Summit Public Schools
Summit, New Jersey
Grade Level: 8 th/ Content Area: Integrated Science

Overview:
The 8th 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.

Unit 1: Matter and Its Characteristics

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

- In this unit, students will investigate the physical and chemical properties and changes in sample substances, determine how new substances are formed from a chemical reaction, and explore patterns within the periodic table that will determine how certain elements create bonds.

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
Essential Questions 1. How is density determined? 2. How does density affect floating and sinking of objects in different liquids? 3. How does the change in mass/volume affect density? 4. How are elements classified as metals, nonmetals, and metalloids based on their chemical and physical properties? 5. How are properties of elements related to the arrangement on the periodic table? 6. How does a chemical reaction show the relationship between reactants and products? 7. How do the number of atoms in a chemical reaction remain the same in order to conserve mass? 8. How has the atomic model evolved over time? 9. How does the combination of metals and nonmetals create ionic and covalent bonds?	**Students will understand that:** ● Density is a ratio of the mass of an object relative to its volume. ● The density of an object determines its position relative to other objects/material. ● Changes in matter can be classified as chemical or physical. ● Elements are classified according to their physical and chemical properties. ● The law of conservation of mass states that mass is conserved when substances undergo physical and chemical changes. ● Balanced chemical reactions demonstrate the law of conservation of mass ● Chemical reactions are classified according to the number of reactants and products and the specific types of compounds involved. ● The atomic model has evolved as more knowledge is gained. ● Ionic bonds form when a metal and nonmetal combine. Covalent bonds form when two nonmetals combine.

Areas of Focus: Proficiencies (New Jersey Student Learning Standards)	Lessons
Students will: **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-PS1-4:** Develop a model that predicts and describes changes in the 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 1:** ● Lab Safety ○ Lab safety contract ○ Lab safety cartoon **Lesson 2:** ● Components of a Lab Report/CER ○ Who Killed Mr. Xavier **Lesson 3:** ● Modeling ○ Sam Spade CER **Lesson 4:** ● Physical Properties and Changes Benchmark ○ Physical prop/changes worksheet **Lesson 5:** ● Density Benchmark (Mass and Volume) ○ Density Practice Worksheets 1 and 2 ○ Density Gizmos lesson ○ Labs: ■ Density of water lab ■ Density column lab ■ Density of Earth's layers lab **Lesson 6:** ● Chemical Properties and Changes Benchmark ○ Chemical prop/changes worksheet ○ Chemical reaction lab ● Conservation of Mass Benchmark ○ Balancing equations practice worksheets 1-3 ○ Polyurethane Foam lab ○ Bonding ■ Ionic and Covalent **Lesson 8:** ● Periodic Table Benchmark ○ Periodic Table Activity List: ■ Layout: Groups/Periods ■ Components ■ Reactivity ■ Elements ○ Properties of Elements lab **Lesson 9:**

	● History of the Atomic Model Benchmark ○ Atomic Theory Scientist Activity ○ Scientist Worksheets **Lesson 10:** ● Bohr Model Benchmark ○ Digital Bohr practice ○ Bohr Model worksheets ○ Bohr Model Analysis Activity **Lesson 11:** ● LEDs Model Benchmark ○ LEDs practice worksheets
Differentiation	**Assessments**
Interdisciplinary Connections ● Writing CER lab conclusions ● Mathematical calculations of the density of liquids and solids ● History of the Atomic Theory **Technology Integration** ● Gizmo lessons ● Kahoot - Test/Quiz Review ● Peardeck - Bohr Model Practice ● Google Classroom **Media Literacy Integration** ● Science World Magazines ● Research of scientists involved in the evolution of the atomic model **Global Perspectives** ● Periodic table was developed by scientists from different countries. ● Element names are based on different languages, places and people. ● Particles of the atom were discovered by scientists from different countries. **Supports for English Language Learners**	**Formative Assessments:** ● CER reports ● Check for Understanding Mini Quizzes ● Calculation worksheets ● Lab Reports ● Scientist Poster **Summative Assessments, Projects, and Celebrations:** ● Safety Quiz ● Density Quiz ● Matter and Its Characteristics Test ● Atomic Theory scientists Quiz ● Quarter 1 Quarterly

