Eagleswood Township School District Curriculum
Science Grade 6

Standard Alignment September 2016
NJDOE Adoption Date September 2016
ETESD BOE Approved 1/3/2019
Revised december 2020
BOE Approved January 2021

Pacing Guide

Unit	Anticipated Timeframe
Unit 1: Introduction to Engineering and Design	18 Days
Unit 2: Forces, Motion, and Fields	18 Days
Unit 3: Cells and Heredity	20 Days
Unit 4: Ecology and the Environment	60 Days
Unit 5: Earth's Water and Atmosphere	30 Days
Unit 6: Space Science	30 Days

Core Materials:
Houghton Mifflin Harcourt Science Textbook
Studies Weekly Science

	Correlation Key	
Holocaust	Amistad	Financial Literacy

Career Readiness, Life Literacies, and Key Skills Practices	
Act as a responsible and contributing community members and employee.	Students understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
Consider the environmental, social and economic impacts of decisions.	Students understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.
Demonstrate creativity and innovation.	Students regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.

Utilize critical thinking to make sense of problems and persevere in solving them.	Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
Model integrity, ethical leadership and effective management.	Students consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.
Plan education and career paths aligned to personal goals.	Students take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.

Use technology to enhance productivity, increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
Work productively in teams while using cultural/global competence.	Students positively contribute to every team, whether formal or informal. They apply an awareness of cultural differences to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

Unit 1 Disciplinary Core Ideas Chart

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems Asking questions and defining problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models. Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. (MS-ETS1-1)	ETS1.A: Defining and Delimiting Engineering Problems The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1) ETS1.B: Developing Possible Solutions A solution needs to be tested, and then	Influence of Science, Engineering, and Technology on Society and the Natural World All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ETS1-1) The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in

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 a model to generate data to test ideas about designed systems, including those representing inputs and outputs. (MS-ETS1-4) 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-ETS1-3) 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 world. Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-ETS1-2)	modified on the basis of the test results, in order to improve it. (MS-ETS1-4) There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-2), (MS-ETS1-3) Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3) Models of all kinds are important for testing solutions. (MS-ETS1-4) ETS1.C: Optimizing the Design Solution Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design. (MS-ETS1-3) The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (MSETS1-4)	such factors as climate, natural resources, and economic conditions. (MS-ETS1-1)

Career Readiness, Life Literacies, and Key Skills Core Ideas
Unit 1 will incorporate the following core ideas.
Individuals can use their talents, resources and abilities to give back.
Marketing techniques are designed to encourage individuals to purchase items they may not need or want.
A budget aligned with an individual's financial goals can help prepare for life events.
An individual's strengths, lifestyle goals, choices, and interests affect employment and income
Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.
Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills.
Multiple solutions often exist to solve a problem.
An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.
Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work.
Digital communities are used by individuals to share information, organize, and engage around issues and topics of interest. Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction
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.
Sources of information are evaluated for accuracy and relevance when considering the use of information.

There is a need to produce and publish media that has information supported with quality evidence and is intended for authentic audiences.

Computer Science and Design Thinking

Unit 1 will incorporate the following core ideas.

People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.

Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.

Computer models can be used to simulate events, examine theories and inferences, or make predictions.

Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community.

Engineering design is a systematic, creative, and iterative process used to address local and global problems.

Engineering design requirements and specifications involve making trade-offs between competing requirements and desired design features.

Economic, political, social and cultural aspects of society drive development of new technological products, processes, and systems.

Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants.

Scientists use systematic investigation to understand the natural world.

Resources need to be utilized wisely to have positive effects on the environment and society. Some technological decisions involve tradeoffs between environmental and economic needs, while others have positive effects for both the economy and environment

Science Unit 1: Introduction to Engineering and Design	**Duration:** 20 Days

Standards:

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.

Unit Summary: Students will be exposed to engineering in this unit. This unit has six lessons attached to it and should be completed in 15-20 Days. They will be able to define criteria and constraints, develop models, evaluate competing design solutions, analyze data, and create models to generate data.

NJ Student Learning Standards:

Interdisciplinary Skills

Primary Interdisciplinary Connections: Infused within the unit are connections to the NJSLS for Mathematics, Language Arts RI.6.7. Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

W.6.10. 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.
SL.6.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

Career Readiness, Life Literacies, and Key Skills

9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factor.
9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education.
9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish.
9.1.8.PB.1: Predict future expenses or opportunities that should be included in the budget planning process.
9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.
9.4.8.CI.2: Repurpose an existing resource in an innovative way (e.g., 8.2.8.NT.3).
9.4.8.CI.4: Explore the role of creativity and innovation in career pathways and industries.
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.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.
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).

Computer Science and Design Thinking

8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.
8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users
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.2: Compare how technologies have influenced society over time.
8.2.8.NT.2: Analyze an existing technological product that has been repurposed for a different function.
8.2.8.ETW.1: Illustrate how a product is upcycled into a new product and analyze the short- and long-term benefits and costs

Essential Understanding	**Essential Questions**
Students will understand that… ● Science helps man to understand the natural world while engineering helps man to manipulate the natural world in order to solve problems. ● Asking questions helps define problems and create solutions. ● Models can help explain natural phenomena and communicate ideas. ● Analyzing data and testing results can lead to improvements in engineering designs.	● What are the steps of the Engineering Design Process? ● How do we apply the Engineering Design Process to create solutions to real-world problems? ● How do we determine when solutions are effective? ● What careers utilize the Engineering Design Process?
Evidence of Student Learning	
Performance Tasks: *Activities to provide evidence for student learning of content and cognitive skills.*	**Other Assessments**

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- Spaghetti Towers - Students work in teams to apply the Engineering Design Process to build a spaghetti tower strong enough to support a large marshmallow.

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Formative Assessments

- Teacher Observations
- Response Cards
- Graphic Organizers

Summative Assessments

- Tests
- Quizzes
- Hands-On Activities

Benchmark Assessment

- Beginning of the Year Benchmark
- Mid-Year Benchmark
- End of the Year Benchmark

Alternative Assessments

- Teacher Observations
- Group Work/Class Work

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engineering/technology/system/component/input/output/boundary/criteria/constraints/iterative testing</td>
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Students will know…	*Students will be able to...*
• That the Engineering Design Process (EDP) is a series of five steps applied cyclically. • How to safely utilize all equipment, materials, and furniture in the STEAM Lab. • The various cooperative learning jobs available in the engineering teams.	• Work in teams to solve engineering challenges. • Apply the Engineering Design Process to solve engineering challenges. • Identify careers that utilize the Engineering Design Process.

Instructional Plan

Suggested Activities	**Resources**
- Design a system to help identify the cause and effect relationships between inputs and outputs and components in the model system - Design a bicycle helmet. - Design a model car (3 lessons, 3 models) *Create a digital Ad for the car or helmet. Include price comparisons to similar items currently on the market.	- www.brainpopjr.com - www.newsela.com (leveled texts) - https://www.teachengineering.org/ - www.readworks.org (leveled texts) - www.neok12.com - http://stem-works.com/ - http://pbskids.org/designsquad/parentseducators/index.html - http://stemcollaborative.org/additionalResources.html

Print Materials

- HMH Science Dimensions Textbook/Workbook
- Studies Weekly Science
- *Black Inventors for Children: Famous African American Inventors Who Changed History Forever!* by Charles Jones

Websites	
	- www.brainpopjr.com - www.newsela.com (leveled texts) - https://www.teachengineering.org/ - www.readworks.org (leveled texts) - www.neok12.com - http://stem-works.com/ - http://pbskids.org/designsquad/parentseducators/index.html - http://stemcollaborative.org/additionalResources.html

Modifications

Special Education Students / 504 (*These are just suggested ideas to modify instruction. All modifications and accommodations should be specific to each student's IEP or 504 plan*) reduce/revise assignments & assignments as per IEP; provide individual and small group assistance; notes, and study guides; provide background knowledge.

