Science - Grade 5

Joseph C. Caruso School

Required

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Statement of Purpose

This 5th grade course will expose students to our Earth, its place in the Solar System and the effects of its relationship with the Moon and Sun. Students will also explore the functions of the systems of the Earth, both living and nonliving, as well as human effects on these systems**.**

Summary of the Course

The course of study is designed to expose students to the basic systems of the Earth and its role in the Solar System. The relationship the Earth has with the Moon and Sun determines functions that affect the entire Earth and its ability to survive as a the only planet in our system that sustains life. Students will explore the various systems of the Earth that contribute to the continuum of life, such as the atmosphere and the water cycle. Students will also evaluate living systems of the Earth, which include plant and animal life. Students will investigate their interactions with each other, and determine that all systems must interact in order for their success. Finally, students will pay particular attention to the human impact on these systems, and explore ways humans alter the Earth for worse and for the better.

- The use of various formative assessments are encouraged in order to provide an ongoing method of determining the current level of understanding the students have of the material presented.
- Students will participate in small exercises that will expose them to the basic laboratory process, small group activities, web based investigations, class discussions, projects, and research.
- Homework, when assigned should be relevant and reflective of the current teaching taking place in the classroom.
- Organizational strategies should be in place that allow the students the ability to take the information gained in the classroom and put in in terms that are relevant to them.
- Instruction should be differentiated to allow students the best opportunity to learn.
- Assessments should be varied and assess topics of instruction delivered in class.
- Modifications to the curriculum should be included that address students with Individualized Educational Plans (IEP), English Language Learners (ELL), and those requiring other modifications (504 plans).

Pacing Guide

Unit	Timeframe	Title of Unit
1	Marking Period 1	Earth's Place in the Universe
2	Marking Period 2	Earth's Systems-Non-Living
3	Marking Period 3	Earth's Systems -Living (Plants and Animals)
4	Marking Period 4	Earth's Systems -Living (Humans)

Unit 1: Earth's Place in Universe

Summary of the Unit: Students analyze and interpret data,develop models,construct arguments, and demonstrate a deeper understanding of the Earth and its relationship with the Sun and Moon, specifically their movement and position creating changes on the Earth and the appearance of the night sky. They will understand the revolution and rotation of the earth and how it affects night and day and seasons. They will study the position of the Earth in its proximity to the Sun, which creates seasons on Earth. They are also able to study the Sun itself, and how it not only provides energy to the earth, but its distance keeps the Earth at a temperature to sustain life. Students will also understand that the sun is a star, and that its proximity to Earth makes it seem larger than other stars. Star groups are only visible at certain times of the year.

The crosscutting concept that will be explored in this unit include scale and proportion, patterns, cause and effect , and structure and function.

Assessment and/ or Summative Criteria to Demonstrate Mastery of the Unit:

Summative Assessments
Alternative Assessments
Formative Assessments

- Students will build and view models of the Earth, Moon and Sun to demonstrate their relationship.
- Participate in demonstrations showing the placement of the Earth, Moon and Sun
- Create detailed diagrams of the Earth, Moon and Sun
- DO Nows
- Exit Tickets
- Projects
- Quizzes
- Assessment Test

Understandings **(Students will understand or know)**	**Essential Questions**
• The Earth, Moon and Sun have a relationship and interact in ways that determine Earth's characteristics. • The tilt of the Earth as it orbits the Sun determines seasonal changes in the hemispheres. • The rotation of the Earth causes one half of the Earth to face the	1. Why is describing the relationship of the Earth Moon and Sun essential in understanding how it affects life on Earth? 2. How does the position of the Earth throughout the calendar year determine its seasons? 3. Why does the Earth experience night and day?

Sun, causing day, for 12 hours. The opposite side experiences night. ● The Moon's gravity causes tides on Earth. ● The revolution of the Earth places the Earth in different positions throughout the year, causing different viewpoints for observation. ● The combination of the Moon's rotation and revolution around Earth, and its reflection of the Sun causes us to see phases of the Moon. ● The Sun is a star, which is stationary. The distance of the Sun allows the Earth to maintain heat and light, and produces energy that is essential for life on Earth. ● Stars are not planets, and have their own characteristics such as a life cycle. ● The Sun's proximity to Earth makes it appear larger than other stars that are greater distances away. The Sun is actually a medium star ● Star groups are patterns of stars that remain the same. SInce the Earth is moving and they do not, our view of them varies throughout the year. Their stationary position helps us to understand the pattern of movement of the Earth, or its revolution around the Sun.	4. How do you know the Moon is present even when we cannot see it? What causes the moon to go through phases? 5. How does the Moon directly affect the Earth? 6. Why do we see objects in the night sky at certain times of the year and not others? 7. What is a star and how do these characteristics apply to our Sun? 8. Why does the Sun appear so large in comparison to other stars? 9. What are star groups and how do they help us map and understand movement of the Earth throughout the year?

