Summit Public Schools
Summit, New Jersey
Grade Level: 7/ Content Area: Integrated Science

Overview:

The 7th grade science program will provide students with a thorough, relevant, and engaging standards-based curriculum that focuses on implementing the scientific and engineering practices as well as the cross-cutting concepts based on the core ideas. This course will emphasize problem-based learning experiences, 21st Century Skills, and engineering design processes in a supportive, challenging environment for all students. Classroom activities will include scientific investigations, application of research, and analyzing and interpreting data.

The following topics are covered in the 7th grade science curriculum:

1) Introduction to Scientific Practices
2) The Solar System
3) Energy & Chemistry
4) Photosynthesis & Cellular Respiration
5) Organic Chemistry
6) Human Impact on Ecosystems
7) Genetics
8) Evolution
9) Weather

Unit 1: Introduction to Scientific Practices	
Big Ideas: *Course Objectives/Content Statement(s)* ● Throughout this unit, students will learn about observations and inferences. Students will be able to differentiate between the two types of observations, quantitative and qualitative data. While covering quantitative data, students will learn how to effectively apply the metric system as well as how to convert from one value to another. Finally, students will learn how to make an observation and apply this to an inference. These concepts will be used throughout the school year.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1) What steps can one take to keep safe in the science classroom? 2) What are the steps in the Engineering Design Process? 3) How is the design process used to solve a real-world problem? 4) What tools are essential for scientists? 5) What are the 3 main units used in the metric system and what do they measure? 6) How does making observations differ from making inferences?	**Students will understand that:** ● Knowing universal science procedures and practicing them promotes a safe learning environment. ● The Engineering Design Process involves identifying the problem, researching (a) possible solution(s), designing a model, testing the design, reflecting and then possibly redesigning. ● The design process is used by scientists and people with other occupations to define and ultimately solve problems, whether small or large. The process of trial and redesign leads to the best possible product/result. ● Scientists use instruments like rulers/meter sticks, graduated cylinders, beakers, and scales very frequently in various fields of science. ● The three main units in the metric system are meter (distance/length), Liter (volume), gram (mass). ● Observations can be quantitative or qualitative and are completely factual, while observations are assumptions based on observations. Multiple good observations lead to better inferences.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will:	**Lesson 1:** Design and create a marshmallow launching

MS-PS3-1
Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

MS-PS3-2
Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.

MS-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.

Career-Ready Practices
CRP1: Act as a responsible and contributing citizen and employee.
CRP2: Apply appropriate academic and technical skills.
CRP3: Attend to personal health and financial well-being.
CRP4: Communicate clearly and effectively and with reason.
CRP5: Consider the environmental, social and economic impacts of decisions.
CRP6: Demonstrate creativity and innovation.
CRP7: Employ valid and reliable research strategies.
CRP8: Utilize critical thinking to make sense of problems

catapult
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Lesson 2: Properly and safely prepare, complete, and clean up a lab/experiment
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Lesson 3: Identify and implement the steps of the engineering design process
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Lesson 4: Utilize scientific instruments such as rulers, graduated cylinders, scales, etc.
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Lesson 5: Recognize the units to be used when measuring either length, volume, or mass
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Lesson 6: Differentiate between observations and inferences
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Lesson 7: Use observations to make scientifically appropriate inferences
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and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management. **CRP10**: Plan education and career paths aligned to personal goals. **CRP11**: Use technology to enhance productivity. **CRP12**: Work productively in teams while using cultural global competence.	
Differentiation	**Assessments**
Interdisciplinary Connections ● Catapult research, Metric Conversion Act of 1975- Social Studies ● Metric conversions, metric units, STEAM Build - Math ● STEAM Report- ELA ● Art - development of the aesthetics of the catapult build **Technology Integration** ● metrics (digital scale) ● Frequent use of Chromebook for research/check-ins ● Kahoot!, Peardeck Flashcard Factory , Quizlet and Jeopardy used as review games ● Google Docs for STEAM Report ● Google Slides, Peardeck for teacher-led and student-led presentations **Media Literacy Integration** ● Flocabulary- Week in Rap ○ Every Friday, as a class, we will watch this brief 2-3 summary of current events sung in rap ○ After watching, students are welcome to share thoughts/comments and/or ask questions on any science topics in the video	**Formative Assessments:** ● Digital checks for understanding **Summative Assessments, Projects, and Celebrations:** ● Metric System Quiz ● STEAM Report ● Catapult STEAM Build