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: Objects in Motion	
Big Ideas: *Course Objectives/Content Statement(s)* ● What determines the behavior and movement of matter?	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
Essential Questions 1. How are scalars and vectors used to describe motion? 2. How is speed, velocity, and acceleration calculated to describe the motion of an object? 3. How can an object's motion be represented on a graph? 4. What are the types of forces and how do they interact to cause motion. 5. How does Newton's Laws explain and predict how objects move? 6. How is the mass of an object and the force of the object related? 7. Describe the properties of a magnet. 8. How can the strength of an electromagnetic field be determined by the number of coils around an electromagnet?	**Students will understand that:** ● Scalars are quantities that are measured using only a numerical value, while vectors include both the numerical value and the direction. ● Speed is a measurement of the distance an object moves over time. ● Velocity is the speed of an object in a certain direction. ● An object's motion can be described on a distance vs. time graph and a velocity vs. time graph. ● For every action, there is an equal and opposite reaction according to Newton's 3rd Law. ● Objects at rest remain at rest unless an unbalanced force acts on it. Similarly, an object in motion remains in motion unless an unbalanced force acts on it. ● The motion of an object is determined by the sum of the forces acting on it. ● The greater the mass, the greater the force needed to achieve motion. ● Different forces, such as friction, air resistance, and an applied force can change how objects move. ● Opposite poles of a magnet attract and like poles repel. ● Magnetic strength is dependent on the distance between the interaction objects. ● The strength of a magnetic field around a current-carrying wire increases when the wire is wound into a coil.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will:	**Lesson 1:**

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

MS-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

MS-PS2-3.
Ask questions about data to determine the factors that affect the strength of electric and magnetic forces

MS-PS2-5.
Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

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.

Career-Ready Practices

- Speed and Velocity Benchmark
    - Scalar vs. Vector Practice
    - Speed, Velocity Calculation Practice
    - Bubble Gum Lab
    - Motion Gizmo

Lesson 2:

- Acceleration Benchmark
    - Acceleration Calculation Practice

Lesson 3:

- Motion Graphs Benchmark
    - Motion Graph Practice Worksheets
    - Creating Motion Graphs Activity
    - Motion Stories Activity

Lesson 4:

- Forces Benchmark
    - Understanding Forces Practice Worksheet
    - Calculating Net Forces
    - Force equations worksheet

Lesson 5:

- Momentum Benchmark
    - Calculating Momentum Practice
    - Momentum Bashing Lab

Lesson 6:

- Newton's Laws of Motion
    - 3 Section Foldable
    - Newton's Laws of Motion 3-Day Lab Class Rotation

Lesson 7:

- STEM Design and Build: Egg Car Crash
    - Research on Self Driving Cars
    - Crumple Zones Gizmo
    - Design and Build Car and Bumper System
    - Car Crash Test, Data Collection, Calculations and Results

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.

Differentiation	Assessments
Interdisciplinary Connections ● Writing CER conclusions ● Mathematical Calculations of Speed, Velocity, Acceleration, Momentum, Force ● Motion Graphs **Technology Integration** ● Gizmos - Motion, Crumple Zones ● Edpuzzle- Newton's Laws ● Kahoot - Test/Quiz Review ● Quizlet - Test/Quiz Review ● Google Classroom **Media Literacy Integration** ● Research/ Articles on self driving cars **Global Perspectives** ● Looking at car designs from various countries such as Japan and Germany ● Design of self driving cars in the US vs. other countries	**Formative Assessments:** ● CER reports ● Check for Understanding Mini Quiz ● Calculation worksheets ● Motion Graph Activity ● Edpuzzle - Newton's Laws **Summative Assessments, Projects, and Celebrations:** ● Speed, Velocity, Acceleration, Motion Graph Quest ● Forces, Momentum, Newton's Laws Quiz ● Car Crash Calculations and Results

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 3: Energy in a Closed System

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

- In this unit students will explore the role of energy in the movement of objects.

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
Essential Questions 1. What is energy? 2. What is the relationship between kinetic and potential energy? 3. What factors determine an object's kinetic energy? 4. What factors determine an object's potential energy? 5. What are the types of kinetic energy? 6. What are the types of potential energy? 7. How can energy be transferred from one type to another?	**Students will understand that:** ● Energy is the ability to do work or cause change. ● An object's kinetic energy can be increased by increasing its potential energy. ● Kinetic energy is dependent on the mass and speed of an object. ● Potential energy is dependent on the mass and height of an object. ● Kinetic energy is the energy an object has because of its motion. ● Electrical and mechanical energy are examples of kinetic energy. ● Potential energy is stored energy. ● Gravitational, chemical, and nuclear energy are examples of potential energy. ● Energy is not lost or made, it is transferred to or from an object. ● The total amount of energy is the same before and after any process.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **MS-PS3-1** Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass and 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.	**Lesson 1:** ● Kinetic/Potential Energy Benchmark ○ Energy Activity List ○ Measuring Energy with Weighted Objects Lab ○ Activity List Check for Understanding **Lesson 2:** ● Energy Transformations Benchmark ○ Energy transformation lab stations **Lesson 3:**

MS-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. **MS-PS3-5** Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. **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. **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.	● STEM Design and Build: Roller Coasters ○ Brainstorm and Design roller coasters according to parameters. ○ Testing Roller Coasters, collecting data, and calculations

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.

Differentiation

Interdisciplinary Connections

- Mathematical Calculations of kinetic and potential energy
- Writing Measuring Energy Lab CER

Technology Integration

- Kahoot - Test/Quiz Review
- Quizlet - Test/Quiz Review
- Google Classroom

Media Literacy Integration

- Researching features of different types of roller coasters

Global Perspectives

- Using the website Coasting with Culture website to see different roller coasters and amusement parks that have roots in a variety of cultures.

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,	Graphs	Using cooperative

Assessments

Formative Assessments:

- Measuring Energy Lab calculations and CER
- PE/KE Activity List
- Check for Understanding Mini Quiz
- Calculation worksheets

Summative Assessments, Projects, and Celebrations:

- Energy Quest
- Roller Coaster Data and Calculation
- Physics Quarterly Exam

diagrams & drawings		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: Weather and Climate	
Big Ideas: *Course Objectives/Content Statement(s)* ● In this unit students will analyze how the unequal heating of the Earth by the Sun contributes to the type of weather, climate, and natural weather phenomena that occurs in different parts of the world.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
Essential Questions 1. What are the similarities and differences between weather and climate? 2. How does scientific evidence support the phenomena of global climate change? 3. What is the relationship between the atmosphere and the ocean? 4. What is the difference between land and sea breezes? 5. What is the difference between valley and mountain breezes? 6. How does the coriolis effect contribute to the global wind patterns? 7. How does the unequal heating of the Earth cause global wind patterns? 8. How do ocean currents affect the climate on coastal land masses? 9. How does the analysis and interpretation of real time data predict global climate events?	**Students will understand that:** ● Weather is the minute by minute changes in the atmosphere. ● Climate is the overall weather of a specific location over a long period of time. ● Humans impact the environment in a negative/positive way. ● There are many pieces of evidence that support global climate change. ● Land and sea breezes occur when there is a difference in pressure over the land and sea causing convection currents. ● Valley and mountain breezes occur when there is a difference in pressure over the valley and mountain causing convection currents. ● The coriolis effect, caused by the rotation of the Earth, causes winds and ocean currents to curve. ● The unequal heating of the earth creates pressure belts in the atmosphere causing predictable global wind patterns. ● Air always moves from areas of high pressure to low pressure. ● Ocean currents cool or warm air above land masses causing changes in temperature and weather. ● Sea surface temperature maps and graphs of ocean currents can be used to predict changes in global climate.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **MS-ESS2-6:** Develop and use a model to describe how unequal heating	**Lesson 1:** ● Weather and Climate Benchmark ○ Videos

and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

MS-ESS3-2:
Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

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 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.