**Please include resource links in the boxes above.*

Topic/ Selection	**Suggested Timeline per topic**	**General Objectives**	**Instructional Activities**	**New Jersey Student Learning Standards/ NGSS, etc.**
Earth's Place in the Universe. This includes the effect of its positioning in the solar system, and its relationship with the Sun and Moon.	45 Days (MP1)	Students will be able to: ● Engage in an argument from evidence that the apparent brightness of the stars and sun is in relationship to their distance from Earth. ● Obtain, evaluate and communicate information that the Sun is a natural body who gives off its own light. In addition,	● Demonstration of the Earth, Moon and Sun using a lamp and globe. ● Penny demonstration of rotation/revolution of Moon https://sallyridescience.com/downloads/moonkam_activities/penny_moon.pdf ● Observe the moon at night and discuss findings	**5-ESS1-1.** Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. **5-ESS1-2**. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

		understand that other stars are a great distance from Earth and so their apparent brightness is less. ● Evaluate the evidence to determine if the claim that the sun appears brighter due to its distance from Earth. ● Ask questions and use reasoning to determine that objects appear smaller and dimmer because they are farther from the viewer on Earth and are so far away. ● Engage in an argument from evidence that stars vary in brightness, thus indicating they are various distances from Earth. ● Analyze and interpret data to show the Earth goes through seasons due to its tited rotation and revolution around the Sun. ● Analyze and interpret data to determine that the presence and absence of stars in the sky throughout the year is due to the Earth's tilted rotation and revolution around the Sun. ● Engage in an argument from evidence that the apparent motion of the Sun moving east to west is due actually to the movement of the Earth. ● Construct explanations as to why stars appear in the sky	● Oreo cookie moon phases https://sciencebob.com/oreo-cookie-moon-phases/ ● Use a balloon to demonstrate tides on Earth and pull of water ● Brain Pop video Moon phases ● Flocabulary video Moon ● Link students to local tide charts, make predictions and observations ● Finding the phases of your birth date and making predictions using moon calendars. ● Moon scavenger hunt ● Bill Nye seasons, Moon ● Hallway demonstration to show relative size ● Build model of the Sun	**5-PS2-1.** Support an argument that the gravitational force exerted by Earth on objects is directed down.

		all year while others are only seasonally present. ● Engage in arguments from evidence that there is a gravitational force exerted by Earth on objects directed toward the center of the Earth. ● Planning and carrying out investigations to conclude that objects dropped fall straight down. ● Analyze and interpret data that proves the Earth is a spherical shape ● Construct explanations to support the claims that Earth has gravity and is spherical. ● Obtain, evaluating and communicate that evidence proves there is a force acting on objects on the Earth pulling them towards Earth's center.		

**The suggested timeline per topic should total the number of days in the Pacing Guide for each unit.*

Suggested Modifications for Special Education, 504, English Language Learners, RTI and Gifted Students:
*Consistent with individual plans, when appropriate.

Students with Disabilities & 504: Utilize modifications & accommodations delineated in the student's IEP. Use of visual and multisensory formats that provide helpful visual, auditory, and tactile reinforcement of ideas, Use of assisted technology, Use of prompts, Modification of content and student products, Testing accommodations, Authentic assessments, Give directions/instructions verbally and in simple written format, Work with a partner.

English Language Learners: Teacher modeling. Peer modeling. Develop and post routines, Label classroom materials. Word walls. Give directions/instructions verbally and in simple written format. Pre-teaching of vocabulary and concepts, Visual learning, including graphic organizers, Use of cognates to increase comprehension, Teacher modeling, Pairing students with beginning English language skills with students who have more advanced English language skills, Scaffolding (word walls, sentence frames, think-pair-share, cooperative learning group). Students will be supported according to the recommendations for "can do's" as outlined by WIDA - https://www.wida.us/standards/CAN_DOs/

Bilingual: Repetition, simplify language (use shorter phrases), visual word banks, limited use of idioms, metaphors and words with multiple meanings, use of cognates. Use realia (concrete objects), dramatization (gestures, facial expressions, intonation), built on students background knowledge (topics/examples students can relate to), texts that reflect their experiences, extended time, provide samples (teacher and students created), model, pair with with partner.

Gifted Students: Adjusting the pace of lessons, Curriculum compacting, Inquiry-based instruction, Independent study, Higher-order thinking skills, Interest based content, Student-driven, Real-world problems and scenarios.