Global Perspectives

- Consider the struggles of individuals moving from countries using the metric system to the United States.
- The Metric System is used world-wide as a common language of numbers so that mistakes and miscalculations can be avoided.
- Recognize that the metric system is used throughout many disciplines and that using it will be beneficial no matter the career path.

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations

Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 2: The Solar System	
Big Ideas: *Course Objectives/Content Statement(s)* ● Throughout the solar system unit, students research the eight planets to determine distinguishing characteristics for each planet. Students also create an alien that inhabits one of the planets, as well as a passport as these aliens will be visiting Earth for a few days. The unit also involves the concept of gravity and how it is affected by mass.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1) What evidence is there to support the theory of the Big Bang? 2) What are the names of the 8 planets and what distinguishing characteristics do they possess? 3) Why is Earth the only planet in our solar system capable of sustaining life? 4) Why was Pluto once considered a planet? What is Pluto now? 5) What are the consequences of not taking care of our planet? 6) How does planet size and distance affect mass/weight.	**Students will understand that:** ● There are multiple types of evidence supporting the theory of the Big Bang. They are Cosmic Microwave Background Radiation, Redshift, and Mixture of Elements. ● Earth is the only planet in our solar system that can support life because of it's "perfect" distance from the sun. ● The order of the planets from the sun is: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune. ● Pluto is now considered a dwarf planet. It's orbit and size, and therefore gravity, caused it to "downgraded". ● Earth, as of now, is the only planet we know of that can sustain life. If we do not care for our home, the effects of climate change will become more apparent and we may risk being able to live on Earth. ● The mass of an object always remains the same. The amount of gravity affects the weight of an object. The closer objects are together the stronger the gravitational pull, and the larger an object is, the more gravity it exerts.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will:	**Lesson 1:** Support the theory of the Big Bang with 3

MS-ESS1-2
Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.

MS-ESS1-3
Analyze and interpret data to determine scale properties of objects in the solar system.

MS-ESS1-4
Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

Career-Ready Practices
CRP1: Act as a responsible and contributing citizen and employee.
CRP2: Apply appropriate academic and technical skills.
CRP3: Attend to personal health and financial well-being.
CRP4: Communicate clearly and effectively and with reason.
CRP5: Consider the environmental, social and economic impacts of decisions.
CRP6: Demonstrate creativity and innovation.
CRP7: Employ valid and reliable research strategies.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9: Model integrity, ethical leadership and effective management.
CRP10: Plan education and career paths aligned to personal goals.
CRP11: Use technology to enhance productivity.
CRP12: Work productively in teams while using cultural global competence.

types of evidence
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Lesson 2: Identify all the planets in our solar system and their distinguishing characteristics
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Lesson 3: Model the proximity of the planets within our solar system.
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Lesson 4: Apply the concepts of mass vs. weight to real world problems
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Lesson 5: Recognize the effects of climate change on our planet
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Lesson 6: Create an alien that is traveling from its home planet to Earth (includes passport with planet info)
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Differentiation	Assessments
Interdisciplinary Connections ● Distance between planets using metrics - Math ● Weight-gravity calculations	**Formative Assessments:** ● Digital checks for understanding **Summative Assessments, Projects, and Celebrations:**

(Advanced-Enrichment) - Math
- Alien- Art
- Passport, reading *Born with a Bang*- ELA
- History of The Space Race, history of Big Bang, etc. - Social Studies

Technology Integration
- Peardeck- Gravity
- Google Docs for alien passport
- Power of 10 video
- NASA.gov- Planet characteristics research

Media Literacy Integration
- Read *Born with a Bang*
- Possibly watch *Hidden Figures*
- Flocabulary- Week in Rap