English Language learners: *use consistent, simplified language; provide bilingual when appropriate; provide cooperative learning opportunities, use modeling, visual aids, and manipulatives.*

Students at Risk of Failure: *Provide less distracting seating if possible, frequent check-in by teacher, study guides, notes, etc.*

Gifted Students: *provide additional enrichment activity involving demonstrating knowledge, deeper research to answer a higher level questions, or complimentary assignment.*

**For additional modifications and accommodations, see below*

English Language Learners

- Pre-teach vocabulary words

- Extended Time
- Less questions on a page for tests
- Modified Assignments

Gifted and Talented

- Students design questions
- Higher level texts
- Peer tutoring
- Choice of activity to extend learning
- Expose to sophisticated vocabulary
- Enrichment opportunities to push assessment boundaries

Basic Skills/Economically Disadvantaged/Students at Risk

- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Communication logs

Special Education/504

- Follow all IEP modifications/504 plan
- Provide student with specific graphic organizers to help them note take about the different levels of government
- Labeled pictures related to concepts
- Check in's during experiments to help refocus

Career Readiness, Life Literacies, and Key Skills Core Ideas
Unit 2 will incorporate the following core ideas. Individuals can use their talents, resources and abilities to give back. There are government agencies and policies that affect the financial industry and the broader economy

Marketing techniques are designed to encourage individuals to purchase items they may not need or want.

A budget aligned with an individual's financial goals can help prepare for life events.

Philanthropic, charitable, and entrepreneurial organizations play distinctly different but vitally important roles in supporting the interests of local and global communities.

An individual's strengths, lifestyle goals, choices, and interests affect employment and income

There are variety of resources available to help navigate the career planning process.

Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.

Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.

Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills.

Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.

Multiple solutions often exist to solve a problem.

An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.

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.

Sources of information are evaluated for accuracy and relevance when considering the use of information.

Computer Science and Design Thinking
Unit 2 will incorporate the following core ideas. Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem. Advancements in computing technology can change individuals' behaviors. Society is faced with trade-offs due to the increasing globalization and automation that computing brings. Computer models can be used to simulate events, examine theories and inferences, or make predictions. Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community. Engineering design is a systematic, creative, and iterative process used to address local and global problems. Engineering design requirements and specifications involve making trade-offs between competing requirements and desired design features. Economic, political, social and cultural aspects of society drive development of new technological products, processes, and systems. Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants. Sometimes a technology developed for one purpose is adapted to serve other purposes. Engineers use a systematic process of creating or modifying technologies that is fueled and constrained by physical laws, cultural norms, and economic resources. Scientists use systematic investigation to understand the natural world. Resources need to be utilized wisely to have positive effects on the environment and society. Some technological decisions involve tradeoffs between environmental and economic needs, while others have positive effects for both the economy and environment

Technological disparities have consequences for public health and prosperity.

	Correlation Key	
Holocaust	Amistad	Financial Literacy

Career Readiness, Life Literacies, and Key Skills Practices	
Act as a responsible and contributing community members and employee.	Students understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
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Utilize critical thinking to make sense of problems and persevere in solving them.	Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
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Plan education and career paths aligned to personal goals.	Students take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.
Use technology to enhance productivity, increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
Work productively in teams while using cultural/global competence.	Students positively contribute to every team, whether formal or informal. They apply an awareness of cultural differences to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

Unit 2 Disciplinary Core Ideas Chart

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems Asking questions and defining problems in	PS2.A: Forces and Motion For any pair of interacting objects, the force exerted by	Cause and Effect Cause and effect relationships may be used

grades 6–8 builds from grades K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models. Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles. (MS-PS2-3) 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. Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. (MS-PS2-2) Conduct an investigation and evaluate the experimental design to produce data to serve as the basis for evidence that can meet the goals of the investigation. (MS-PS2-5) Constructing Explanations and Designing	the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law). (MS-PS2-1) The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion. (MS-PS2-2) All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared. (MSPS2-2) 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 two masses, but it is very small except when one or both of the objects have large mass—e.g., Earth and the sun.	to predict phenomena in natural or designed systems. (MS-PS2-3),(MS-PS2- 5) Systems and System Models Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems. (MS-PS2-1),(MS-PS2-4) Stability and Change 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) --- Connections to Engineering, Technology, and Applications of Science 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. (MS-PS2-1)

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. Apply scientific ideas or principles to design an object, tool, process or system. (MS-PS2-1) Engaging in Argument from Evidence Engaging in argument from evidence in 6–8 builds from 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) ----------Connections to Nature of Science 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-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)	

Science Unit 2: Forces, Motion, and Fields	**Duration:** 20 Days

Standards:

M-PS2-1 - Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.

M-PS2-2 - Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.

M-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.

Unit Summary: Students will be exposed to forces, motion, and fields. This unit has eight lessons attached to it and should be completed in about 15-20 Days. They will be able to explore how forces work, discover different types of forces, learn about forces that act from a distance, apply Newton's laws of motion to design a solution, plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object, construct and present arguments, evaluate competing design solutions, ask questions about data, and evaluate experimental designs.

NJ Student Learning Standards

Interdisciplinary Skills

NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
RST.6-8.3: Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
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.
RST.6-8.1. Cite specific textual evidence to support analysis of science and technical texts.
6.RP.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
MP2. Reason abstractly and quantitatively.

Career Readiness, Life Literacies, and Key Skills
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Computer Science and Design Thinking

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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.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.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.

Essential Understandings	**Essential Questions**
Students will understand that… ● Forces are all around them ● Gravity, friction, and air resistance affect motion	● What are forces? ● How do outside forces affect motion? ● What is motion? ● How do collisions affect other objects?

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- Motion can be relative to a reference point
- Changes can occur to an object when a collision takes place
- Magnets exert forces at a distance
- Different fields have different effects

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- What is a field?

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<tr><td colspan="2">Evidence of Student Learning</td></tr>
<tr><td>Performance Tasks: Activities to provide evidence for student learning of content and cognitive skills.</td><td>Other Assessments</td></tr>
<tr><td>

- Collision Course - students will identify materials and build an apparatus in which a rolling ball is used to knock over an object or to ring a bell at a specific distance.

