Unit #1: Earth & Space Science 7- Planetary Science

Content Area:	Science
Course(s):	Science 7
Time Period:	First Marking Period
Length:	September Through December
Status:	Published

Unit Overview

Science is central to the lives of all people. Our science education program must prepare our students to be informed citizens and knowledgeable consumers. If the nation is to compete and lead in the global economy, and if American students are to be able to pursue expanding employment opportunities in science-related fields, all students must have a solid K-12 science education that prepares them for college and careers that involve science and science practices. Linden's hand-on program actively engages students in discovery and learning.

The Next Generation standards are based on learning progressions that provide students with opportunities to investigate core ideas in science in increasingly complex ways over time. The target goals for the curriculum are to help students know and use scientific explanations of the natural world and the designed world; to understand the nature and development of scientific knowledge and technological capabilities; and to participate productively in scientific and engineering practices.

In our Earth and Space unit, students will understand patterns of the apparent motion of the Sun and other stars, motion of the Moon, and planets in the sky. They will be able to make predictions with an understanding of these patterns. Students will make connections to what they can observe in the night sky and begin to understand why these patterns exist. Students will learn that gravitational forces are constantly at work, and that celestial alignment and gravitational pull impacts tides, planet positioning, and other objects in the sky.

GOALS

The **Planetary Science Course** for grades 6-8 emphasizes the use of knowledge and evidence to construct explanations for the structure and motions of objects in the solar system. This course supports the following principles set forth in *A Framework fork-12 education: Practices, Cross-Cutting Concepts, and Core Ideas* (National Research Council, 2011)

STAGE 1- DESIRED RESULTS

Physical Science

SCI.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.

Earth and Space Science

SCI.MS-ESS2-1	Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
SCI.MS-ESS1-3	Analyze and interpret data to determine scale properties of objects in the solar system.
SCI.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.
SCI.MS-ESS1-2	Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
SCI.MS-ESS2-2	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

Science and Engineering Practices

- Analyzing and Interpreting Data
- Asking Questions and Defining Problems
- Constructing Explanations and Designing Solutions
- Developing and Using Models
- Engaging in Argument from Evidence
- Obtaining, Evaluating, and Communicating Information
- Planning and Carrying Out Information
- Using Mathematics and Computational Thinking

Cross Cutting Concepts

- Cause and Effect
- Energy and Matter
- Influence of Engineering, Technology, and Science on Society and the Natural World
- Interdependence of Science, Engineering, and Technology
- Patterns
- Scale, Proportion, and Quantity
- Stability and Change

- Structure and Functions
- Systems and System Models

Disciplinary Core Ideas

Physical Sciences

- PS2A: Forces and Motion
- PS2B: Types of Interaction
- PS3A: Definitions of Energy
- PS4A: Wave Properties
- PS4C: Information Technologies and Instrumentation

Life Sciences

• LS1D: Information Processing

Earth and Space Sciences

- ESS1A: The Universe and its Stars
- ESS1B: Earth and the Solar System
- ESS1C: The History of Planet Earth
- ESS2A: Earth Materials and Systems
- ESS2C: The Role of Water in Earth's Surface Processes
- ESS2D: Weather and Climate

Engineering. Technology. and Applications of Science

- ETS1A: Defining and Delimiting an Engineering Problem
- ETS1B: Developing Possible Solutioins
- ETS1C: Optimizing the Design Solution

Essential Questions

- How can location be identified? Can you make a map to identify your specific location?
- What is the shape of the Earth? What is the evidence?

- What is Earth made of? How does it compare to other planets?
- What are the phases of the moon? What is the predictable pattern?
- What is the position of the Sun in our solar system? How does it provide energy for planets? Discuss the gravitational pull.
- What causes the seasons? What is the tilt of Earth's axis?
- What causes day and night? Why is that pattern predictable?
- What causes the tidal pattern? How often do they occur?
- What are solar and lunar eclipses?
- What are the theories on the formation of craters?
- How does density effect crater formation?
- What is our solar system comprised of?
- How does the energy flow in the solar system.
- What is the role of gravity in our solar system?
- How was the solar system formed?
- What are the relative sizes and distances of and between planets and stars.
- What is difference in planetary orbits?
- How can satellites help to predict weather conditions, provide data, and gather information?

Enduring Understanding

- Students will be able to understand lunar patterns and make predictions based on their understanding of these patterns.
- The Sun is the center of the universe. Its gravitational force holds planets, moons, and other objects in place in their orbits around the Sun.
- The students will collect and analyze data to support the evidence of early scientists' claims for the shape of the Earth and theories on crater formation.

Students will know...