Global Perspectives
- Read about The Space Race and research other countries that were involved.
- Discuss how international cooperation to explore our solar system has led to a greater understanding of Earth's role within the solar system.
- SpaceX- Elon Musk- Tesla

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines &	Timelines	Structures

- Planet Quiz
- Gravity, Mass, and Weight Quiz
- Unit Test

Projects/Labs:
- Alien & Passport Project
- Solar System Walk
- Planet Size Activity
- Power of 10 Video

Newspapers		
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Recommended Texts to Support Unit:

- *Born with a Bang*

Unit 3: Energy & Chemistry	
Big Ideas: *Course Objectives/Content Statement(s)* ● The chemistry & energy unit begins by examining the smallest unit of matter, an atom. Students will be able to draw a Bohr model of an atom by using the Periodic Table. Finally, students will be able to contrast fusion and fission, and determine how the processes are atomically different.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1) What are the three subatomic particles? 2) How does the sun create enough heat to reach the Earth? 3) How is the periodic table arranged? 4) What occurs during physical and chemical changes?	**Students will understand that:** ● All atoms contain protons, neutrons, and electrons. ● Without fusion on the sun, life could not exist. ● The sun drives almost all of the energy processes on the Earth. ● The periodic table is arranged by the number of protons, also known as the element's atomic number. ● During physical and chemical changes, matter is neither created nor destroyed.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **MS-PS1-1** Develop models to describe the atomic composition of simple molecules and extended structures. **MS-PS1-2** Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. **MS-PS1-3.** Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.	**Lesson 1:** Calculate the atomic mass from the number of protons and neutrons ● **Lesson 2:** Recognize that the number of electrons is equal to the number of protons in a neutral atom ● **Lesson 3:** Relate atomic number and the number of protons ● **Lesson 4:** Apply math concepts to atomic math calculations ●

MS-PS1-4.
Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed

MS-PS1-5.
Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.

MS-PS1-6.
Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.

Career-Ready Practices
CRP1: Act as a responsible and contributing citizen and employee.
CRP2: Apply appropriate academic and technical skills.
CRP3: Attend to personal health and financial well-being.
CRP4: Communicate clearly and effectively and with reason.
CRP5: Consider the environmental, social and economic impacts of decisions.
CRP6: Demonstrate creativity and innovation.
CRP7: Employ valid and reliable research strategies.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9: Model integrity, ethical leadership and effective management.
CRP10: Plan education and career paths aligned to personal goals.
CRP11: Use technology to enhance productivity.
CRP12: Work productively in teams while using cultural global competence.

Lesson 5: Compare and contrast fission and fusion

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Lesson 6: Identify the three subatomic particles

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Lesson 7: Demonstrate examples of physical and chemical changes

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Lesson 8: Find an element on the periodic table

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Lesson 9: Read an element square on the periodic table

Differentiation	Assessments
Interdisciplinary Connections	**Formative Assessments:** ● Digital checks for understanding

- Math - atomic mass, electron, neutron, etc calculations
- Research - all disciplines
- Social Studies- history of atomic warfare and nuclear power plant disasters

Technology Integration

- Interactive Periodic Table
- Frequent use of Flocabulary and BrainPOP in this unit
- Kahoot!, Peardeck Flashcard Factory , Quinzlet and Jeopardy used as review games

Media Literacy Integration

- Watch clips of series or movies such as "River Monsters-Chernobyl" or a Vice documentary about the effects of nuclear radiation
- Students are challenged to weigh the pros and cons of nuclear power

Global Perspectives

- Recognize that atomic bombs which use fission have been used for war in the past.
- Understand that nuclear power uses fission and it is a chain reaction that is difficult to stop.
- Identifying compounds that can be made out of elements and how these compounds can be good or bad throughout the world.
- Students will learn how scientists use the periodic table universally throughout the world.

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups

Summative Assessments, Projects, and Celebrations:

- Atoms Quiz
- Periodic Table Quiz
- Unit Test

Projects/Labs:

- Bohr model chalk practice
- Periodic Table Alien Activity
- Physical & Chemical Changes Lab

Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 4: Photosynthesis & Cellular Respiration

Big Ideas: *Course Objectives/Content Statement(s)*

- Throughout this unit, students will learn about plants and how they use photosynthesis to produce their own food. Inversely, they will learn about cellular respiration and how living beings use it. Ultimately, students will recognize the similarities in the two processes and how they rely on one another. This unit also includes a STEAM Build where students will be challenged to construct a greenhouse made purely out of recyclables.