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Formative Assessments

- Interactive Notebook
- Performance Assessments
- Exit Slips

Summative Assessments

- Summary
- Labs
- Hands-On Activities

Benchmark Assessment

- Beginning of the Year Benchmark
- Mid-Year Benchmark
- End of the Year Benchmark

Alternative Assessments

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- Teacher Observations
- Participation Rubric

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Vocabulary

force/newton/velocity/acceleration/gravity/friction/motion/reference point/speed/inertia/magnet/magnetic force/field/gravitational field/electric field/magnetic field

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Knowledge and Skills

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Content

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Skills

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Students will know…

- How a force as a push or a pull on an object determines the effect on the motion of an object caused by a set of forces, and recognizes that systems with balanced forces are stable and systems with unbalanced forces are unstable
- How forces of gravity, friction, and air resistance affect motion
- Newton’s 3 Laws of Motion
- How to apply Newton’s Laws of Motion to collisions
- How to describe magnets and the magnetic force
- How to evaluate evidence of magnetic fields

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Students will be able to …

- Identify a force as a push or a pull on an object
- Determine the effect of motion of an object
- Recognize that systems with balanced forces are unstable
- Recognize that systems with unbalanced forces are unstable
- Determine how the forces of gravity, friction and air resistance affect motion
- Describe motion relative to a reference point and use models to calculate speed, velocity, and acceleration
- Investigate how magnetic domains and how magnet interact and gather data
- Compare the effects of magnetic and gravitational fields on objects

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Instructional Plan

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Suggested Activities	Resources
- Observe everyday forces - Investigate falling objects (mass) - Investigate friction - Investigate falling objects (air resistance) - Investigate motion - Test packing materials. Compare and contrast those materials for effectiveness, cost, environmental impact. - Explore the behavior of magnets - Model a magnetic field - Explore career opportunities that are related to this unit of study.	- www.brainpopjr.com - www.newsela.com (leveled texts) - https://www.teachengineering.org/ - www.readworks.org (leveled texts) - www.neok12.com
Print Materials - HMH Science Dimensions Textbook/Workbook - Studies Weekly Science	
Websites - www.brainpopjr.com - www.newsela.com (leveled texts) - https://www.teachengineering.org/ - www.readworks.org (leveled texts) - www.neok12.com	
Modifications	

Special Education Students / 504 (*These are just suggested ideas to modify instruction. All modifications and accommodations should be specific to each student's IEP or 504 plan*) reduce/revise assignments & assignments as per IEP; provide individual and small group assistance; notes, and study guides; provide background knowledge.

English Language learners: *use consistent, simplified language; provide bilingual when appropriate; provide cooperative learning opportunities, use modeling, visual aids, and manipulatives.*

Students at Risk of Failure: *Provide less distracting seating if possible, frequent check-in by teacher, study guides, notes, etc.*

Gifted Students: *provide additional enrichment activity involving demonstrating knowledge, deeper research to answer a higher level questions, or complimentary assignment.*

Suggested Options for Differentiation

English Language Learners

- Leveled readers
- Preview lessons
- Labeled pictures
- Use visuals
- Teacher tutoring
- Modified Assignments

Gifted and Talented

- Higher level questioning
- Students design questions
- Differentiated Assignments
- Choice board to extend learning
- Peer tutoring

Basic Skills/Economically Disadvantaged/Students at Risk

- Highlight key words
- Preview lessons
- Reteaching if needed
- Graphic organizers
- Cooperative learning groups

Special Education/504

- Provide differentiated instruction as needed
- Follow all IEP modifications/504 plan
- Pre-teach and model strategies to learn and practice new vocabulary words pertaining to the unit
- Modified assignments
- Provide alternate seating options

	Correlation Key	
Holocaust	Amistad	Financial Literacy

Career Readiness, Life Literacies, and Key Skills Practices

Act as a responsible and contributing community members and employee.	Students understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
Consider the environmental, social and economic impacts of decisions.	Students understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.
Demonstrate creativity and innovation.	Students regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.
Utilize critical thinking to make sense of problems and persevere in solving them.	Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.

Model integrity, ethical leadership and effective management.	Students consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.
Plan education and career paths aligned to personal goals.	Students take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.
Use technology to enhance productivity, increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.

Work productively in teams while using cultural/global competence.	Students positively contribute to every team, whether formal or informal. They apply an awareness of cultural differences to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

Career Readiness, Life Literacies, and Key Skills Core Ideas

Unit 3 will incorporate the following core ideas.

Individuals can use their talents, resources and abilities to give back.

There are government agencies and policies that affect the financial industry and the broader economy

Marketing techniques are designed to encourage individuals to purchase items they may not need or want.

A budget aligned with an individual's financial goals can help prepare for life events.

Philanthropic, charitable, and entrepreneurial organizations play distinctly different but vitally important roles in supporting the interests of local and global communities.

An individual's strengths, lifestyle goals, choices, and interests affect employment and income

There are variety of resources available to help navigate the career planning process.

Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.

Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.

Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills.

Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.

Multiple solutions often exist to solve a problem.

An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.

Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work.

Digital communities are used by individuals to share information, organize, and engage around issues and topics of interest. Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction

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.

Sources of information are evaluated for accuracy and relevance when considering the use of information.

There is a need to produce and publish media that has information supported with quality evidence and is intended for authentic audiences.

Computer Science and Design Thinking

Unit 3 will incorporate the following core ideas.

Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem.

Advancements in computing technology can change individuals' behaviors. Society is faced with trade-offs due to the increasing globalization and automation that computing brings.

People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.

Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.

Computer models can be used to simulate events, examine theories and inferences, or make predictions.

Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community.

Engineering design is a systematic, creative, and iterative process used to address local and global problems.

Engineering design requirements and specifications involve making trade-offs between competing requirements and desired design features.

Economic, political, social and cultural aspects of society drive development of new technological products, processes, and systems.

Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants.

Sometimes a technology developed for one purpose is adapted to serve other purposes.

Engineers use a systematic process of creating or modifying technologies that is fueled and constrained by physical laws, cultural norms, and economic resources.

Scientists use systematic investigation to understand the natural world.

Resources need to be utilized wisely to have positive effects on the environment and society. Some technological decisions involve tradeoffs between environmental and economic needs, while others have positive effects for both the economy and environment

Technological disparities have consequences for public health and prosperity.

Unit 3 Disciplinary Core Ideas Chart

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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-LS1-2) Develop a model	LS1.A: Structure and Function All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (MS-LS1-1) Within cells, special structures are	Cause and Effect Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8) Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.

to describe unobservable mechanisms. (MS-LS1-7) Planning and Carrying Out Investigations Planning and carrying out investigations in 6-8 builds on K5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions. Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation. (MS-LS1-1) 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) Engaging in Argument from Evidence Engaging in argument from evidence in 6–8	responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2) In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (MS-LS1-3) LS1.B: Growth and Development of Organisms Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4) Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. (MS-LS1-4) Genetic factors as well as local conditions affect the growth of the adult plant. (MS-LS1-5) LS1.C: Organization for Matter and Energy Flow in Organisms Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use. (MS-LS1- 6) Within individual organisms, food moves through a series of	(MS-LS1-4),(MSLS1-5) Scale, Proportion, and Quantity Phenomena that can be observed at one scale may not be observable at another scale. (MS-LS1-1) Systems and System Models Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3) Energy and Matter Matter is conserved because atoms are conserved in physical and chemical processes. (MS-LS1-7) Within a natural system, the transfer of energy drives the motion and/or cycling of matter. (MS-LS1-6) Structure and Function Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS1-2) ----------C onnections to Engineering, Technology, and Applications of Science Interdependence of Science, Engineering, and Technology Engineering advances have led to important

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 world(s). Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. (MS-LS1-3) Use an oral and written argument 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-LS1-4) Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 6-8 builds on K-5 experiences and progresses to evaluating the merit and validity of ideas and methods. Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (MS-LS1-8) ----------Connections to Nature of Science Scientific Knowledge is Based on Empirical Evidence Science knowledge is based upon logical connections between evidence and explanations. (MS-LS1-6)	chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy. (MS-LS1-7) LS1.D: Information Processing Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (MS-LS1- 8) PS3.D: Energy in Chemical Processes and Everyday Life The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen. (secondary to MS-LS1-6) Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials. (secondary to MS-LS1-7)	discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-LS1- 1) ----------Connections to Nature of Science Science is a Human Endeavor Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (MS-LS1-3)

Unit 3: Science/6th Grade **Cells and Heredity**	**Duration:** 15-20 Days

Standards:

MS-LS1-1 - Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.