Vocabulary:

Earth; core, mantle, crust

rotation

revolution

orbit

gravitational force

sun

stars, constellations

planets

moon, lunar phases; 1st quarter, full, 3rd quarter, new, crescent, gibbous

waning, waxing

tides, eclipses

craters

density

solar system

galaxy, Milky Way

asteroids

comets

satellites

Common Misconceptions:

- Clarifications of rotation & revolution
- Day is when the Sun is out. Night is when the Moon is out.
- A full moon occur at the end of the month.
- Sun is a planet
- Sun rotates
- Moon's position is fixed

Students will be able to...

- Develop and use models to describe phenomena.
- Use simulations to support the shape of the Earth, day and night patterns.
- Analyze and interpret data to determine similarities and and differences in round Earth vs. flat Earth argument.
- Construct a scientific explanation based on valid and reliable evidence for crater formation, tidal patterns, solar and lunar eclipses.
- Design solutions to measure density.
- Plan and carry out investigations to support theories of crater formation.
- Collect data to produce data to serve as the bases for evidence to answer questions planets'

composition, distance from the sun, and orbital paths.

- Revise findings based on evidence.
- Ask questions to identify and clarify evidence of an argument.
- Engage in argument from evidence that supports or refutes claims for either explanations or solutions about the natural and designed world.
- Construct an oral and written argument using evidence and reasoning.
- Apply scientific principles to design an object, tool, process or system.
- Build a model to explain positioning, motion, size, and scale of planets in our solar system.

STAGE 2- EVIDENCE OF LEARNING

Formative Assessment

- 3- Minute Pause
- A-B-C Summaries
- Analogy Prompt
- Choral Response
- Debriefing
- Exit Card / Ticket
- Hand Signals
- Idea Spinner
- Index Card Summaries
- Inside-Outside Circle Discussion (Fishbowl)
- Journal Entry
- Misconception Check
- Observation
- One Minute Essay
- One Word Summary
- Portfolio Check
- Questions & Answers
- Quiz
- Self-Assessment
- Student Conference
- Think-Pair-Share
- Web or Concept Map

Authentic Assessments

- follow lab procedures on measuring the shape of the Earth, and collecting shadow evidence.
- complete assessments for labs.
- develop and utilize models for the movement of the Earth and Moon, and the apparent motion of the Sun.
- cooperate in groups and with partners to collect data for investigations.
- complete a written science journal.
- maintain class notes and vocabulary in MacBook Airs.
- complete data tables.
- complete and interpret graphs.

Benchmark Assessments

pass the end-of-investigation assessments.

pass an end-of-unit exam.

complete a research project.

develop a model to support research.

Complete I-Checks

STAGE 3- LEARNING PLAN

Instructional Map

Investigation 1: (week 1)

• Introduction to Unit. What we already know about Earth-KWL. What is Planetary Science? Where Am I? Mapping.

Investigation 2: (weeks 2 & 3)

- Planet Earth: Shape and Composition; core, mantle, crust, (oceans, land, tectonic plates). Result of geologic process.
- How do know this? Study of early discoveries and scientists (Columbus, Eratosthenes, and others). Round Earth/flat Earth. Work with models.

Investigation 3: (weeks 4 and 5)

• Planetary System; Earth, Sun, and Moon. Distance, scale. Patterns in the sky, Sun's apparent motion across sky, lunar calendar, eclipses and seasons. Begin lunar calendar with 1st full moon or new moon, make observations of night sky. Note/discuss current patterns of moon and lunar eclipses. Students explore models of patterns for day and night, motion and movement of Sun/Earth/Moon.

Investigation 4: (week 6)

• The Moon; composition, appearance, surface, crater formation. Theories of Green and Shoemaker. Lunar myths.

Investigation 5: (week 7)

• Space exploration. NASA. Lunar landing, missions. New discoveries and technologies.

Investigation 6: (week 8)

• Density. Lunar rocks, size and density as impact on craters.

Investigation 7: (week 9)

• The Solar System; formation and components. The Sun, planets, asteroids, other objects in the sky, satellites (natural and man-made), and the use of satellites to predict weather, hurricanes, etc. Watch "Powers of Ten" video.

Investigation 8: (week 10)

• The Milky Way Galaxy; introduction, components, distance, scale.

Investigation 9: (week 11 and 12)

• Student research and presentation of research and models on Earth and Space Science.

Investigation 10: (week 13 and 14)

• Unit exam. Review, revise, and revisit.

Modification/Differentiation of Instruction

Differentiation Strategies for Special Education Students

- Remove unnecessary material, words, etc., that can distract from the content
- Use of off-grade level materials
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Time allowed
- Level of independence required

- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in "chunks"
- Varied texts and supplementary materials
- Use technology, if available and appropriate
- Varied homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Ability to work at their own pace
- Present ideas using auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment
- Differentiated checklists and rubrics, if available and appropriate

Differentiation Strategies for Gifted and Talented Students

- Increase the level of complexity
- Decrease scaffolding
- Variety of finished products
- Allow for greater independence
- Learning stations, interest groups
- Varied texts and supplementary materials
- Use of technology
- Flexibility in assignments
- Varied questioning strategies
- Encourage research
- Strategy and flexible groups based on formative assessment or student choice
- Acceleration within a unit of study
- Exposure to more advanced or complex concepts, abstractions, and materials
- Encourage students to move through content areas at their own pace
- After mastery of a unit, provide students with more advanced learning activities, not more of the same activity
- Present information using a thematic, broad-based, and integrative content, rather than just singlesubject areas

Differentiated Strategies for ELL Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in "chunks"
- Varied texts and supplementary materials, including visuals
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Allow students to work at their own pace
- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Role play
- Provide graphic organizers, highlighted materials
- Strategy and flexible groups based on formative assessment

Differentiation Strategies for At Risk Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in "chunks"
- Varied texts and supplementary materials
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts

- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment

504 Plans

Students can qualify for 504 plans if they have physical or mental impairments that affect or limit any of their abilities to:

- walk, breathe, eat, or sleep
- communicate, see, hear, or speak
- read, concentrate, think, or learn
- stand, bend, lift, or work

Examples of accommodations in 504 plans include:

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- adjusted class schedules or grading
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits
- occupational or physical therapy

Modification Strategies

- Cooperative Grouping
- Extended Time
- Frequent Breaks
- Highlighted Text
- Interactive Notebook
- Modified Test

- Oral Directions
- Peer Tutoring
- Preferential Seating
- Re-direct
- Repeated Drill and Practice
- Shortened Assisgnment
- Teacher Notes
- Tutorials
- Use of Additional Reference Materials
- Use of Audio Resources

Differentiation Strategies

High Preparation

- Alternative Assessments
- Choice Boards
- Games and Tournaments
- Group Investigations
- Guided Reading
- Independent Research / Project
- Interest Groups
- Learning Contracts
- Leveled Rubrics
- Literature Circles
- Multiple Intelligence Options
- Multiple Texts
- Personal Agendas
- Project Based Learning (PBL)
- Stations / Centers
- Think-Tac-Toe
- Tiered Activities / Assignments
- Varying Graphic Organizers

- Choice of Book / Activity
- Cubing Activities
- Exploration by Interest (using interest inventories)
- Flexible Grouping
- Goal Setting With Student
- Homework Options
- Jigsaw
- Mini Workshops to Re-teach or Extend Skills
- Open-ended Activities
- Think-Pair-Share by Readiness, Interest, or Learning Style
- Use of Collaboration
- Use of Reading Buddies
- Varied Journal Prompts
- Varied Product Choice
- Varied Supplemental Materials
- Work Alone / Together

Horizontal Intergration- Interdisciplinary Connections New Jersey Student Learning Standards for Mathematics

Grade 7

7.RP.A. Analyze proportional relationships and use them to solve real worls mathematical problems.

7.NS.A. Apply and extend previous understandings of operations.

7.EE.B. Solve real life and mathematical problems using numerical and algebraic expressions and equations.

Reading in Science

RST.6-8.1. Cite specific textual evidence to support analysis of science and technical texts.

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.

RST.6-8.3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

RST.6-8.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6-8 texts and topics*.

RST.6-8.5. Analyze the structure an author uses to organize a text, including how the major sections

contribute to the whole and to an understanding of the topic.

RST.6-8.6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.

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.6-8.8.Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

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.

RST.6-8.10. By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

Writing in Science

LA.WHST.6-8.1 Write arguments focused on discipline-specific content.

LA.WHST.6-8.1.A Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.

LA.WHST.6-8.1.B Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

LA.WHST.6-8.1.C Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.

LA.WHST.6-8.1.D Establish and maintain a formal/academic style, approach, and form.

LA.WHST.6-8.1.E Provide a concluding statement or section that follows from and supports the argument presented.

LA.WHST.6-8.10 Write routinely over extended time frames (time for research, reflection, metacognition/self correction, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

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

LA.WHST.6-8.2.A Introduce a topic and organize ideas, concepts, and information using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aiding comprehension.

LA.WHST.6-8.2.B Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

LA.WHST.6-8.2.C Use appropriate and varied transitions to create cohesion and clarify the relationships

among ideas and concepts.

LA.WHST.6-8.2.D Use precise language and domain-specific vocabulary to inform about or explain the topic.

LA.WHST.6-8.2.E Establish and maintain a formal/academic style, approach, and form.

LA.WHST.6-8.2.F Provide a concluding statement or section that follows from and supports the information or explanation presented.

LA.WHST.6-8.3 (See note; not applicable as a separate requirement)

LA.WHST.6-8.4 Produce clear and coherent writing in which the development, organization, voice, and style are appropriate to task, purpose, and audience.

LA.WHST.6-8.5 With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.

LA.WHST.6-8.6 Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

LA.WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

LA.WHST.6-8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

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

2020 New Jersey Student Learning Standards- Computer Science and Design Thinking

Computer Science and Design Thinking Practices

CSDT.K-12.CSDTP1	Fostering an Inclusive Computing and Design Culture
CSDT.K-12.CSDTP2	Collaborating Around Computing and Design
CSDT.K-12.CSDTP3	Recognizing and Defining Computational Problems
CSDT.K-12.CSDTP4	Developing and Using Abstractions
CSDT.K-12.CSDTP5	Creating Computational Artifacts
CSDT.K-12.CSDTP6	Testing and Refining Computational Artifacts

8.2 Design Thinking

8.2.8.ED.1: Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.

8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.

8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).

8.2.8.ED.4: Investigate a malfunctioning system, identify its impact, and explain the step-bystep process used to troubleshoot, evaluate, and test options to repair the product in a collaborative team.

8.2.8.ED.5: Explain the need for optimization in a design process.

8.2.8.ED.6: Analyze how trade-offs can impact the design of a product.

8.2.8.ED.7: Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches).

8.2.8.ITH.1: Explain how the development and use of technology influences economic, political, social, and cultural issues.

8.2.8.ITH.2: Compare how technologies have influenced society over time.

8.2.8.ITH.3: Evaluate the impact of sustainability on the development of a designed product or system.

8.2.8.ITH.4: Identify technologies that have been designed to reduce the negative consequences of other technologies and explain the change in impact.

8.2.8.ITH.5: Compare the impacts of a given technology on different societies, noting factors that may make a technology appropriate and sustainable in one society but not in another.

8.2.8.NT.1: Examine a malfunctioning tool, product, or system and propose solutions to the problem.

8.2.8.NT.2: Analyze an existing technological product that has been repurposed for a different function.

8.2.8.NT.3: Examine a system, consider how each part relates to other parts, and redesign it for another purpose.

8.2.8.NT.4: Explain how a product designed for a specific demand was modified to meet a new demand and led to a new product.

8.2.8.ETW.1: Illustrate how a product is upcycled into a new product and analyze the shortand long-term benefits and costs.

8.2.8.ETW.2: Analyze the impact of modifying resources in a product or system (e.g., materials, energy, information, time, tools, people, capital).

8.2.8.ETW.3: Analyze the design of a product that negatively impacts the environment or society and develop possible solutions to lessen its impact.

8.2.8.ETW.4: Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best.

8.2.8.EC.1: Explain ethical issues that may arise from the use of new technologies.

8.2.8.EC.2: Examine the effects of ethical and unethical practices in product design and development.

2020 New Jersey Student Learning Standards- Career Readiness, Life Literacies, and Key Skills Career Readiness, Life Literacies, and Key Skills Practices

CRP.K-12.CRP1	Act as responsible and contributing community members and employee.
CRP.K-12.CRP2	Attend to financial well-being.
CRP.K-12.CRP3	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP4	Demonstrate creativity and innovation.
CRP.K-12.CRP5	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP6	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP7	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP8	Use technology to enhance productivity, increase collaboration and communicate effectively.
CRP.K-12.CRP9	Work productively in teams while using cultural/global competence.

9.2 Career Awareness and Planning

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.

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.

9.4 Life Literacies and Key Skills

9.4.8.Cl.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.Cl.2: Repurpose an existing resource in an innovative way (e.g., 8.2.8.NT.3).

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.

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 (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).

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.

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).

9.4.8.DC.3: Describe tradeoffs between allowing information to be public (e.g., within online games) versus keeping information private and secure.

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 selfdisclosure.

9.4.8.DC.6: Analyze online information to distinguish whether it is helpful or harmful to reputation.

9.4.8.DC.7: Collaborate within a digital community to create a digital artifact using strategies such as crowdsourcing or digital surveys.

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).

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.

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.

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.

9.4.8.IML.6: Identify subtle and overt messages based on the method of communication.

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).

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.

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.

9.4.8.TL.1: Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate databased 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., MS-LS4-5, 6.1.8.CivicsPI.3).

9.4.8.TL.5: Compare the process and effectiveness of synchronous collaboration and asynchronous collaboration.

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

Vertical Integration- Discipline Mapping

Grade 5: Earth and Sun

Grade 6: Weather and Water

Additional Materials

- Classroom posters that show Earth's structure, lunar calendar, and phases of the moon.
- Word Wall
- You tube videos; The Moon, flow of tides, lunar calendar.
- Bill Nye short videos; Seasons, The Moon. Comet and Meteors.
- Colored pencils for coding, labeling.
- Objects of similar size and different density.
- Small objects to represent planets for scaling; Kix cereal, mini marshmallows, pepper, poppy seeds, bird seed, sand, coarse sand.