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1) What are the key differences in organelles between a plant and animal cell? 2) What does a greenhouse look like that will optimize growing conditions for plants? 3) What is the relationship between photosynthesis and cellular respiration? 4) How does the Law of Conservation of Mass apply to the above processes?	**Students will understand that:** ● plants have three key organelles that animal cells do not, which are the cell wall, the large central vacuole and chloroplasts. ● basic components needed to create optimal growing conditions include sunlight, water, and the conversion of carbon dioxide into oxygen. ● convection, conduction, and radiation are three types of energy involved in a greenhouse. ● photosynthesis and cellular respiration are basically inverses of one another including water, oxygen, CO_2 and sunlight. ● in order for an equation to be balanced, the number of atoms on the reactant side must be equal to the number of atoms on the product side proving the Law of Conservation of Mass ("What goes in, must come out.", "Matter can never be created or destroyed, it can only change form!")
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **MS-PS1-4** Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. **MS-LS1-1**	**Lesson 1:** Differentiate between a plant and animal cell ● **Lesson 2:** Construct a greenhouse made purely out of recyclable materials ●

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-LS1-6** 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. OBJ **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. **Career-Ready Practices** **CRP1**: Act as a responsible and contributing citizen and employee. **CRP2**: Apply appropriate academic and technical skills. **CRP3**: Attend to personal health and financial well-being. **CRP4**: Communicate clearly and effectively and with reason. **CRP5**: Consider the environmental, social and economic impacts of decisions. **CRP6**: Demonstrate creativity and innovation. **CRP7**: Employ valid and reliable research strategies. **CRP8**: Utilize critical thinking to make sense of problems and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management. **CRP10**: Plan education and career paths aligned to personal goals. **CRP11**: Use technology to enhance productivity. **CRP12**: Work productively in teams while using cultural global competence.	**Lesson 3:** Care for their own radish plant ● **Lesson 4:** Balance a chemical equation ● **Lesson 5:** Apply concepts of convection, conduction, and radiation while building their greenhouse ● **Lesson 6:** Identify the similarities and differences between photosynthesis and cellular respiration equations ● **Lesson 7:** Utilize probes to determine O_2 ,CO_2, and temperature levels within the greenhouse ●
Differentiation	**Assessments**
Interdisciplinary Connections ● STEAM build, balancing equations- Math ● STEAM Report- ELA	**Formative Assessments:** ● Digital checks for understanding

- Research on greenhouses have worked in the past- Social Studies
- Creating a recyclable greenhouse- Art

Technology Integration

- Vernier probes - oxygen, carbon dioxide, and temperature probes
- Google Slides/ Peardeck for teacher and student presentations
- Google Docs for STEAM Report

Media Literacy Integration

- Flocabulary- Week in Rap

Global Perspectives

- Identify the hunger problem facing millions of people in the world and how a greenhouse could be part of the solution to this.

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors

Summative Assessments, Projects, and Celebrations:

- STEAM Report
- Cell Organelles Quiz
- Photosynthesis & Cellular Respiration Quiz
- Unit Test

Projects/Labs:

- Greenhouse STEAM Build

Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 5: Organic Chemistry	
Big Ideas: *Course Objectives/Content Statement(s)* ● The organic compounds unit focuses on the element carbon and its presence in the three macronutrients found in foods. Students will learn about the roles lipids, carbohydrates, and proteins play in their nutrition. They will conduct experiments to determine how some everyday foods are classified, while ultimately learning the importance of proper nutrition.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1) What main element is in every organic compound? 2) How do valence electrons affect carbon? 3) What are the three types of macronutrients and how are they used by the body? 4) How do these macronutrients affect someone's overall health?	**Students will understand that…** ● Carbon is the main element found in every organic compound. ● Valence electrons control bonding and therefore the molecular structure and absorption of molecules containing carbon. ● Lipids, Carbohydrates and Proteins are the three types of macronutrients found in foods. ● All macronutrients are necessary for different body systems and functions. However, as part of a healthy diet, there needs to be balance. Also, one should eat more complex carbs than simple and more unsaturated fat than saturated.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **MS-PS1-1** Develop models to describe the atomic composition of simple molecules and extended structures. **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.	**Lesson 1:** Investigate what macronutrients are found in common foods through the use of indicators ● **Lesson 2:** Model a molecule and/or compound through drawings and/or Ball and Stick Kits ● **Lesson 3:** Differentiate between the two types of lipids: saturated and unsaturated fats ●

Career-Ready Practices
CRP1: Act as a responsible and contributing citizen and employee.
CRP2: Apply appropriate academic and technical skills.
CRP3: Attend to personal health and financial well-being.
CRP4: Communicate clearly and effectively and with reason.
CRP5: Consider the environmental, social and economic impacts of decisions.
CRP6: Demonstrate creativity and innovation.
CRP7: Employ valid and reliable research strategies.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9: Model integrity, ethical leadership and effective management.
CRP10: Plan education and career paths aligned to personal goals.
CRP11: Use technology to enhance productivity.
CRP12: Work productively in teams while using cultural global competence.

Lesson 4: Differentiate between the two types of carbohydrates: simple and complex

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Lesson 5: Research the effects of a diet high in saturated fats and simple carbohydrates

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Lesson 6: Read and interpret a nutrition label

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Differentiation	Assessments
Interdisciplinary Connections ● Lab Report- ELA ● Reading a nutrition label (% & other units)- Math ● The history of McDonald's and other fast food chains and the lawsuits filed against them (*SuperSize Me*) - Social Studies **Technology Integration** ● Google Docs for lab report ● Kahoot!, Peardeck Flashcard Factory, Quizlet, Factile for review **Media Literacy Integration** ● Watch *SuperSize Me* as a "hook" ● Harkness discussion about the documentary...is the fast food epidemic the fault of the consumer or the producer?	**Formative Assessments:** ● Digital checks for understanding **Summative Assessments, Projects, and Celebrations:** ● Carbon & Lipids Quiz ● Macronutrients Quiz ● Organic Compounds Lab Report **Projects/Labs:** ● Organic Compounds Lab ● Menu Project

Global Perspectives

- Nutritionist or registered dietician volunteer (probably a parent) comes in to inform students about their career & teach how to read a nutrition label
- Discussion about diet/nutrition in different countries and how this in turn affects the countries obesity rate, keeping in mind that the US has one of the highest- WHY?

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations

Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 6: Human Impact on Ecosystems	
Big Ideas: *Course Objectives/Content Statement(s)* ● Throughout the "Human Impact on Ecosystems" unit, interactions of ecosystems will be explored, with a focus on how human activity affects species and their environment. Students will study evidence of global warming and be able to link the phenomenon of climate change to the increased amounts of greenhouse gasses present in the atmosphere due to our dependence on fossil fuels.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1) What effect(s) does our reliance on fossil fuels have on our planet? 2) How can the level or rate of global climate change be reduced? 3) What alternatives can be pursued in order to combat climate change?	**Students will understand that:** ● Human activities, such as burning fossils, are major factors in the rise in Earth's mean surface temperature (global warming) ● There is ample evidence to show that global warming is occurring ● Combustion of fossil fuels releases greenhouse gasses into the atmosphere ● Fossil fuels contain **carbon** and hydrogen and take hundreds of millions of years to form ● Fossil fuels are nonrenewable resources ● Increased amounts of greenhouse gasses present in the atmosphere increases the mean surface temperature ● While the U.S. relies heavily on fossil fuels for energy production, there are alternatives such as cleaner, renewable resources
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **MS-ESS3-5.** Ask questions to clarify evidence of the factors that have caused climate change over the past century. **Career-Ready Practices** **CRP1**: Act as a responsible and contributing citizen and	Lesson 1: ● Fossil Fuels ○ Delaware River Fracking Ban Article ○ HW: Fossil Fuels Reading Passage & Qs Lesson 2: ● Global Climate Change