MS-LS1-2 - Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.

MS-LS1-3 - Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

MS-LS1-8 - Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

Unit Summary: Students will be exposed to cells and heredity. This unit has seven lessons attached to it and should be completed in about 15-20 Days. They will be able to explore organisms to develop an understanding that the cell is the basic unit of life and that there are both unicellular and multicellular organisms, use models to understand and describe how a cell's functions are performed by specific cell structures, study models of a variety of organisms to relate structure to function at each level in an organism, investigate the structure and function of systems in plants and evaluate how the systems meet the needs of plants and respond to the environment, investigate the structure and function of systems in animals and evaluate how the systems meet the needs of animals and respond to the environment, and explain the cause and effect relationship between the information animals gather from the environment and their resulting behaviors.

NJ Student Learning Standards

Interdisciplinary Skills

RI.6.7 - Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
W.6.10 - 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.

SL.6.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.
Career Readiness, Life Literacies, and Key Skills
9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factor. 9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education. 9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish. 9.1.8.PB.1: Predict future expenses or opportunities that should be included in the budget planning process. 9.1.8.PB.2: Explain how different circumstances can affect one's personal budget. 9.1.12.CFR.1: Compare and contrast the role of philanthropy, volunteer service, and charities in community development and quality of life in a variety of cultures. 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.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 9.2.8.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. 9.4.8.CI.1: Assess data gathered on varying perspectives on causes of climate change (e.g., crosscultural, 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). 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).

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.7: Collaborate within a digital community to create a digital artifact using strategies such as crowdsourcing or digital surveys.
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.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.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).
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Computer Science and Design Thinking

8.1.8.CS.4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect individual's everyday activities and career options.
8.1.8.IC.2: Describe issues of bias and accessibility in the design of existing technologies.
8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.
8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed.
8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.
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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.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.
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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.ETW.1: Illustrate how a product is upcycled into a new product and analyze the short- and 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.
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8.2.8.EC.2: Examine the effects of ethical and unethical practices in product design and development.

Essential Understandings	**Essential Questions**
Students will understand that… ● Living organisms are composed of cellular units (structures) that carry out functions required for life.	● How do the structures of organisms contribute to life's functions? ● What do all living things have in common?

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- Cellular units are composed of molecules, which also carry out biological functions.
- In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.

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<tr><td colspan="2">Evidence of Student Learning</td></tr>
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Performance Tasks: Activities to provide evidence for student learning of content and cognitive skills.

- Edible Cell: Students create an animal or a plant cell using various candies. They must know all of the names of the parts of the cell and describe them once their creation is completed.

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Other Assessments

Formative Assessments

- Teacher Observations
- Interactive Notebook
- Performance Assessments
- Exit Slips
- Response Cards
- Graphic Organizers

Summative Assessments

- Tests
- Quizzes
- Summary
- Labs
- Hands-On Activities

Benchmark Assessment

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- Beginning of the Year Benchmark
- Mid-Year Benchmark
- End of the Year Benchmark

Alternative Assessments

- Teacher Observations
- Group Work/Class Work

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<tr><td colspan="2">Vocabulary

organism/cell/unicellular organism/multicellular organism/cell membrane/organelle/nucleus/mitochondria/chloroplasts/cell wall/tissue/organ/organ system/leaf/root/stem/digestive system/excretory system/respiratory system/circulatory system/muscular system/nervous system/homeostasis/sensory receptor/behavior/memory</td></tr>
<tr><td colspan="2">Knowledge and Skills</td></tr>
<tr><td>Content</td><td>Skills</td></tr>
<tr><td>

Students will know…

- the parts and use of a compound microscope
- know the major contributors to cell theory
- cell structure and specialized function of each organelle in a plant and animal cell
- Multicellular organisms begin as a single cell.
- Organisms grow and develop as a result of cell division.
- the levels of organization within an organism
- that each sense receptor responds to different inputs (electromagnetic, mechanical, chemical) transmitting them as

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Students will be able to …

- Demonstrate how to correctly use the compound microscope.
- Describe the structure and function of each organelle in a plant and animal cell.
- Compare and contrast structures of different types of cells and relate the structures to the functions the different cells perform.
- Understand the different levels of organization within an organism.

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signals that travel along the nerve cells to the brain resulting in immediate behaviors and memories	

Instructional Plan

Suggested Activities	Resources
- Observe cells with a microscope - Use cell models to investigate cell size - Model tissue structure and function - Observe transport - Measure system response to exercise - Measure reaction time	- www.brainpopjr.com - www.newsela.com (leveled texts) - https://www.teachengineering.org/ - www.readworks.org (leveled texts) - www.neok12.com

Print Materials

- HMH Dimensions Textbook/Workbook
- Studies Weekly Science
- *When Hilter stole the Pink Rabbit* by Judith Kerr
- *Number the Stars* by Lois Lowery
- *The Devil's Arithmetic* by Jane Yolen

Websites

- www.brainpopjr.com
- www.newsela.com (leveled texts)
- https://www.teachengineering.org/
- www.readworks.org (leveled texts)
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Modifications

Special Education Students / 504 (*These are just suggested ideas to modify instruction. All modifications and accommodations should be specific to each student's IEP or 504 plan*) reduce/revise assignments & assignments as per IEP; provide individual and small group assistance; notes, and study guides; provide background knowledge.

English Language learners: *use consistent, simplified language; provide bilingual when appropriate; provide cooperative learning opportunities, use modeling, visual aids, and manipulatives.*

Students at Risk of Failure: *Provide less distracting seating if possible, frequent check-in by teacher, study guides, notes, etc.*

Gifted Students: *provide additional enrichment activity involving demonstrating knowledge, deeper research to answer a higher level questions, or complimentary assignment.*

Suggested Options for Differentiation

English Language Learners

- Highlight key words
- Sentence starters
- Prompting and cueing
- Provide pictures and well labeled models
- Speak slowly and gesture when necessary
- Pre-teach vocabulary words
- Extended Time
- Less questions on a page for tests

Gifted and Talented

- Differentiate Assignments
- Complete different homework assignments than peers
- Open ended questions to activate higher level thinking

- Higher level texts

Basic Skills/Economically Disadvantaged/Students at Risk

- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Highlight key words
- Frequent breaks
- Strategic grouping

Modifications/Accommodations

Special Education

- Provide differentiated instruction as needed
- Follow all IEP modifications
- Review concepts and important vocabulary from previous lessons before teaching new information
- Check for student understanding often with formal, informal, verbal, and nonverbal measures
- Progress Monitoring
- Strategic grouping
- Pre-teach concepts
- Allow for movement while working when needed

504

- Pre-teach and/or re-teach important concepts
- Prepare advanced organizers/study guides for new material Assignments
- Modify the amount of homework
- Reduce paper and pencil tasks
- Break assignments into a series of smaller assignments
- Use highlighted texts Evaluation Methods

	Correlation Key	

Holocaust	Amistad	Financial Literacy

Career Readiness, Life Literacies, and Key Skills Practices	
Act as a responsible and contributing community members and employee.	Students understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
Consider the environmental, social and economic impacts of decisions.	Students understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.

Demonstrate creativity and innovation.	Students regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.
Utilize critical thinking to make sense of problems and persevere in solving them.	Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
Model integrity, ethical leadership and effective management.	Students consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.

Plan education and career paths aligned to personal goals.	Students take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.
Use technology to enhance productivity, increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
Work productively in teams while using cultural/global competence.	Students positively contribute to every team, whether formal or informal. They apply an awareness of cultural differences to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

Career Readiness, Life Literacies, and Key Skills Core Ideas
Unit 4 will incorporate the following core ideas. Individuals can use their talents, resources and abilities to give back. There are government agencies and policies that affect the financial industry and the broader economy Marketing techniques are designed to encourage individuals to purchase items they may not need or want. A budget aligned with an individual's financial goals can help prepare for life events. Philanthropic, charitable, and entrepreneurial organizations play distinctly different but vitally important roles in supporting the interests of local and global communities. An individual's strengths, lifestyle goals, choices, and interests affect employment and income There are variety of resources available to help navigate the career planning process. Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.

Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.

Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills.

Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.

Multiple solutions often exist to solve a problem.

An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.

Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work.

Digital communities are used by individuals to share information, organize, and engage around issues and topics of interest. Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction

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.

Sources of information are evaluated for accuracy and relevance when considering the use of information.

There is a need to produce and publish media that has information supported with quality evidence and is intended for authentic audiences.

Computer Science and Design Thinking

Unit 4 will incorporate the following core ideas.

Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem.

Advancements in computing technology can change individuals' behaviors. Society is faced with trade-offs due to the increasing globalization and automation that computing brings.

People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.

Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.

Computer models can be used to simulate events, examine theories and inferences, or make predictions.

Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community. Engineering design is a systematic, creative, and iterative process used to address local and global problems.

Engineering design requirements and specifications involve making trade-offs between competing requirements and desired design features.

Economic, political, social and cultural aspects of society drive development of new technological products, processes, and systems.

Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants.

Sometimes a technology developed for one purpose is adapted to serve other purposes.

Engineers use a systematic process of creating or modifying technologies that is fueled and constrained by physical laws, cultural norms, and economic resources.

Scientists use systematic investigation to understand the natural world.

Resources need to be utilized wisely to have positive effects on the environment and society. Some technological decisions involve tradeoffs between environmental and economic needs, while others have positive effects for both the economy and environment

Technological disparities have consequences for public health and prosperity.

Unit 4 Disciplinary Core Ideas Chart

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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 a model to describe phenomena. (MS-LS2-3) 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 provide evidence for phenomena. (MS-LS2-1) 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	LS2.A: Interdependent Relationships in Ecosystems Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (MS-LS2-1) In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. (MS-LS2- 1) Growth of organisms and population increases are limited by access to resources. (MS-LS2-1) Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of	Patterns Patterns can be used to identify cause and effect relationships. (MS-LS2-2) Cause and Effect Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-LS2-1) Energy and Matter The transfer of energy can be tracked as energy flows through a natural system. (MSLS2-3) Stability and Change Small changes in one part of a system might cause large changes in another part. (MSLS2-4),(MS-LS2-5) ---------- Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World The use of technologies and any

supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena. (MS-LS2-2) 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 world(s). Construct an oral and written argument 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-LS2-4) Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-LS2- 5) --- Connections to Nature of Science Scientific Knowledge is Based on Empirical Evidence Science disciplines share common rules of obtaining and evaluating empirical evidence. (MS-LS2-4)	organisms with their environments, both living and nonliving, are shared. (MS-LS2-2) LS2.B: Cycle of Matter and Energy Transfer in Ecosystems Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (MS-LS2-3) LS2.C: Ecosystem Dynamics, Functioning, and Resilience Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (MS-LS2-4) Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a	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-LS2-5) --- Connections to Nature of Science 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-LS2-3) Science Addresses Questions About the Natural and Material World Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-LS2-5)

	measure of its health. (MS-LS2-5) LS4.D: Biodiversity and Humans Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (secondary to MS-LS2-5) ETS1.B: Developing Possible Solutions There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (secondary to MS-LS2-5)	

ScienceUnit 4: Ecology and the Environment	**Duration:** 50-60 Days
Standards: **MS-LS1-6 - Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.** **MS-LS1-7 - Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.** **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-LS2-1 - Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.**	

MS-LS2-4 - Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

Unit Summary: Students will be exposed to ecology and the environment. This unit has nine lessons attached to it and should be completed in 50-60 Days. They will be able to explore construct a scientific explanation based on evidence for the role of photosynthesis, develop a model to describe how food is rearranged through chemical reactions forming new molecules, develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem, analyze and interpret data to provide evidence, and construct an argument supported by empirical evidence.

NJ Student Learning Standards

Interdisciplinary Skills

RI.6.7 - Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
W.6.10 - 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.
SL.6.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

Career Readiness, Life Literacies, and Key Skills

9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factor.
9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education.
9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish.
9.1.8.PB.1: Predict future expenses or opportunities that should be included in the budget planning process.
9.1.8.PB.2: Explain how different circumstances can affect one's personal budget.
9.1.12.CFR.1: Compare and contrast the role of philanthropy, volunteer service, and charities in community development and quality of life in a variety of cultures.
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.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
9.2.8.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.
9.4.8.CI.1: Assess data gathered on varying perspectives on causes of climate change (e.g., crosscultural, 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).
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 (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).
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.7: Collaborate within a digital community to create a digital artifact using strategies such as crowdsourcing or digital surveys.
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.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.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: Ap9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.ply deliberate and thoughtful search strategies to access high-quality information on climate change (e.g., 1.1.8.C1b)
Computer Science and Design Thinking
8.1.8.CS.4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems. 8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect individual's everyday activities and career options. 8.1.8.IC.2: Describe issues of bias and accessibility in the design of existing technologies. 8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose. 8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed. 8.1.8.DA.3: Identify the appropriate tool to access data based on its file format. 8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users 8.1.8.DA.5: Test, analyze, and refine computational models. 8.1.8.DA.6: Analyze climate change computational models and propose refinements. 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.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.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.ETW.1: Illustrate how a product is upcycled into a new product and analyze the short- and 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.

Essential Understandings	**Essential Questions**
Students will understand that… ● Living things have a variety of observable features that enable them to survive and reproduce through the conversion of energy from one form to another. ● Organisms and their environments are interconnected.	● How is matter transformed, and energy transferred/transformed in living systems? (photosynthesis and cellular respiration) ● How can change in one part of the ecosystem affect change in other parts of the ecosystem?

Evidence of Student Learning

Performance Tasks: *Activities to provide evidence for student learning of content and cognitive skills.*	**Other Assessments**
● Create an infomercial on an endangered species. Students will first research an endangered species, they will then work in small groups separated by the biome their species lives in. Together they will create an informative short film highlighting the endangered animals of their biome. Students will present their video to the class and grade other students using a rubric.	**Formative Assessments** ● Teacher Observations ● Interactive Notebook ● Performance Assessments **Summative Assessments** ● Tests

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- Hands-On Activities

Benchmark Assessment

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- Mid-Year Benchmark
- End of the Year Benchmark

Alternative Assessments

- Teacher Observations
- Group Work/Class Work

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ecosystem/biodiversity/disturbance/succession/ecosystem service/habitat destruction/habitat fragmentation/biotic factor/abiotic factor/species/population/community/predator/prey/herbivore/symbiosis/competition/matter/molecule/energy/producer/ consumer/decomposer/chemical reaction/photosynthesis/cellular respiration/food web/energy pyramid</td></tr>
<tr><td colspan="2">Knowledge and Skills</td></tr>
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<tr><td>Students will know….