RTI: Using visual demonstrations, illustrations, and models, Give directions/instructions verbally and in simple written format, Peer Support, Increase one on one time, Teachers may modify instructions by modeling what the student is expected to do, Instructions may be printed out in large print and hung up for the student to see during the time of the lesson, Review behavior expectations and adjust for personal space or other behaviors as needed, Oral prompts can be given, Ask students to restate information,

Suggested Technological Innovations/ Use:

Laptops. WIFI, Apple TV, Kahoot, Google classroom, Google Docs, Portaportal

Computer Science and Design Thinking Standards

8.1.5.IC.1: Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.
8.1.5.IC.2: Identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users.
8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.
8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment.
8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.

Interdisciplinary Connections, Career Ready Practices, & 21st Century Connections:

9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes. **(Science Block, Activity,Group Projects)**
9.2.5.CAP.2: Identify how you might like to earn an income. (**Science Mini Lesson, Group Activities)**
9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations. (**Group Projects, Group Activities)**
9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements. (**Group Projects, Group Activities)**
9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems. (**Group Projects, Group Activities)**
9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (**Group Projects, Group Activities)**
9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (**Group Projects, Group Activities)**

ELA/Literacy – RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (**5-ESS1-1**)
RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (**5-ESS1-1)**
RI.5.8 Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). (**5-ESS1-1)**
RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (**5-ESS1-1)**
W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. **(5-ESS1-1)**
SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (**5- ESS1-2)**
Mathematics – MP.2 Reason abstractly and quantitatively. (**5-ESS1-1),(5-ESS1-2)**
MP.4 Model with mathematics. **(5-ESS1-1),(5-ESS1-2**)
5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. (**5-ESS1-1)**
5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (**5-ESS1-2**)
RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (**5-PS2-1**)
RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. **(5-PS2-1)**
W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (**5-PS2-1**)

Unit 2: Earth's Systems- Non Living

Summary of the Unit: Students analyze and interpret data,develop models,construct arguments, and demonstrate a deeper understanding of the atmospheric layers of the Earth and how they influence and shape life on Earth, in addition to various water systems found on Earth. Students will study four basic layers and what can be found in each layer. In addition, they will understand how each layer has a specific role on Earth, such as creating weather and creating environments to sustain life. They will also understand and sort the different types of water found on Earth, compare locations and amount of saltwater to freshwater resources.

The Cross Cutting concept that will be explored in this unit will include Scale Proportion & Quantity , Systems and System Models , and Energy and Matter.

Assessment and/ or Summative Criteria to Demonstrate Mastery of the Unit:

Summative Assessments
Alternative Assessments
Formative Assessments

- Build models to show the layers of the Earth
- Draw diagrams to show layers
- Draw charts and diagrams to show water distribution around the Earth
- Conduct demonstrations to various actions of water (condensation, evaporation, etc)
- DO Nows
- Exit Tickets
- Projects
- Quizzes
- Assessment Tests

Understandings **(Students will understand or know)**	**Essential Questions**
• The Earth has four basic layers to the atmosphere, each of which have specific characteristics and functions. • The atmosphere layers contain matter that is present, even if it cannot be seen, such as air that fills a balloon. • The layers of the Earth keep the Earth warm, circulate air to	1. What are the atmospheric layers of the Earth and how do their characteristics affect life on Earth? 2. How do you know there is matter in the atmosphere even though we cannot see it? 3. How do the layers protect the Earth?

breathe and create weather patterns for Earth. ● The atmosphere protects Earth like a big blanket of insulation. It absorbs the heat from the Sun and keeps the heat inside the atmosphere helping the Earth to stay warm. ● The Earth is comprised mostly of ocean. Fresh water is found in limited areas of the Earth. ● Water is essential to life on Earth, such as supporting plant, animal and human life. ● Water on Earth can become a solid or evaporate, contributing to the explanation of the water cycle. ● The water cycle is a system on Earth that continually happens to sustain life. ● Water systems can merge together to make weather patterns and contribute to and alter the water cycle.	4. What types of water can be found on Earth, and what are the percentages of various types of water on Earth? 5. How does the presence of water and water systems affect the Earth and its ability to sustain life? 6. What happens to the water on Earth if it is heated or cooled? 7. What is the water cycle and how does it help the Earth function and sustain life? 8. What changes take place in the atmosphere and components of Earth's water (salt and fresh) when they are mixed together?

Topic/ Selection	**Suggested Timeline per topic**	**General Objectives**	**Instructional Activities**	**New Jersey Student Learning Standards/ NGSS, etc.**
The components of Earth's Systems, in particular non- living. This includes the atmospheric layers that sustain life on Earth. In addition, the water systems on Earth and the effects of their changes (evaporation, condensation and mixing)	45 Days (MP2)	Students will be able to: ● Develop and use a model to show the 4 layers of the Earth and how they interact with one another. ● Obtain and evaluate information so that the relationships between the layers can be identified and described. ● Construct explanations as to how the layers affect the functioning of the Earth system.	Create a model of Earth's layers using tissue paper and cellophane ● Earth's atmosphere foldable ● Interactive notebook ● Interactive mini lab http://homeschool.rebeccareid.com/atmosphere-layers/ ● Demonstrate air pressure http://www.giftofcuriosity.com/3-air-pressure-activities-for-kids/ ● Cloud in a jar http://www.giftofcuriosity.com/weather-science-how-to-make-a-cloud-in-a-jar/	5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. 5-ESS2-2. Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. 5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. 5-PS1-2. Measure and graph quantities to provide evidence that

		• Use mathematics, information and computer technology to collect data and compare the amount of fresh and salt water on the Earth. • Analyze and interpret data to conclude that the majority of water on Earth is found in Oceans, and that freshwater mostly is found in glaciers and underground, with a fraction of that being found in lakes, rivers, wetlands and the atmosphere. • Develop a model to show that matter is too small to be seen but is present, such as in the atmosphere. • Construct an explanation as to the behavior of tiny particles collected together, such as taking up space, evaporating or dissolving. • Use mathematics, information and computer technology to determine what happens to matter when it is heated or cooled, the changes in the matter itself. • Obtaining and evaluation information to determine that matter can be identified by its properties, such as its ability to conduct electricity (water) and its reflectivity) atmosphere • Engage in an argument to address the specific	• National Weather Service water cycle activity http://www.srh.noaa.gov/jetstream/atmos/ll_whatacycle.html • PBS Learning Water distribution http://mass.pbslearningmedia.org/resource/ess05.sci.ess.watcyc.lp_waterconservation/water-conservation/ • Water jars to show evaporation • Watershed activity https://www.montereybayaquarium.org/-/m/pdf/education/curriculum/shower_curtain_watershed.pdf • Oil Spill Activity https://www.teachingchannel.org/videos/natural-resources-lesson-plan • Bill Nye Water Cycle video • Flocabulary water cycle • Brain Pop • Manipulate ecosystems https://concord.org/stem-resources/experiment-ecosystems • Interactive notebook	regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. 5-PS1-3. Make observations and measurements to identify materials based on their properties. 5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

		question as to if total weight of matter is conserved when heated, cooled or mixed. ● Plan and carry out an investigation that determines if mixing two substances together will result in a new substance. ● Analyze and interpret data about the substance before and after mixing to show changes in the atmosphere and changes in components of Earth's water (salt and fresh) .		

**The suggested timeline per topic should total the number of days in the Pacing Guide for each unit.*

Suggested Modifications for Special Education, 504, English Language Learners, RTI and Gifted Students:
*Consistent with individual plans, when appropriate.

Students with Disabilities & 504: Utilize modifications & accommodations delineated in the student's IEP. Use of visual and multisensory formats that provide helpful visual, auditory, and tactile reinforcement of ideas, Use of assisted technology, Use of prompts, Modification of content and student products, Testing accommodations, Authentic assessments, Give directions/instructions verbally and in simple written format, Work with a partner.

English Language Learners: Teacher modeling. Peer modeling. Develop and post routines, Label classroom materials. Word walls. Give directions/instructions verbally and in simple written format. Pre-teaching of vocabulary and concepts, Visual learning, including graphic organizers, Use of cognates to increase comprehension, Teacher modeling, Pairing students with beginning English language skills with students who have more advanced English language skills, Scaffolding (word walls, sentence frames, think-pair-share, cooperative learning group). Students will be supported according to the recommendations for "can do's" as outlined by WIDA - https://www.wida.us/standards/CAN_DOs/

Bilingual: Repetition, simplify language (use shorter phrases), visual word banks, limited use of idioms, metaphors and words with multiple meanings, use of cognates. Use realia (concrete objects), dramatization (gestures, facial expressions, intonation), built on students background knowledge (topics/examples students can relate to), texts that reflect their experiences, extended time, provide samples (teacher and students created), model, pair with with partner.

Gifted Students: Adjusting the pace of lessons, Curriculum compacting, Inquiry-based instruction, Independent study, Higher-order thinking skills, Interest based content, Student-driven, Real-world problems and scenarios.

RTI: Using visual demonstrations, illustrations, and models, Give directions/instructions verbally and in simple written format, Peer Support, Increase one on one time, Teachers may modify instructions by modeling what the student is expected to do, Instructions may be printed out in large print and hung up for the student to see during the time of the lesson, Review behavior expectations and adjust for personal space or other behaviors as needed, Oral prompts can be given, Ask students to restate information, directions, and assignments, Repetition and practice Model skills / techniques to be mastered, Extended time to complete class work, Graphic organizers, More conferencing time, Partner work.

Suggested Technological Innovations/ Use:

Laptops. WIFI, Apple TV, Kahoot, Google classroom, Google Docs, Portaportal **,** BrainPop subscription

Computer Science and Design Thinking Standards

8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.
8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems.
8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources.
8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.
8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment.
8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.

Interdisciplinary Connections, Career Ready Practices, & 21st Century Connections:

21st Century Life and Career Skills:

9.1.5.CR.1: Compare various ways to give back and relate them to your strengths, interests, and other personal factors. **(Science mini-lesson, activities, group activities)**
9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes. **(Science Block, Activity,Group Projects)**
9.2.5.CAP.2: Identify how you might like to earn an income. (**Science Mini Lesson, Group Activities)**
9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations. (**Group Projects, Group Activities)**
9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements. (**Group Projects, Group Activities)**

RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **(5-PS1- 1)**
RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (**5-ESS2- 1),(5-ESS2-2**)
W.5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (**5-ESS2-2)**
SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (**5- ESS2-1),(5-ESS2-2**) Mathematics – MP.2 Reason abstractly and quantitatively. (**5-ESS2-1),(5-ESS2-2)**
MP.4 Model with mathematics. (**5-ESS2-1),(5-ESS2-2**)
5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (**5-ESS2-1)**
W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. **(5-PS1-2),(5-PS1-3),(5-PS1-4)**
W.5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (**5-PS1-2),(5-PS1-3),(5-PS1-4)**
W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (**5-PS1-2),(5-PS1-3),(5-PS1-4**)
Mathematics – MP.2 Reason abstractly and quantitatively. (**5-PS1-1),(5-PS1-2),(5-PS1-3)**
MP.4 Model with mathematics. (**5-PS1-1),(5-PS1-2),(5-PS1-3**)
MP.5 Use appropriate tools strategically. (**5-PS1-2),(5-PS1-3**)
5.NBT.A.1 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. (**5-PS1-1**) **5.NF.B.7** Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. **(5-PS1-1**)
5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems. (**5-PS1-2**)
5.MD.C.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement. **(5-PS1-1**)
5.MD.C.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. (**5-PS1-1**)

Unit 3: Earth's Systems-Living (Plants and Animals)

Summary of the Unit: Students analyze and interpret data,develop models,construct arguments, and demonstrate a deeper understanding of what is needed for plants and animals to grow and flourish on Earth, which includes their vital dependence on the Sun and water. In addition, they will understand that animals and plants transfer energy and matter. They will also study ecosystems of plants and animals, their components and how they depend on one another for success. This includes the relative components of an ecosystem such as the study of matter. The breakdown of these systems will be included in the study.

The crosscutting concepts that will be explored in this unit include Systems and System Models, Energy and Matter, Cause and Effect, and Structure and Function.

Assessment and/ or Summative Criteria to Demonstrate Mastery of the Unit:

Summative Assessments

Alternative Assessments

Formative Assessments

- Do Nows
- Exit Tickets
- Quizzes
- Unit Tests
- Projects
- Assessments

Understandings **(Students will understand or know)**	**Essential Questions**
• Plants and animals have essential needs to grow and flourish, such as energy from the Sun, water and air. • Animals and plants get their energy from the Sun. • Animals and plants transfer energy because they depend on one another to sustain life, such as animals eating plants and that matter being transferred from one to another.	1. What are the essential needs of Plants and animals to grow and flourish? 2. How do you know that the energy for plant and animal life comes from the Sun? 3. How do animals and plants transfer energy and matter? 4. What is an ecosystem? 5. What does an ecosystem need for success?

• An ecosystem is a biological community of interacting organisms and their physical environment. • Ecosystems are truly systems, with components that are essential to continue their success. Each part has a role to play. • Ecosystems interact with others. Some components, such as , oxygen are part of several systems. • External factors that are not natural to the ecosystem can cause the system to break down. • An ecosystem can be comprised of objects that can be seen as well as small matter that is just as important to its success.	6. How do you know that ecosystems interact with one another? 7. What would cause the breakdown of ecosystems? 8. What are the components of an ecosystem?

Topic/ Selection	**Suggested Timeline per topic**	**General Objectives**	**Instructional Activities**	**New Jersey Student Learning Standards/ NGSS, etc.**
The components of Earth's Systems, in particular living systems of plants and animals (humans will be covered later in Unit 4) . This includes the plant and animal ecosystems, their cycles and their need to depend on one another and the resources of the Earth for survival	45 Days (MP3)	Earth's Systems Living (Plants and Animals) Students will be able to: • Support the claim that plants acquire materials they need for growth from air and water • Obtain, evaluate and identify evidence that plants grow over time and that changes in soil, water and air determine their growth. However, that soil does not provide most of the material for growth. • Evaluate evidence that certain materials (air, water, soil) play more or	Experiment adding and eliminating different components to the plant growing process. Create a diagram of the parts of a plant using cupcake liners, pipe cleaners, etc. What are the parts of plants? http://www.mbgnet.net/bioplants/parts.html Seeds The Magic School Bus Activity http://www.scholastic.com/teachers/lesson-plan/magic-school-bus-goes-seed Growing project with 7th grade biology classes Tri Foldable model of an ecosystem	5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. 5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water. 5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

		less of a role in how much plants grow. ● Engage in an argument from evidence that changes in air and water play a vital role in plant growth and that although plants can without soil, they cannot grow without air. ● Engage in an argument from evidence that air and water can transport materials needed for growth. ● Plan and investigate what happens to plants if amounts of air and water affect plant growth. ● Develop and use a model to show that matter moves within plants and animals to create ecosystems. ● Construct explanations to show how that animals consume other animals, animals consume plants and this creates an ecosystem that transfers energy. ● Develop and use models to show the cycling of matter between plant, animals decomposers and the environment. ● Engage in an argument from evidence, distinguish among facts, and reasoned judgment based on research findings that interruptions in the ecosystems are going to affect the systems.	Build a terrarium http://media.wfyi.org/IndianaExpeditions/IDEXSeason2_2009/IDEX201/IDEX201BottleBiologyTerrariumL.pdf Pop Bottle Ecosystem http://www.layers-of-learning.com/pop-bottle-ecosystem/ Do plants need sunlight activity http://www.reachoutmichigan.org/funexperiments/agesubject/lessons/sunlight.html Online ecosystem activity https://concord.org/stem-resources/experiment-ecosystems Build a biome https://www.teachengineering.org/activities/view/cub_bio_lesson02_activity1 I have , you have around the room activity What is an ecosystem? http://betterlesson.com/lesson/631075/what-is-an-ecosystem Building an Ecosystem http://betterlesson.com/lesson/631082/constructing-ecosystem-models	

		• Develop a diagram or model to convey that energy in animal and plant food came from the Sun. • Use data to evaluate claims about cause and effect, specifically how the Sun has a relationship with plants and animals that provides them with the ability to grow, have motion, and body repair. • Represent data in tables and/or bar graphs, pictographs and/or pie charts to reveal patterns that indicate all food can eventually be traced back to plants. • Construct and/or support an argument with evidence to show that the amount of matter is conserved when it changes form, such as when animals eat plants.		

**The suggested timeline per topic should total the number of days in the Pacing Guide for each unit.*

Suggested Modifications for Special Education, 504, English Language Learners, RTI and Gifted Students:
*Consistent with individual plans, when appropriate.

Students with Disabilities & 504: Utilize modifications & accommodations delineated in the student's IEP. Use of visual and multisensory formats that provide helpful visual, auditory, and tactile reinforcement of ideas, Use of assisted technology, Use of prompts, Modification of content and student products, Testing accommodations, Authentic assessments, Give directions/instructions verbally and in simple written format, Work with a partner.

English Language Learners: Teacher modeling. Peer modeling. Develop and post routines, Label classroom materials. Word walls. Give directions/instructions verbally and in simple written format. Pre-teaching of vocabulary and concepts, Visual learning, including graphic organizers, Use of cognates to increase comprehension, Teacher modeling, Pairing students with beginning English language skills with students who have more

advanced English language skills, Scaffolding (word walls, sentence frames, think-pair-share, cooperative learning group). Students will be supported according to the recommendations for "can do's" as outlined by WIDA - https://www.wida.us/standards/CAN_DOs/

Bilingual: Repetition, simplify language (use shorter phrases), visual word banks, limited use of idioms, metaphors and words with multiple meanings, use of cognates. Use realia (concrete objects), dramatization (gestures, facial expressions, intonation), built on students background knowledge (topics/examples students can relate to), texts that reflect their experiences, extended time, provide samples (teacher and students created), model, pair with with partner.

Gifted Students: Adjusting the pace of lessons, Curriculum compacting, Inquiry-based instruction, Independent study, Higher-order thinking skills, Interest based content, Student-driven, Real-world problems and scenarios.

RTI: Using visual demonstrations, illustrations, and models, Give directions/instructions verbally and in simple written format, Peer Support, Increase one on one time, Teachers may modify instructions by modeling what the student is expected to do, Instructions may be printed out in large print and hung up for the student to see during the time of the lesson, Review behavior expectations and adjust for personal space or other behaviors as needed, Oral prompts can be given, Ask students to restate information, directions, and assignments, Repetition and practice Model skills / techniques to be mastered, Extended time to complete class work, Graphic organizers, More conferencing time, Partner work.

Suggested Technological Innovations/ Use:

Laptops. WIFI, Apple TV, Kahoot, Google classroom, Google Docs, Portaportal**,** BrainPop subscription, Flocabulary Subscription

Computer Science and Design Thinking Standards

8.1.5.IC.1: Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.
8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.
8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
8.2.5.ED.1: Explain the functions of a system and its subsystems.
8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
8.2.5.ED.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).
8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.
8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment.
8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.

8.2.5.EC.1: Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.

Interdisciplinary Connections, Career Ready Practices, & 21st Century Connections:
21st Century Life and Career Skills:

9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes. **(Science Block, Activity,Group Projects)**
9.2.5.CAP.2: Identify how you might like to earn an income. (**Science Mini Lesson, Group Activities)**
9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations. (**Group Projects, Group Activities)**
9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements. (**Group Projects, Group Activities)**
9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (**Group Projects, Group Activities)**
9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process **(Science Block, Activity,Group Projects)**
9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (**Group Projects, Group Activities)**

RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **(5-LS2- 1)**
SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (**5- LS2-1**)
Mathematics – MP.2 Reason abstractly and quantitatively. (**5-LS2-1)**
MP.4 Model with mathematics. **(5-LS2-1)**
RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (**5-LS1-1)**
RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (**5-LS1-1)**
W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (**5-LS1-1**)
Mathematics – MP.2 Reason abstractly and quantitatively. (**5-LS1-1)** MP.4 Model with mathematics. (**5-LS1-1)** MP.5 Use appropriate tools strategically. (**5-LS1-1)**
5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. **(5-LS1-1**)
RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (**5-PS3- 1)**
SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (**5- PS3-1**)

Unit 4: Earth's Systems- Living (Human)

Summary of the Unit: Students analyze and interpret data,develop models,construct arguments, and demonstrate a deeper understanding of different human activities affecting various parts of the natural Earth. Students will study the effects of agriculture, industry, and everyday human life on soil, air and the water systems.They will understand how humans can manipulate and change the Earth and its ability to sustain life and ecosystems. They will also study how humans have used data and research to find ways to protect natural resources of the Earth.

The Crosscutting Concepts that will be explored in this unit include Systems and System Models, Energy and Matter, and Stability and Change.

Assessment and/ or Summative Criteria to Demonstrate Mastery of the Unit:

Summative Assessments
Alternative Assessments
Formative Assessments

- Do Nows
- Projects
- Exit Tickets
- Assessments

Understandings **(Students will understand or know)**	**Essential Questions**
• Humans impact the Earth both positively and negatively • Agriculture, industry, and everyday human life impact the Earth by altering ecosystems and natural aspects of the Earth such as the water cycle. • Humans build on and erode the Earth and change its topography. • Certain systems have been changed, some forever, by the actions of humans. For example, the extinction of animals, or the damming of rivers. • The Earth provides natural resources such as fuel, that help to sustain human life.	1. How do humans impact the Earth? 2. How does agriculture, industry, and everyday human life impact the Earth? 3. How do humans manipulate the Earth? 4. What evidence do we have that human activity has changed the Earth's ability to sustain life and ecosystems? 5. What are the natural resources of Earth? 6. How do humans use research to find ways to protect the Earth?

• Humans study the environment and use their information to find ways to protect it. With education, they encourage a culture of environmental protection. They create man made systems as well as laws to ensure that the future of the Earth is successful.	

**Please include resource links in the boxes above.*

Topic/ Selection	**Suggested Timeline per topic**	**General Objectives**	**Instructional Activities**	**New Jersey Student Learning Standards/ NGSS, etc.**
The effect of the Humans on the Earth and their role in both altering systems but negatively and positively.	45 Days (MP3)	Students will be able to: • Develop a diagram or model to convey that energy in animal and plant food came from the Sun and humans are consumers of plants and animals. • Use data to evaluate claims about cause and effect, specifically how the Sun has a relationship with humans that provides them with the ability to grow, have motion, and body repair. • Construct and/or support an argument with evidence to show that the amount of matter is conserved when it changes form, such as when humans eat plants and animals. • Identify the evidence that supports in particular the fact that humans are part of ecosystems of Earth. • Obtain and combine information from books	Create a diagram of a cycle of ecosystems Powerpoint detailing the natural resources f the Earth https://educators.brainpop.com/lesson-plan/earth-awareness-lesson-plan-whats-cause/ Water Pollution lesson https://educators.brainpop.com/lesson-plan/water-pollution-lesson-plan/ How oil production effects the ocean activity https://educators.brainpop.com/lesson-plan/the-environmental-cost-of-oil-lesson-plan-how-oil-production-can-impact-oceans/ The human footprint activity http://www.nationalgeographic.com/xpeditions/lessons/14/g68/HumanFootprint.pdf The Sun's energy dispersed http://www.trueaimeducation.com/light-box-magic/ Solar Oven	5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. 5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment 5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water 5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. 5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. [5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or

		and/or other reliable media to explain how human activity (agriculture, industry and everyday life) affects the Earth's resources and environment • Obtain and combine information from books and/or other reliable media to explain how humans use scientific ideas to protect the Earth's resources and environment • Compare and contrast data collected by different groups in order to evaluate the positive and negative effects on the environment as a result of human activities. • Combine information in written text with that contained in corresponding tables, diagrams, and/or charts to support the evidence that communities apply information about how the environment works in order to protect it.	Solar Updraft Tower http://almostunschoolers.blogspot.com/2015/04/simple-solar-thermal-projects-for-kids.html Energy Quest Interactive site http://www.energyquest.ca.gov/ Interactive water cycle https://www3.epa.gov/safewater/kids/flash/flash_watercycle.html Research Earth Day Impact of humans making changes Burning Town Investigation (Centralia PA, town with coal burning underground.) Article in Scholastic, Web sites	mixing substances, the total weight of matter is conserved. 5-PS1-3. Make observations and measurements to identify materials based on their properties. 5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

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English Language Learners: Teacher modeling. Peer modeling. Develop and post routines, Label classroom materials. Word walls. Give directions/instructions verbally and in simple written format. Pre-teaching of vocabulary and concepts, Visual learning, including graphic organizers, Use of cognates to increase comprehension, Teacher modeling, Pairing students with beginning English language skills with students who have more advanced English language skills, Scaffolding (word walls, sentence frames, think-pair-share, cooperative learning group). Students will be supported according to the recommendations for "can do's" as outlined by WIDA - https://www.wida.us/standards/CAN_DOs/

Bilingual: Repetition, simplify language (use shorter phrases), visual word banks, limited use of idioms, metaphors and words with multiple meanings, use of cognates. Use realia (concrete objects), dramatization (gestures, facial expressions, intonation), built on students background knowledge (topics/examples students can relate to), texts that reflect their experiences, extended time, provide samples (teacher and students created), model, pair with with partner.

Gifted Students: Adjusting the pace of lessons, Curriculum compacting, Inquiry-based instruction, Independent study, Higher-order thinking skills, Interest based content, Student-driven, Real-world problems and scenarios.

RTI: Using visual demonstrations, illustrations, and models, Give directions/instructions verbally and in simple written format, Peer Support, Increase one on one time, Teachers may modify instructions by modeling what the student is expected to do, Instructions may be printed out in large print and hung up for the student to see during the time of the lesson, Review behavior expectations and adjust for personal space or other behaviors as needed, Oral prompts can be given, Ask students to restate information, directions, and assignments, Repetition and practice Model skills / techniques to be mastered, Extended time to complete class work, Graphic organizers, More conferencing time, Partner work.

Suggested Technological Innovations/ Use:

Laptops. WIFI, Apple TV, Kahoot, Google classroom, Google Docs, Portaportal**,** BrainPop subscription , Flocabulary

Computer Science and Design Thinking Standards

8.1.5.IC.1: Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.
8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.
8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.
8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.
8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data
8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system.
8.2.5.ITH.3: Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use.
8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies.

8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems.
8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources.
8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.
8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment.
8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.
8.2.5.EC.1: Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.

Interdisciplinary Connections, Career Ready Practices, & 21st Century Connections:
21st Century Life and Career Skills:

9.1.5.CR.1: Compare various ways to give back and relate them to your strengths, interests, and other personal factors. (**Science Mini Lesson, Group Activities)**
9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes. **(Science Block, Activity,Group Projects)**
9.2.5.CAP.2: Identify how you might like to earn an income. (**Science Mini Lesson, Group Activities)**
9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations. (**Group Projects, Group Activities)**
9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements. (**Group Projects, Group Activities)**
9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (**Group Projects, Group Activities)**
9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue(**Group Projects, Group Activities)**
9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (**Group Projects, Group Activities)**

RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (**5-ESS3-1**)
RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.**(5-ESS3-1)**
RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (**5-ESS3-1**)
W.5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (**5-ESS3-1)**
W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (**5-ESS3-1**)
Mathematics – MP.2 Reason abstractly and quantitatively. (**5-ESS3-1**)

MP.4 Model with mathematics. (**5-ESS3-1**)
RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **(5-PS3- 1**)
SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (**5- PS3-1**)
RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (**5-LS2- 1)**
SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (**5- LS2-1)**
Mathematics – MP.2 Reason abstractly and quantitatively. **(5-LS2-1)**
MP.4 Model with mathematics. **(5-LS2-1)**