employee. **CRP2**: Apply appropriate academic and technical skills. **CRP3**: Attend to personal health and financial well-being. **CRP4**: Communicate clearly and effectively and with reason. **CRP5**: Consider the environmental, social and economic impacts of decisions. **CRP6**: Demonstrate creativity and innovation. **CRP7**: Employ valid and reliable research strategies. **CRP8**: Utilize critical thinking to make sense of problems and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management. **CRP10**: Plan education and career paths aligned to personal goals. **CRP11**: Use technology to enhance productivity. **CRP12**: Work productively in teams while using cultural global competence.	○ CW/HW: Graph Analysis (hard to link) Lesson 3: ● Renewable Energy Sources ○ Culminating STEAM project ○ Rubric ○ HW - Wind Turbine
Differentiation	**Assessments**
Interdisciplinary Connections ● Math - Reading/Analyzing Charts and Graphs **Technology Integration** ● Utilizing 3M website to create realistic wind turbines **Media Literacy Integration** ● Discussing media messaging in political commercials and propaganda having to do with policies surrounding climate change **Global Perspectives** ● Researching and discussing what countries emit a large amount of greenhouse gasses ● Paris Climate Agreement ● Comparing various U.S. data (such as amount renewable resources used) to other countries	**Formative Assessments:** ● Quizzes ○ Fossil Fuels ○ Climate Change ○ Renewable Energy **Summative Assessments, Projects, and Celebrations:** ● STEAM Build - Wind Turbine **Supports for English Language Learners:** ● Review sheet - Fossil Fuels ● Review sheet - Climate Change ● Review sheet - Renewable Energy ● Quiz - Fossil Fuels and Climate Change ● Quiz - Renewable Energy ● Newsela Article “Los diferentes tipos de energía renovable” ● BrainPOP Espanol ○ Fuentes de Energía (Energy Sources)

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and	Modified assessment grading

- Recursos Naturales (Natural resources)
- Humanos y el Ambiente (Humans and the Environment)
- Efecto Invernadero (Greenhouse Effect)

	activities previews, anticipatory guides, and semantic mapping		

Recommended Texts to Support Unit:

- Textbook Modules
  - Greenhouse Effect
  - Nonrenewable Resources
  - Natural Resources

Unit 7: Genetics	
Big Ideas: *Course Objectives/Content Statement(s)* ● The lengthy Genetics unit covers material from mitosis and meiosis through genetic mutations. Students begin by modeling the phases of mitosis and meiosis while focusing on the key differences between the two processes. Next, they learn about patterns of inheritance through completing Punnett Squares and Pedigrees. Finally, DNA and the processes of transcription and translation are covered before ending the unit with the study of various mutations and how they can lead to genetic disorders.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1) What is DNA? 2) How are traits inherited? 3) What type of effects can mutations have on traits? 4) What is the difference between sexual and asexual reproduction? 5) How can punnett squares be used to predict the probability of trait inheritance? 6) How is the process of forming somatic cells different	**Students will understand that…** ● DNA is the genetic code found in every cell of a living organisms. ● Traits can be passed on for generations through DNA. ● Mutations can be harmful, helpful, or neutral. Harmful mutations may lead to genetic disorders. ● Sexual reproduction requires two parents while asexual reproduction requires one parent. ● The probability of inheriting a particular trait varies, but can be predicted through a Punnett Square.

than forming gametes? 7) What must happen before sexual reproduction can take place?	• Somatic cells are formed during mitosis and gametes are formed during meiosis. • Before sexual reproduction can take place, gametes must be formed through the process of meiosis which makes egg cells in females and sperm cells in males.
Areas of Focus: Proficiencies (New Jersey Student Learning Standards)	**Lessons**
Students will: **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-LS1-4** Use arguments based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. OBJ OBJ OBJ **MS-LS1-5** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. **MS-LS3-1** Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. OBJ**MS-LS3-2** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. OBJ	**Lesson 1:** Differentiate between mitosis and meiosis • **Lesson 2:** Relate phases of growth and repair to mitosis • **Lesson 3:** Recognize that meiosis must occur before sexual reporduction can take place • **Lesson 4:** Compare and contrast asexual and sexual reproduction • **Lesson 5:** Analyze various genotype and phenotype examples to determine which allele and traits are dominant or recessive • **Lesson 6:** Predict possible genotypes and phenotypes of offspring through the use of a Punnett Square • **Lesson 7:** Research a genetic disorder of their choice and display the information on an infographic • **Lesson 8:** Create a pedigree for a genetic disorder and/or correctly label a pedigree •