- the possible ecological relationships between species that coexist in an ecosystem
- that ecological relationships evolved over time and are integral to maintaining the balance and stability of ecosystems
- the living and nonliving factors that can throw ecosystems out of balance

</td><td>Students will be able to …

- Illustrate and/or model the processes of photosynthesis, cellular respiration and protein synthesis to obtain and use energy.
- Analyze the flow of energy through an ecosystem beginning with photosynthesis.

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- how human actions that have contributed to ecosystem imbalance and species decline
- how the cell uses the processes of photosynthesis, cellular respiration and protein synthesis to obtain and use energy as well as maintain and repair itself
- how the nutrients needed by an organism change over the organism's life span

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<tr><td colspan="2">Instructional Plan</td></tr>
<tr><td>Suggested Activities

- Investigate decomposition
- Investigate the effect of sunlight on Elodea
- Model energy flow in an ecosystem
- Investigate your schoolyard
- Investigate effects of limited resources
- Simulate feeding relationships
- Measure biodiversity

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Gifted Students: *provide additional enrichment activity involving demonstrating knowledge, deeper research to answer a higher level questions, or complimentary assignment.*

Suggested Options for Differentiation

English Language Learners

- Prompting and cueing
- Activate schema
- Build background knowledge
- Provide pictures and well labeled models
- Speak slowly and gesture when necessary
- Pre-teach vocabulary words
- Extended time on assessments
- Small group for assessment

Gifted and Talented

- Extend reading response to further enrich understanding
- Organize and offer flexible small group learning activities

- Teach cognitive and methodological skills
- Use centers

Basic Skills/Economically Disadvantaged/Students at Risk

- Reteaching if needed
- Displays or charts to give deeper understanding
- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Communication logs

Special Education

- Follow all IEP modifications
- Provide visual aids to support concepts being taught
- Use graphic organizers to help students organize important information from a lesson
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus

504

- Pre-teach and/or re-teach important concepts
- Prepare advanced organizers/study guides for new material Assignments
- Modify the amount of homework
- Reduce paper and pencil tasks
- Break assignments into a series of smaller assignments
- Use highlighted texts Evaluation Methods

	Correlation Key	
Holocaust	Amistad	Financial Literacy

Career Readiness, Life Literacies, and Key Skills Practices	
Act as a responsible and contributing community members and employee.	Students understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
Consider the environmental, social and economic impacts of decisions.	Students understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.

Demonstrate creativity and innovation.	Students regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.
Utilize critical thinking to make sense of problems and persevere in solving them.	Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
Model integrity, ethical leadership and effective management.	Students consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.

Plan education and career paths aligned to personal goals.	Students take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.
Use technology to enhance productivity, increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
Work productively in teams while using cultural/global competence.	Students positively contribute to every team, whether formal or informal. They apply an awareness of cultural differences to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

Career Readiness, Life Literacies, and Key Skills Core Ideas
Unit 5 will incorporate the following core ideas. Individuals can use their talents, resources and abilities to give back. There are government agencies and policies that affect the financial industry and the broader economy Marketing techniques are designed to encourage individuals to purchase items they may not need or want. A budget aligned with an individual's financial goals can help prepare for life events. Philanthropic, charitable, and entrepreneurial organizations play distinctly different but vitally important roles in supporting the interests of local and global communities. An individual's strengths, lifestyle goals, choices, and interests affect employment and income There are variety of resources available to help navigate the career planning process. Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income. Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions. Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills. Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking. Multiple solutions often exist to solve a problem.

An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.

Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work.

Digital communities are used by individuals to share information, organize, and engage around issues and topics of interest. Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction

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.

Sources of information are evaluated for accuracy and relevance when considering the use of information.

There is a need to produce and publish media that has information supported with quality evidence and is intended for authentic audiences.

Computer Science and Design Thinking

Unit 5 will incorporate the following core ideas.

Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem.

Advancements in computing technology can change individuals' behaviors. Society is faced with trade-offs due to the increasing globalization and automation that computing brings.

People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.

Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.

Computer models can be used to simulate events, examine theories and inferences, or make predictions.

Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community. Engineering design is a systematic, creative, and iterative process used to address local and global problems.

Engineering design requirements and specifications involve making trade-offs between competing requirements and desired design features.

Economic, political, social and cultural aspects of society drive development of new technological products, processes, and systems.

Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants.

Sometimes a technology developed for one purpose is adapted to serve other purposes.

Engineers use a systematic process of creating or modifying technologies that is fueled and constrained by physical laws, cultural norms, and economic resources.

Scientists use systematic investigation to understand the natural world.

Resources need to be utilized wisely to have positive effects on the environment and society. Some technological decisions involve tradeoffs between environmental and economic needs, while others have positive effects for both the economy and environment

Technological disparities have consequences for public health and prosperity.

Unit 5 Disciplinary Core Ideas Chart

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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	ESS1.C: The History of Planet Earth Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. (HS.ESS1.C GBE) (secondary to MS-ESS2-3)	Patterns Patterns in rates of change and other numerical relationships can provide information about natural systems. (MS-ESS2-3)

design systems. Develop and use a model to describe phenomena. (MSESS2-1),(MS-ESS2-6) Develop a model to describe unobservable mechanisms. (MS-ESS2-4) 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 provide evidence for phenomena. (MS-ESS2-3) 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	ESS2.A: Earth's Materials and Systems 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 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) ESS2.B: Plate Tectonics and Large-Scale System Interactions 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. (MS-ESS2-3) ESS2.C: The Roles of Water in Earth's Surface Processes Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (MS-ESS2-4) The complex patterns of the changes and the movement of water	Cause and Effect Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MSESS2-5) 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) Systems and System Models Models can be used to represent systems and their interactions—such as inputs, processes and outputs— and energy, matter, and information flows within systems. (MS-ESS2-6) Energy and Matter Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (MS-ESS2-4) 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)

solutions supported by multiple sources of evidence consistent with scientific ideas, 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 nature operate today as they did in the past and will continue to do so in the future. (MS-ESS2-2) ---------- Connections to Nature of Science Scientific Knowledge is Open to Revision in Light of New Evidence Science findings are frequently revised and/or reinterpreted based on new evidence. (MS-ESS2-3)	in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. (MSESS2-5) Global movements of water and its changes in form are propelled by sunlight and gravity. (MS-ESS2-4) Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6) Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. (MS-ESS2-2) ESS2.D: Weather and Climate 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. (MS-ESS2-6) Because these patterns are so complex, weather can only be predicted probabilistically. (MS-ESS2-5) The ocean exerts a major influence on weather and climate by	

ScienceUnit 5: Earth's Water and Atmosphere	**Duration:** 20-30 Days

Unit Summary: Students will be exposed to Earth's water and atmosphere. This unit has six lessons attached to it and should be completed in 20-30 Days. They will be able to design a model that describes oceanic an atmospheric circulation and use it to explain the factors that influence each type of circulation, use models to explain the processes by which energy and matter flow through Earth's systems, learn ways in which sunlight and gravity drive water movement and how the transfer of energy moves through a system, carry out investigations about changes in weather and examine how weather is influenced by interactions involving sunlight, winds, landforms, ocean temperatures and currents, and movement of water throughout Earth's systems, collect data related to mathematical models and learn how they are used to predict weather, and use models to explore interactions that influence regional climates and they compare climates by interpreting graphs and maps.

Standards:

MS-ESS2-6 - Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

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

NJ Student Learning Standards

Interdisciplinary Skills

RI.6.7 - Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
W.6.10 - 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.
SL.6.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

Career Readiness, Life Literacies, and Key Skills

9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factor.
9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education.
9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish.

9.1.8.PB.1: Predict future expenses or opportunities that should be included in the budget planning process.
9.1.8.PB.2: Explain how different circumstances can affect one's personal budget.
9.1.12.CFR.1: Compare and contrast the role of philanthropy, volunteer service, and charities in community development and quality of life in a variety of cultures.
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.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
9.2.8.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.
9.4.8.CI.1: Assess data gathered on varying perspectives on causes of climate change (e.g., crosscultural, 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).
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 (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).
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.7: Collaborate within a digital community to create a digital artifact using strategies such as crowdsourcing or digital surveys.

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.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.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: Ap9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.ply deliberate and thoughtful search strategies to access high-quality information on climate change (e.g., 1.1.8.C1b)

Computer Science and Design Thinking

8.1.8.CS.4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect individual's everyday activities and career options.
8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.
8.1.8.DA.6: Analyze climate change computational models and propose refinements.
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.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.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.ETW.1: Illustrate how a product is upcycled into a new product and analyze the short- and 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.

Essential Understandings	**Essential Questions**
Students will understand that… ● Earth's components form systems. These systems continually interact at different rates of time, affecting the Earth regionally and globally. ● Earth systems can be broken down into individual components which have observable measurable properties. ● Technology enables us to better understand Earth's system and the impact of Earth's systems on human activity.	● How do changes in one part of an Earth system affect other parts of the system? ● How does understanding the properties of Earth materials and the physical laws that govern behavior lead to predictions of Earth? ● How does technology extend human senses and understanding of Earth?
Evidence of Student Learning	
Performance Tasks: *Activities to provide evidence for student learning of content and cognitive skills.* ● Students will implement a weather forecast video broadcast. The final production will cover a wide range of real world techniques and examples and will teach the students how to create, manage and produce a professional weather forecast. The students will use their	**Other Assessments** **Formative Assessments** ● Exit Slips ● Response Cards ● Graphic Organizers

<table>
<tr><td>weather knowledge learned throughout the unit and apply it to the forecast. They will work in cooperative groups to complete this task.</td><td>Summative Assessments
Quizzes
Summary
Labs
Benchmark Assessment
Beginning of the Year Benchmark
Mid-Year Benchmark
End of the Year Benchmark
Alternative Assessments
Teacher Observations
Group Work/Class Work</td></tr>
<tr><td colspan="2">Vocabulary

weather/air mass/front/weather forecast/climate/convection/Coriolis effect/ocean current/convection/sublimation/transpiration/evaporation/condensation/precipitation/runoff</td></tr>
<tr><td colspan="2">Knowledge and Skills</td></tr>
<tr><td>Content</td><td>Skills</td></tr>
<tr><td>Students will know….
Interactions of air masses as they relate to weather
The impact that air pressure systems have on the weather
How hurricanes develop</td><td>Students will be able to …
Infer from an experiment how density affects colliding air masses
Read a weather map to answer a series of questions</td></tr>
</table>

• Compare different types of winter storms • How thunderstorms develop and the effects of thunderstorms on weather • The effects of tornadoes as well as the mechanisms involved in their formation • The various instruments used by meteorologist to forecast weather • Isobars, recognize them on a weather map and determine the type of weather each represents and differentiate weather from climate • The geographic factors that affect climate as well as the six major climate zones • How oceans affect climate	• Observe through a demonstration two air masses with different densities • Create a model of the hydrologic cycle that focuses on the transfer of water in and out of the atmosphere • Apply the model to different climates around the world
Instructional Plan	
Suggested Activities • Experiment with wind • Explore density differences in water • Rain in a jar • Model an air mass interaction • Predict costs using a model • Model local climate	**Resources** - www.brainpopjr.com - www.newsela.com (leveled texts) - https://www.teachengineering.org/ - www.readworks.org (leveled texts) - www.neok12.com
Print Materials - HMH Dimensions Textbook/Workbook	
Websites - www.brainpopjr.com - www.newsela.com (leveled texts)	

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- www.neok12.com

Modifications

Special Education Students / 504 (*These are just suggested ideas to modify instruction. All modifications and accommodations should be specific to each student's IEP or 504 plan*) reduce/revise assignments & assignments as per IEP; provide individual and small group assistance; notes, and study guides; provide background knowledge.

English Language learners: *use consistent, simplified language; provide bilingual when appropriate; provide cooperative learning opportunities, use modeling, visual aids, and manipulatives.*

Students at Risk of Failure: *Provide less distracting seating if possible, frequent check-in by teacher, study guides, notes, etc.*

Gifted Students: *provide additional enrichment activity involving demonstrating knowledge, deeper research to answer a higher level questions, or complimentary assignment.*

Suggested Options for Differentiation

English Language Learners

- Provide pictures and well labeled models
- Printed text
- Partner work
- Speak slowly and gesture when necessary
- Extended time on assessments
- Small group for assessment

Gifted and Talented

- Differentiate Assignments
- Differentiate Texts
- Students will become experts in weather and assist the other students in need. Higher order thinking questions.

- Complete Different Homework than peers

Basic Skills/Economically Disadvantaged/Students at Risk

- Graphic organizers
- Reteaching if needed
- Displays or charts to give deeper understanding
- Build background knowledge
- Increased parent communication
- Strategic grouping
- Pre-teach concepts
- Small group for assessments

Special Education

- Follow all IEP modifications
- Provide manipulatives or the opportunity to draw solution strategies
- Pre-Teach concepts
- Extended Time
- Strategic grouping
- Small group for assessments
- Check in's during experiments to help refocus

504

- Pre-teach and/or re-teach important concepts
- Prepare advanced organizers/study guides for new material Assignments
- Modify the amount of homework
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- Use highlighted texts Evaluation Methods
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Plan education and career paths aligned to personal goals.	Students take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.
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Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills.
Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
Multiple solutions often exist to solve a problem.

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Advancements in computing technology can change individuals' behaviors. Society is faced with trade-offs due to the increasing globalization and automation that computing brings.

People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.

Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.

Computer models can be used to simulate events, examine theories and inferences, or make predictions.

Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community. Engineering design is a systematic, creative, and iterative process used to address local and global problems.

Engineering design requirements and specifications involve making trade-offs between competing requirements and desired design features.

Economic, political, social and cultural aspects of society drive development of new technological products, processes, and systems.

Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants.

Sometimes a technology developed for one purpose is adapted to serve other purposes.

Engineers use a systematic process of creating or modifying technologies that is fueled and constrained by physical laws, cultural norms, and economic resources.

Scientists use systematic investigation to understand the natural world.

Resources need to be utilized wisely to have positive effects on the environment and society. Some technological decisions involve tradeoffs between environmental and economic needs, while others have positive effects for both the economy and environment

Technological disparities have consequences for public health and prosperity.

Unit 6 Disciplinary Core Ideas Chart

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and	ESS1.A: The Universe and Its Stars Patterns of the apparent motion of the sun, the moon, and stars in the sky can be	Patterns Patterns can be used to identify cause and-effect relationships. (MS-ESS1-1)

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) 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. 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-ESS1- 4)	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) ESS1.B: Earth and the Solar System 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),(MSESS1-3) 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) ESS1.C: The History of Planet Earth The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. (MS-ESS1- 4)	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) ---------- Connections to Engineering, Technology, and Applications of Science 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. (MSESS1-3) ---------- Connections to Nature of Science 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)

ScienceUnit 6: Space Science	**Duration:** 20-30 Days

Unit Summary: Students will be exposed to space science. This unit has six lessons attached to it and should be completed in 20-30 Days. They will be able to explore patterns in order to better understand the cause and effect relationships within the Earth-sun-moon system, relate the motions of Earth to the apparent motion of stars in the sky to explain why different stars can be observed throughout the year, explore the arrangement of the objects in the solar system, explore geocentric and heliocentric models of the solar system, use models to gain an understanding of where Earth fits into the Milky Way galaxy, and use models to investigate how the attractive force of gravity accounts for the motions of Earth and other objects in the universe.

Standards:

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.

NJ Student Learning Standards

Interdisciplinary Skills

RI.6.7 - Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

W.6.10 - 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.

SL.6.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

Career Readiness, Life Literacies, and Key Skills

9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factor.
9.1.12.CFR.1: Compare and contrast the role of philanthropy, volunteer service, and charities in community development and quality of life in a variety of cultures.
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.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
9.2.8.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.
9.4.8.CI.1: Assess data gathered on varying perspectives on causes of climate change (e.g., crosscultural, 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).
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 (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).
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.
surveys.
9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect (e.g., 1.5.8.C1a).
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.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: Ap9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.ply deliberate and thoughtful search strategies to access high-quality information on climate change (e.g., 1.1.8.C1b)

Computer Science and Design Thinking

8.1.8.CS.4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect individual's everyday activities and career options.
8.1.8.IC.2: Describe issues of bias and accessibility in the design of existing technologies.
8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.
8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users
8.1.8.DA.6: Analyze climate change computational models and propose refinements.
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
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.NT.1: Examine a malfunctioning tool, product, or system and propose solutions to the problem.
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.4: Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best.

Essential Understandings	Essential Questions

Students will understand that… ● Observable, predictable patterns of movement in the Sun, Earth, Moon system occur because of gravitational interaction and energy from the Sun. ● The Universe is made up of galaxies, each of which is composed of solar systems, having the same elements and governed by the same laws.	● What predictable, observable patterns occur as a result of the interaction between the Earth, Moon and Sun? ● What types of celestial bodies encompass our Universe?
Evidence of Student Learning	
Performance Tasks: *Activities to provide evidence for student learning of content and cognitive skills.* ● Students will build their own mini satellite and use it to collect some pretend stellar debris. If you simulate an asteroid impact, how much stellar dust will your satellite collect? Will placing your satellite at different "orbital" distances from the impact change the amount of debris collected?	**Other Assessments** **Formative Assessments** ● Exit Slips ● Response Cards ● Think-Pair-Share **Summative Assessments** ● Quizzes ● Summary ● Hands-On Activities **Benchmark Assessment** ● Beginning of the Year Benchmark

	• Mid-Year Benchmark • End of the Year Benchmark **Alternative Assessments** • Participation Rubric • Teacher Observations
Vocabulary **orbit/phase/eclipse/season/solar nebula/protoplanetary disk/parallax/telescope/comet/asteroid/astronomical unit/galaxy/universe/light-year/gravity**	
Knowledge and Skills	
Content	**Skills**
Students will know…. • How distance and mass affect gravitational attraction • The difference between rotation and revolution • The 3 laws for planetary motion. • The current theory of the origin of the Earth's moon • The causes of the phases of the Earth's moon, eclipses, daily and monthly tides • The factors that combine to explain the changes in the length of the day and seasons	*Students will be able to …* • Distinguish between Earth's rotation and Earth's revolution • Model how the Sun strikes Earth's surface. • Model how solar energy spreads out over Earth's surface throughout the year • Simulate how the Moon moves around the Earth • Illustrate and demonstrate a solar eclipse and lunar eclipse • Design 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 • Model the different phases of the moon

	● Demonstrate the gravitational pull between the Sun and a planet ● Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system ● Construct a scale model of our solar system ● Analyze and interpret data to determine scale properties of objects in the solar system ● Differentiate the sun as it relates to other stars in the universe ● Determine one's own individual responsibility from personal actions and contributions to group activities ● Demonstrate leadership skills, cooperative learning strategies, and community building strategies when participating in classroom laboratory activities ● Demonstrate the ability to understand inferences
Instructional Plan	
Suggested Activities ● Model nebular disk formation ● Investigate parallax ● Determine your location within a field of objects ● Explore the motion of a falling object ● Model the apparent motion of the sun ● Model moon phases ● Model solar and lunar eclipses ● Model sunlight distribution	**Resources** - www.brainpopjr.com - www.newsela.com (leveled texts) - https://www.teachengineering.org/ - www.readworks.org (leveled texts) - www.neok12.com

- Model patterns of sunlight throughout Earth's revolution

Print Materials

- HMH Dimensions Textbook/Workbook
- Studies Weekly Science
- The Life of Benjamin Banneker: Astronomer and Mathematician (Legendary African Americans) by Laura Baskes Litwin

Websites

- www.brainpopjr.com
- www.newsela.com (leveled texts)
- https://www.teachengineering.org/
- www.readworks.org (leveled texts)
- www.neok12.com

Modifications

Special Education Students / 504 (*These are just suggested ideas to modify instruction. All modifications and accommodations should be specific to each student's IEP or 504 plan*) reduce/revise assignments & assignments as per IEP; provide individual and small group assistance; notes, and study guides; provide background knowledge.

English Language learners: *use consistent, simplified language; provide bilingual when appropriate; provide cooperative learning opportunities, use modeling, visual aids, and manipulatives.*

Students at Risk of Failure: *Provide less distracting seating if possible, frequent check-in by teacher, study guides, notes, etc.*

Gifted Students: *provide additional enrichment activity involving demonstrating knowledge, deeper research to answer a higher level questions, or complimentary assignment.*

Suggested Options for Differentiation

English Language Learners

- Provide pictures and well labeled models
- Speak slowly and gesture when necessary

Leveled readers

- Extended time on assessments
- Small group for assessment

Gifted and Talented

- Differentiate Assignments
- Higher order thinking questions
- Differentiate Texts
- Complete Different Homework than peers

Basic Skills/Economically Disadvantaged/Students at Risk

- Teacher created model to display for student understanding
- Graphic organizers
- Build background knowledge
- Increased parent communication
- Strategic grouping
- Pre-teach concepts
- Small group for assessments

Special Education

- Follow all IEP modifications
- Provide manipulatives or the opportunity to draw solution strategies
- Pre-Teach concepts
- Extended Time
- Strategic grouping
- Small group for assessments
- Check in’s during experiments to help refocus

504

- Follow 504 Plan

- Pre-teach and/or re-teach important concepts
- Prepare advanced organizers/study guides for new material Assignments
- Modify the amount of homework
- Reduce paper and pencil tasks
- Break assignments into a series of smaller assignments
- Use highlighted texts Evaluation Methods