- Skittles Lab

Lesson 2:
- Coriolis Effect Benchmark
  - Turntable demo
  - Coriolis Effect worksheet
  - Coriolis Effect lab

Lesson 3:
- Global Winds Benchmark
  - Diagram
  - Global wind belts questions
  - Prevailing Wind System Diagram and Questions
  - Global Winds Drag and Drop

Lesson 4:
- Local Winds Benchmark
  - Local Winds Worksheets (Land/Sea and Mountain/Valley)
  - Local Winds Drag and Drop

Lesson 5:
- Ocean Currents Benchmark
  - Ocean currents Demo
  - Video and questions
  - Ocean currents color coded worksheet
  - Comparing Global Winds and Ocean Currents
  - Climographs

Lesson 6:
- Climate Project
  - Climate change scrapbook

Lesson 7:
- El Nino Benchmark
  - EdPuzzle
  - El Nino: Interpreting Sea Surface Temperature Maps and Graphs Activity

Differentiation	**Assessments**
Interdisciplinary Connections ● El Nino CER conclusion paragraph ● Interpreting Sea Surface temperature maps and	**Formative Assessments:** ● Check for Understanding Mini Quizzes ● Calculation worksheets

graphs
- El Nino NY Times article analysis

Technology Integration
- Global Winds Interactive Website
- Computer Drag and Drop activities
- EdPuzzle: El Nino
- NOAA: Temperature maps
- NOAA: Ocean and wind currents global map

Media Literacy Integration
- Analyzing evidence to engage in argumentation on the topic of global climate change
- Determining the quality and validity of evidence regarding global climate change from a variety of resources.
- Research of impacts of El Nino in different countries

Global Perspectives
- Effects of El Nino in different countries
- Differences in global winds depending on the latitude on Earth
- Utilizing NOAA: Ocean and wind currents global map

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

- Climograph activity

Summative Assessments, Projects, and Celebrations:
- Global Winds Mini Quiz
- Local Winds Mini Quiz
- Weather and Climate Test

		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: Interactions of the Sun, Earth, Moon

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

- In this unit students will analyze phenomena that occur as a result of the interaction of the sun, earth, and moon.

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
Essential Questions 1. How does the interaction between the Sun, Earth, and Moon cause the phases of the moon? 2. How does the location of the moon relative to the Earth cause tides? 3. How does the alignment of the sun, Earth and moon cause eclipses? 4. How does the Earth, Sun, and Moon relationship impact humans? 5. How does the tilt of the Earth cause seasonal changes? 6. How does the tilt of the Earth cause changes in the hours of light and darkness throughout the Earth?	**Students will understand that:** ● The phases of the moon from Earth and space are determined by the position of the moon relative to the Earth and the Sun. ● The tilt of the Earth causes seasonal changes. ● The direct alignment of the Sun, Earth and moon causes lunar and solar eclipses. ● The gravitational pull of the sun and the moon cause tides on Earth's surface. ● The angle of insolation from the sun affects the temperature of the Earth's surface at different locations. ● The tilt of the Earth causes hours of light and darkness to increase and decrease depending on the season and time of year.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **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. **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.	**Lesson 1:** ● Introduction to Sun, Earth, Moon phenomena ○ Superstorm Sandy Video, questions and discussion **Lesson 2:** ● Moon and Its Characteristics Benchmark ○ Bill Nye Moon video and questions ○ Moon Phases from Earth diagram ○ Moon phases from Earth/space foldable ○ Moon phases practice worksheets ○ Phases of the Moon Gizmo ○ Moon phases Escape Room activity **Lesson 3:** ● Eclipses Benchmark ○ Solar and Lunar eclipse diagrams and questions

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:

- Tides Benchmark
    - Graphing and interpreting tide data activity
    - Moon phases, tides, and eclipses poster

Lesson 5:

- Seasons Benchmark
    - "Why we have seasons" interactive website
    - Graphing and interpreting seasons data activity
    - Seasons Diagram Practice 1 and 2

Differentiation

Interdisciplinary Connections

- Plotting points on a graph
- Interpreting graphs

Technology Integration

- Superstorm Sandy Video
- Moon Phase Gizmo
- Seasons Interactive Website
- YouTube videos of phases, tides, eclipses
- Peardeck - moon phases

Media Literacy Integration

- Hurricane Sandy articles and documentaries relating the storm to tides and moon phases.

Global Perspectives

- Tidal ranges change depending on the location on Earth.
- Seasons vary depending on location on Earth.
- Effects of Hurricane Sandy from its formation in the Gulf of Mexico to its impact on the east coast of the US.

Supports for English Language Learners

Assessments

Formative Assessments:

- Moon phase Gizmo
- Moon phase escape room
- Seasons Practice Worksheets

Summative Assessments, Projects, and Celebrations:

- Moon Mini Quiz
- Eclipse/Tides Mini Quiz
- Tides Graphing Activity
- Moon Phases, Eclipses, Tides Cumulative Poster
- Seasons Graphing Activity
- Sun, Earth, Moon Test
- Earth Science Quarterly Exam

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 7: Human Body Systems

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

- In this unit, students examine how the body consists of interconnected systems that work together to maintain a state of homeostasis in the body.

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
Essential Questions 1. What are the systems that make up the human body and how are they organized? 2. What are the structures and functions of the circulatory system? 3. What are the structures and functions of the respiratory system? 4. What are the structures and functions of the nervous system? 5. How are the body systems interconnected? 6. What is the role of the brain in interpreting and storing memories? 7. How have scientists attempted to "improve" the human body?	**Students will understand that:** ● The human body systems (circulatory, respiratory, nervous, digestive, etc.) are all interconnected and rely on one another. ● Each body system is composed of subsystems that are working together. ● Cells and tissues make up organs that are specialized according to their structure and function. ● Organisms, especially humans, have interacting subsystems made up of specialized structures. ● The circulatory system is made up of the heart and blood vessels and circulates blood and vital nutrients to the entire body. ● The respiratory system is composed of the specialized organs that take in oxygen and release carbon dioxide from the body. ● The nervous system is composed of specialized cells that help transmit messages to the brain. ● Scientists develop drugs and structures to help the body when it loses its natural ability to function properly.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **MS-LS1-3** Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. **MS-LS1-8**	**Lesson 1:** ● Intro to Body Systems ● Body Systems Scavenger Hunt **Lesson 2:** ● Circulatory System ○ Gizmos ○ Worksheets/Labeling ○ Heart Rate Lab

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

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.

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:
- Respiratory System
    - Worksheets/Labeling
    - Modeling Respiratory system lab

Lesson 4:
- Nervous System
    - Worksheets/Labeling
    - Brain Stations lab

Lesson 5:
- Build a Better Body Project: Create a 2-D model of the body that shows a solution to a disorder/injury related to a specific body system.

Differentiation	Assessments
Interdisciplinary Connections ● Research on disorders of body systems ● Heart Rate CER **Technology Integration** ● Gizmo lessons ● Creating graphs and data tables using Google Sheets ● YouTube Videos	**Formative Assessments:** ● Project/lab reports ● Gizmos lessons ● Build a Better Body Project **Summative Assessments Projects, and Celebrations** ● Circulatory System Quiz ● Respiratory System Quiz

- EdPuzzle
- Google Classroom

Media Literacy Integration

- Library research on disorders of human body systems

Global Perspectives

- Scientists from all over the world have created solutions to improve the body when it can not function properly.

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	Differentiated materials

- Nervous System Quiz
- Heart Rate Lab and CER

	for understanding, feedback	
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