MS-LS4-5 Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. **Career-Ready Practices** **CRP1**: Act as a responsible and contributing citizen and employee. **CRP2**: Apply appropriate academic and technical skills. **CRP3**: Attend to personal health and financial well-being. **CRP4**: Communicate clearly and effectively and with reason. **CRP5**: Consider the environmental, social and economic impacts of decisions. **CRP6**: Demonstrate creativity and innovation. **CRP7**: Employ valid and reliable research strategies. **CRP8**: Utilize critical thinking to make sense of problems and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management. **CRP10**: Plan education and career paths aligned to personal goals. **CRP11**: Use technology to enhance productivity. **CRP12**: Work productively in teams while using cultural global competence.	**Lesson 9:** Identify the level of organization within cells (nucleic acids, DNA, chromosome, nucleus, cell…) ●
Differentiation	**Assessments**
Interdisciplinary Connections ● Probability through Punnett Squares- Math ● Research through media center ● Infographic- Art & ELA ● Stop Motion- Art & ELA **Technology Integration** ● DNA animation websites ● Use of infographic generator for genetic disorder infographic ● Use of WeVideo for stop motion	**Formative Assessments:** ● Digital checks for understanding **Summative Assessments, Projects, and Celebrations:** ● Mitosis & Meiosis Quiz ● Heredity Quiz ● DNA & RNA Quiz ● Unit Test **Projects/Labs:** ● Mitosis & Meiosis Stop Motion ● Genetic Disorder Infographic

Media Literacy Integration

- *Jurassic Park* as a "hook"
- CRISPR 60 Minutes video
- Flocabulary Week in Rap

Global Perspectives

- Human Genome Project
- Discuss the controversies associated with gene editing (pros? cons?)
- What countries have adapted technologies associated with gene editing? Can this lead to "designer babies?"...lead into GATTACA discussion

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies

- Punnett Square Chalk Practice
- Zork Genetics Punnett Squares packet

Accommodations	Interventions	Modifications
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 8: Evolution	
Big Ideas: *Course Objectives/Content Statement(s)* ● Throughout this unit, students will expand upon their knowledge of the theory of evolution. Theorists Charles Darwin and Jean Baptiste Lamarck will be studied and their theories compared and analyzed. The evidence supporting natural selection will be explored through the eyes of Darwin's laboratory, the Galapagos.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1) What types of evidence are there to support the theory of evolution? 2) What two theorists proposed different theories of evolution and who was ultimately correct? 3) What is the difference between artificial and natural selection?	**Students will understand that…** ● The theory of evolution is supported by homologous body structures, the fossil record, etc. ● Jean Baptiste Lamarck proposed that animals could adapt to their environments by changing their traits, while Charles Darwin stated that the organisms unfit for an environment would not adapt and therefore become extinct. ● Natural selection involves the natural process of selecting the species with more desirable traits for survival, while artificial selection involved the intervention of humans in the process.
Areas of Focus: Proficiencies	**Lessons**

