Grade 8

Trimester 2

Unit 8 Patterns in the Solar System

Unit 9 The Solar System and Universe

Unit 2 Reproduction, Heredity, and Growth

New Jersey Student Learning Standards

Established	2016-2017
Revised	2017-2018
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Revised	2024-2025

Marking Period	Unit Title	Recommended Instructional Days
Trimester 2	Unit 8 Patterns in the Solar System Unit 9 The Solar System and Universe Unit 2 Reproduction, Heredity, and Growth	**60 Days**

NJSLS - Science: *Title*	NJSLS - Science: *Performance Expectations*	Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-S within Unit
Earth's Place in the Universe **Motion and Stability: Forces and Interactions**	**MS-ESS1-1** Develop and Use a model of the Earth-Sun-Moon System to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons **MS-ESS1-2.** Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. **MS-ESS1-3.** Analyze and interpret data to determine scale properties of objects in the solar system. **MS-PS2-4.** Construct and present arguments using evidence to support the claim that gravitational	**Essential Question/s:** Unit 8 Patterns in the Solar System 1. What predictable, observable patterns occur as a result of the interaction between the Earth, Moon, and Sun? 2. How can the relationship between the Earth's position and motion in space explain changes in seasons and eclipses? Unit 9 The Solar System and Universe 3. What is the role of gravity in the formation and the orbits of objects in the solar system and the Milky Way galaxy? 4. How can information gathered by space instruments such as telescopes and satellites be used to determine the relative size, scale, and distance of objects in our solar system? 5. How do scientists use data and models to determine

	interactions are attractive and depend on the masses of interacting objects	the structure and scale of systems in the universe? <u>Unit 2 Reproduction, Heredity, and Growth</u> 6. What is the role of genes and chromosomes in the passing of traits from one generation to the next? 7. What are the advantages and disadvantages of sexual and asexual reproduction? 8. How does DNA affect the inheritance of traits from parent to offspring? 9. What is a Punnett Square and how does it help us predict the traits of offspring? 10. How do characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively?
From Molecules to Organisms: Structures and Processes	**MS-LS1-4**. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. **MS-LS1-5.** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	**<u>Activity Description:</u>** ❖ Lesson Phenomenon ❖ Unit Opener: Can you Explain it? ❖ "Take it Further" activities
Heredity: Inheritance and Variation of Traits	**MS-LS3-2.** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	**<u>Unit 8 Patterns in the Solar System</u>** ❖ Hands on Lab:Model the Apparent Motion of the Sun ❖ Hands on Lab:The View from Planet Earth Part 1: Lunar Phases

FOUNDATION Disciplinary: *Core Idea*	FOUNDATION Disciplinary: *Statement*	
ESS1.A: The Universe and Its Stars **ESS1.B: Earth and the Solar System**	Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models. (MS-ESS1-1) Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. (MS-ESS1-2) 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	❖ Hands on Lab: The View from Planet Earth Part 2: Eclipses ❖ Hands on Lab: Model Sunlight Distribution ❖ Hands on Lab:Model Patterns of Sunlight ❖ Virtual Lab: Seasons ❖ You Solve It: When Will an Eclipse Occur? **<u>Unit 9 The Solar System and Universe</u>** ❖ Hands on Lab:Investigate Parallax ❖ Hands on Lab: Explore the Motion of a Falling Object ❖ Hands on Lab: Model Nebular Disk Formation ❖ Hands on Lab: Model the Solar System ❖ Hands on Lab: Determine Your Location Within a Field of Objects ❖ You Solve It: How Can You Design a Satellite's Orbit? **<u>Unit 2 Reproduction, Heredity and Growth</u>** ❖ Hands on Lab: Model Genes and Traits ❖ Hands on Lab: Investigate Flower Structures ❖ Hands on Lab: Model the Growth of an Animal ❖ Virtual Lab: Crossing Pea Plants ❖ You Solve It: What Factors Affect Reproductive Success? **Lab and engineering activities will incorporate these skills:**

	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)	• Planning and Organization • Critical Thinking • Communication in a group • Decision Making • Reflection on activity and participation **Spotlight on scientists and their accomplishments** Examples: Sally Ride - Astronaut Katherine Johnson - Computer Scientist Leon Foucault - Physicist Mau Piailug - Wayfinder Dr. Adriana Ocampo - Planetary Geologist Rosalind Franklin - Scientist (DNA research) Sara Josephine Baker - Physician Marie Maynard Daly- Food Scientist/ Nutritionist
PS2.B: Types of Interactions	Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects. (MS-PS2-3) Gravitational forces are always attractive. There is a gravitational force between any	**Human Impacts on Earth** *Satellites are an example of technology used to detect climate change. Refer to NASA's Climate Kids website. **Interdisciplinary Connection: Content: (NJSLS#)** **Connections to Mathematics:** • Model with mathematics (**MP4)** • Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (**6.RP.A.1)**

LS1.B: Growth and Development of Organisms **LS3.A: Inheritance of Traits**	two masses, but it is very small except when one or both of the objects have large mass—e.g., Earth and the sun. 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) Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. (secondary to MS-LS3-2) Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in	• Use variables to represent numbers and write expressions when solving a 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. (**6.EE.B.6)** • Recognize and represent proportional relationships between quantities. (**7.RP.A.2)** • Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. (**6.SP.A.2)** • Summarize numerical data sets in relation to their context **(6.SP.B.5)** **<u>Connections to Language Arts:</u>** • 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.6-8.9)** • 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.6-8.7)** • Write arguments focused on discipline-specific

LS3.B: Variation of Traits	changes to proteins, which can affect the structures and functions of the organism and thereby change traits. (MS-LS3-1) Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. (MS-LS3-2) In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other. (MS-LS3-2) In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to	content (**WHST.6-8.1)** ● Cite specific textual evidence to support analysis of science and technical texts. (**RST.6-8.1)** ● Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions**. (RST.6-8.2)** ● 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.6-8.4)**

	the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism. (MS-LS3-1)	
FOUNDATION **Science and Engineering Practices:** ***Core Idea***	**FOUNDATION** **Science and Engineering Practices:** ***Statement***	
Planning and Carrying Out Investigations	Planning and carrying out investigations to answer questions or test solutions to problems in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or design solutions.	
Developing and Using Models	Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena design systems.	
Analyzing and Interpreting	Analyzing data in 6–8 builds on	

Data	K–5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.	
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 ideas, principles, and theories.	
Engaging in Argument from Evidence	Engaging in argument from evidence in 6–8 builds on 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 worlds.	
Obtaining, Evaluating and	Obtaining, evaluating, and	

Communication Information	communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.	
FOUNDATION **Crosscutting Concepts:** ***Core Idea***	**FOUNDATION** **Crosscutting Concepts:** ***Statement***	
Patterns	The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. (MS-ESS1-2)	
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)	
Systems and System Models	Models can be used to represent systems and their interactions. (MS-ESS1-2)	
Cause and Effect	Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8)(MS-LS3-2)	

Structure and Function **Stability and Change**	Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability. (MS-LS1-4), (MS-LS1-5) Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS1-2) (MS-LS3-1) Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales. (MS-PS2-2)	
Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***	

Responsible Decision-Making Relationship Skills Self-Management Social Awareness Social Awareness	• Develop, implement, and model effective problem-solving and critical thinking skills • Utilize positive communication and social skills to interact effectively with others • Recognize the skills needed to establish and and achieve personal and educational goals • Demonstrate an understanding of the need for mutual respect when viewpoints differ. • Demonstrate an awareness of the expectations for social interactions in a variety of ways. • Recognize the importance of self-confidence in handling daily tasks and challenges	
Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***		**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***

Formative Assessments: ● Diagnostic tests used to modify teaching and learning activities to improve student attainment	**Benchmarks:** ● District Assessment **Summative Assessments:** ● End of unit/chapter tests/lesson quizzes

Differentiated Student Access to Content: **Teaching and Learning *Resources/Materials***			
Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
● **Interactive Worktext** ● **Equipment Kits** ● **Online Simulations** ● **Lab Safety Handbook**	● Multilingual Glossary ● Online Science Tools (Scientific Calculator, Graphing)	● Multilingual Glossary ● Online Science Tools (Scientific Calculator, Graphing)	● Online Simulations ● Virtual Labs ● Webquests ● Video-Based Projects ● Take It Further ● You Solve It ! ● Unit Performance Tasks ● Unit Projects ● Online Science Tools (Scientific Calculator, Graphing)

Supplemental Resources
Technology: 8.1.8.A.1, 8.1.8.A. 2, 8.1.8.A.3, 8.1.8.A. 4, 8.1.8.A. 5

Other: Career Education

- CRP4 Communicate clearly and effectively and with reason.
- CRP6 Demonstrate creativity and innovation
- CRP7 Employ valid and reliable research strategies
- CRP11 Use technology to enhance productivity

Differentiated Student Access to Content:
Recommended Strategies & Techniques

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
• **Large group instruction** • **Small group instruction** • **Think Pair Share** • **Peer editing** • **Cooperative group work** • **Multimedia presentations** • **Choice Boards/Learning Menus** • **Manipulatives**	• Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat	• Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified	• Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related talent

	directions, provide study guides, and/or break assignments into segments of shorter tasks.	assessment and/or rubric.	development opportunities.

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept: 1.Career Awareness and Planning, 2.Creativity and Innovation, 3.Critical Thinking and Problem Solving, 4.Global and Cultural Awareness 5. Digital Citizenship 6. Information and Media Literacy 7. Technology Literacy**	
	Core Ideas:	**1. There are a variety of resources available to help navigate the career planning process.** **2. Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.** **3. Multiple solutions often exist to solve a problem.** **4. Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.** **5. Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work.** **6. 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.** **7. 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**

	Performance Expectation/s:	**1. 9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.** **2. 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).** **3. 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).** **4. 9.4.8.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.** **5. 9.4.8.DC.1: Analyze the resource citations in online materials for proper use.** **5. 9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).** **6. 9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations.** **7. 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).** **7. 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).**
	Career Readiness, Life Literacies, & Key Skills Practices	
	• **Act as a responsible and contributing community member and employee.** • **Demonstrate creativity and innovation.** • **Utilize critical thinking to make sense of problems and persevere in solving them.** • **Consider the environmental, social and economic impacts of decisions.** • **Use technology to enhance productivity, increase collaboration and communicate effectively.** • **Work productively in teams while using cultural/global competence.**	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
X	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*	X	LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*	X	Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*	X	Standards in Action: *Climate Change*