● Explain how geological events, such as earthquakes, volcanic eruptions, and mountain building, result from the motion of plates. ● Describe how sea floor spreading, revealed in mapping of the Mid-Atlantic Ridge, and subduction zones are evidence for the theory of plate tectonics. ● Identify latitude and longitude as reference lines that help locate points on Earth's surface. ● Explain how maps and globes represent Earth's surface. ● Describe the conditions of Earth's atmosphere and state how the atmosphere is important to all living things. ● Identify where major global wind belts are located. ● Explain how clouds form and name the three types of clouds. ● Global patterns of atmospheric movement influence local weather. ● Describe the main kinds of storms, and how they form. ● Identify the factors that influence temperature and precipitation. ● Develop a storm safe structure. ● Investigate a local or global environmental issue by addressing the underlying scientific causes and develop possible solutions.
Interdisciplinary Connections: ***ELA/Literacy -NJSLS*** RST.6-8.1-Cite specific textual evidence to support analysis of science and technical texts. RST.6-8.7-Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). RST.6-8.9-Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. WHST.6-8.2-Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. WHST.6-8.9-Draw evidence from literary or informational texts to support analysis, reflection, and research. SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. SL.8.4-Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. ***Mathematics -NJSLS*** MP.2-Reason abstractly and quantitatively.	

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6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
6.EE.B.6 Use variables to represent numbers and write expressions when solving real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
7.EE.B.4 Use variables to represent a real-world mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Stage 2: Assessment Evidence

Performance Task(s):

Earthquake Proof Structure:
Students will design an earthquake resistant structure.
Earthquake Proof Building STEM Project

Barometer:
Students will learn how a barometer works to measure the Earth's air pressure by building a model using simple materials.
Build a Barometer

Tracking a Hurricane:
Students will plot and track a hurricane path.
Hurricane Tracking Activity

Tornado in a Jar:
Students will create their own tornado in a jar.
Tornado in a Jar Project

The Enhanced Fujita Scale:
Students will learn about tornadoes and the damage they cause, and how to rate them.
Tornado Damage

Other Evidence:

Do Nows
Classwork
Interactive Notebook
Class discussions
Closure activities (ex. exit tickets, kahoots, KWL charts)
Personal digital responses (Kahoot, Quizizz, Quizlet, etc.)
Homework
On-the-fly assessment
Graphic Organizers
Scientific inquiry analysis
Common Formative Assessments
Summative Unit Assessments

Stage 3: Learning Plan

Learning Opportunities/Strategies:

- Create a topographic map out of clay and "dissect"
- Volcano Brochure "Vacation Destination"
- Anatomy of a Volcano
- Hurricane One-Pager
- December Tornadoes in Kentucky
- Debate regarding a current environmental issue

Teaching Scientific Practices

Resources:

- McGraw Hill Integrated iScience Course 1
- Get Ready to Read
- Launch Labs
- Content Vocabulary
- MiniLabs
- Content Practice worksheets
- Math Skills
- Enrichment
- Challenge
- Lesson Quizzes

Science Enrichment 7

- Guide students through appropriate laboratory techniques (safety, accuracy, frequency, data collection, etc.)
- Students will utilize the engineering and design process to ask questions, plan and carry out investigations, refine models, design solutions, construct explanations, and design solutions.

Literacies
- Use reading strategies to read non-fiction text (preview, question, reflect, highlight, recite, review, utilize text structure, etc.)
- Digital tools - utilize features available on ebooks such as highlighting, bookmarking, linking to more information, etc.
- Digital literacy - Find and evaluate digital sources. Communicate clearly using digital platforms

Questioning - Present guiding leveled questions to students. See differentiation section for specific questions.

Formative assessment response modalities
- Teacher/student question discussion
- Thumbs up/thumbs down
- Rate yourself on understanding on a fist to five scale
- Google Forms
- Digital polling devices (Kahoot, Quizizz, etc.)
- Exit tickets/responses
- Whiteboards

Learning Strategies
- Think, Pair, Share
- Direct instruction
- Jigsaw
- Cooperative groups
- Discussion in class and discussion boards
- Socratic Seminar

Learning Management
- Google Classroom - share information with students, post assignments, collect feedback
- Google Docs & Google Slides - creation and presentation tools

- Kessler Science
- Labs
- Key Concept Builder activities
- Chapter Tests
- Online quiz
- Online Standardized Test Practice
- YouTube videos
- BrainPop videos
- Flocabulary
- Newsela
- Readworks.org
- Scholastic Science World magazine
- Edulastic
- IXL
- NGSS Phenomena: https://www.ngssphenomena.com

Plate Tectonics: An Introduction
https://whyy.pbslearningmedia.org/resource/ess05.sci.ess.earthsys.plateintro/plate-tectonics-an-introduction/

Volcanism

Earthquakes and Volcanoes Interactive
https://whyy.pbslearningmedia.org/resource/buac17-68-sci-ess-quakevolint/earthquakes-and-volcanoes-interactive/

Tornado Simulator
https://scijinks.gov/tornado-simulation/

LGBT and Disabilities Resources:
- LGBTQ-Inclusive Lesson & Resources by Garden State Equality and Make it Better for Youth
- LGBTQ+ Books

DEI Resources:
- Learning for Justice
- GLSEN Educator Resources
- Supporting LGBTQIA Youth Resource List
- Respect Ability: Fighting Stigmas, Advancing Opportunities
- NJDOE Diversity, Equity & Inclusion Educational Resources
- Diversity Calendar

Differentiation
*Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

Science Enrichment 7

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Page Keeley Science Probes Interactive Science notebooks - higher level of Costa's questions created Scaffolded guiding questions - above level Less structure provided for assignments/assessments Heterogeneous grouping Research independently or collaboratively with minimal teacher guidance Laboratory investigations designed and carried out by students	Interactive Science notebooks Scaffolded guiding questions - on level Provide challenging tasks with support to allow students to experience success Moderate amount of scaffold on assignments Heterogeneous grouping Laboratory investigations designed by students with teacher assistance and carried out by students	Interactive Science notebooks - templates provided by teacher Scaffolded guiding questions - below level Break down assignments into smaller tasks Structured, predictable classroom Graphic organizers/Study guides provided Copy of class notes/presentation provided to student Utilize student's best personal learning modality (auditory, visual, kinesthetic) Heterogeneous grouping Laboratory investigations provided by teacher for students to carry out	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

Science Enrichment 7

Pacing Guide

Course Name	Content/Resources	Standards
UNIT 1:		
Astronomy 23 Days	Big Bang: 2 days Inner Planets: 5 days Outer Planets: 5 days Asteroids, Meteors, Comets: 2 days Star Life Cycle: 3 days Galaxies: 3 days Space Exploration: 3 days	MS-ESS1-2 MS-ESS1-3 MS-PS2-4 MS-PS2-5
UNIT 2:		
Geology and Weather 22 Days	Volcanoes: 5 days Earthquakes: 7 days Hurricanes: 5 days Tornadoes: 5 days	MS-PS1-1 MS-PS1-2 MS-PS4-1 MS-PS4-2 MS-PS4-3