(New Jersey Student Learning Standards)	
Students will: **MS-LS1-4** Use arguments based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. **MS-LS1-5** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. **Career-Ready Practices** **CRP1**: Act as a responsible and contributing citizen and employee. **CRP2**: Apply appropriate academic and technical skills. **CRP3**: Attend to personal health and financial well-being. **CRP4**: Communicate clearly and effectively and with reason. **CRP5**: Consider the environmental, social and economic impacts of decisions. **CRP6**: Demonstrate creativity and innovation. **CRP7**: Employ valid and reliable research strategies. **CRP8**: Utilize critical thinking to make sense of problems and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management. **CRP10**: Plan education and career paths aligned to personal goals. **CRP11**: Use technology to enhance productivity. **CRP12**: Work productively in teams while using cultural global competence.	**Lesson 1:** Describe the theories proposed by Darwin and Lamarck ● **Lesson 2:** Defend Darwin's theory of natural selection as being the correct theory ● **Lesson 3:** Identify the different types of evidence for evolution ● **Lesson 4:** Compare and contrast artificial and natural selection ● **Lesson 5:** Apply the theory of natural selection to vary species found on the Galapagos ●
Differentiation	**Assessments**
Interdisciplinary Connections ● History of the theory of evolution, Darwin's journey- Social Studies	**Formative Assessments:** ● Digital checks for understanding

Technology Integration

- Kahoot!, Peardeck Flashcard Factory , Quinzlet and Jeopardy used as review games
- Google Earth Galapagos Trek
- Moth simulation

Media Literacy Integration

- Show clips of Darwin's journey to the Galapagos and videos of the island now
- Explore different animal species through *Planet Earth*

Global Perspectives

- Before introducing the theory of evolution, teacher will recognize the religious beliefs of students, state that he/she is not going against any religion, but merely exposing them to what science says.

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language

Summative Assessments, Projects, and Celebrations:

- Evolution Quiz

Projects/Labs:

- Bird Beak Lab

Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 9: Weather	
Big Ideas: *Course Objectives/Content Statement(s)* ● The weather unit allows students to explore short and long term weather patterns as well as weather map symbols. Students create a weather report to model how meteorologists use weather maps and symbols to predict and report the weather.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1) How can studying local weather patterns better predict future weather conditions? 2) What is the correlation between local and global weather patterns? 3) What do the weather symbols used by meteorologists represent?	**Students will understand that…** ● Weather forecasts not only predict future weather conditions but can also be used to protect life, property, and agriculture. ● Air masses colliding is what causes changes in the weather. ● Without wind there would be no weather. ● Global and local weather patterns are dependent on each other. ● Weather symbols are a simplified way to represent a wide variety of weather conditions. ● Taking care of terrestrial, aquatic, and atmospheric environments can have positive effects on climate
Areas of Focus: Proficiencies	**Lessons**

(New Jersey Student Learning Standards)	
Students will: **MS-ESS2-1** Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. **MS-ESS2-5** Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. **Career-Ready Practices** **CRP1**: Act as a responsible and contributing citizen and employee. **CRP2**: Apply appropriate academic and technical skills. **CRP3**: Attend to personal health and financial well-being. **CRP4**: Communicate clearly and effectively and with reason. **CRP5**: Consider the environmental, social and economic impacts of decisions. **CRP6**: Demonstrate creativity and innovation. **CRP7**: Employ valid and reliable research strategies. **CRP8**: Utilize critical thinking to make sense of problems and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management. **CRP10**: Plan education and career paths aligned to personal goals. **CRP11**: Use technology to enhance productivity. **CRP12**: Work productively in teams while using cultural global competence.	**Lesson 1:** Differentiate between weather and climate ● **Lesson 2:** Identify front symbols ● **Lesson 3:** Analyze front conditions ● **Lesson 4:** Predict weather patterns in certain areas based symbols on a map ● **Lesson 5:** Report on the weather like a meteorologist! ● **Lesson 6:** Calculate wind speed based on a wind symbol ●
Differentiation	**Assessments**
Interdisciplinary Connections ● % precipitation and wind symbol calculations- Math ● Reading an almanac- Social Studies ● Weather report script- ELA	**Formative Assessments:** ● Digital checks for understanding **Summative Assessments, Projects, and Celebrations:** ● Weather quiz

Technology Integration

- WeVideo for weather report

Media Literacy Integration

- Watch and analyze various weather reports
- Understand that weather forecasts are a prediction based on observations and facts (Weather is unpredictable)

Global Perspectives

- Students learn about situations in which the world came together to help countries devastated by a natural weather disaster.
- Students learn how weather symbols break down language barriers between meteorologists around the world.

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Projects/Labs:

- Weather Report

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading