SCN663 Science 6 (BA-2/23/2017)

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STATEMENT OF PURPOSE

The Grade Six course of study is a student-centered, laboratory-based program that seeks to provide adventure and excitement as the students explore new areas of the Earth Sciences. The primary topic areas are meteorology, geology, oceanography, and astronomy. Collectively they provide the students with the knowledge they need to manage our natural resources, better understand our environment, and safeguard the world around us.

The students will develop the ability to identify problems; and then describe, analyze, and predict possible solutions. New forms of observational skills will be in some cases developed and in others refined in order to perform authentic, scientific investigations. The students will also learn to utilize appropriate tools to gather information and solve many issues facing planet Earth today.

The curriculum is implemented in a manner that incorporates interdisciplinary connections with several areas including Mathematics, Language Arts, and Social Studies. Technology is utilized throughout to provide clarifying visual images, and to offer the students the opportunity to access, organize, and store data that greatly enhances their ability to develop a big-picture understanding of the concepts they study.

Special Note for the 2015-16 School Year: In 2014, the New Jersey State Department of Education adopted the New Jersey Student Learning Standards, (NJSLS), that set forth a vision for science education where the Science and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs) of science, and Crosscutting Concepts (CCCs) of science are blended seamlessly into a three dimensional learning environment for all students. The transition to NJSLS across New Jersey and in the Parsippany Troy Hills School District will be deliberate, and full implementation of NJSLS New Jersey is planned for the 2016-17 school year. The shifts required in NJSLS implementation are fundamental, and revision of curriculum requires careful consideration of these changes as well as time to develop, pilot, and implement. During this transitional period, resources in support of NJSLS are being developed and posted for teachers' use in buildings and through Professional Development. A core team of experienced teachers attended NJSLS curriculum training in July 2015, and are steadily working to build units that will be implemented throughout the 2015-16 school year, units that incorporate active learning for students, giving them the opportunities to Engage, Explore, Explain, Elaborate and Evaluate Science. As our master teachers implement these new units their experiences and feedback provide momentum for the unfolding new curricula. Separately we assess students to gauge progress and inform instruction for students in grades 6 through 8 are administered once per quarter.

RATIONALE

The Grade Six Middle School students possess an inquisitive mind, along with a significant capacity for learning. Students continually inquire about the formations they see, and how they developed as they explore new places. Therefore, the Earth Science curriculum is designed to guide the students to answer questions such as these, as well as many more they will formulate as they proceed through this comprehensive program. The needs of all the students are fully considered in the planning process. The course of study is written to address the learning styles of each individual regardless of his or her knowledge, ability, or level of interest. This curriculum is designed to facilitate the growth of all the individuals it serves.

This course is aligned with the New Jersey Student Learning Standards, (NJSLS), the New Jersey Student Learning Standards, for Technological Literacy (NJSLS) for Technological Literacy)and the New Jersey 21st Century Life and Career Ready Practices. Using a variety of materials, resources, and instructional methods, the course reinforces the educational skills of scientific interpretation, investigation, problem-solving, critical analysis and research. District initiatives in assessment and critical reading and writing are emphasized.

THE LIVING CURRICULUM

Curriculum guides are designed to be working documents. Teachers are encouraged to make notes in the margins. Written comments can serve as the basis for future revisions. In addition, the teachers and administrators are invited to discuss elements of the guides as implemented in the classroom and to work collaboratively to develop recommendations for curriculum reforms as needed.

AFFIRMATIVE ACTION

During the development of this course of study, particular attention was paid to material, which might discriminate on the basis of sex, race, religion, national origin, or creed. Every effort has been made to uphold both the letter and spirit of affirmative action mandates as applied to the content, the texts and the instruction inherent in this course.

MODIFICATIONS AND ADAPTIONS: For guidelines on how to modify and adapt curricula to best meet the needs of all students, instructional staff should refer to the Curriculum Modifications and Adaptations (http://njcdd.org/wp-content/uploads/2016/08/tools-teacherspart2.pdf). Instructional staff of students with Individualized Education Plans (IEPs) must adhere to the recommended modifications outlined in each individual plan.

GENERAL GOALS

The students will:

- learn that all of the Earth's processes need energy to occur, which either comes from its very hot interior or the Sun.
- learn that the Earth is a huge system of organized parts, which include the atmosphere, geosphere, hydrosphere, and the biosphere, all working together.
- learn that there are major types of air masses that drive weather changes.
- learn what makes up our Solar System, and how the objects interact.
- learn that the Earth is very dynamic and constantly changing.

- learn how the theory of plate tectonics can explain major changes such as earthquakes, volcanoes, and mountain building.
- learn how the use of technology has provided more detailed images, and has changed people's understanding of the Earth.

Modifications and Adaptations: http://njcdd.org/wp-content/uploads/2016/08/tools-teacherspart2.pdf

GENERAL PERSONAL SAFETY

The science classroom is potentially the most dangerous place in the school. However, this need not constitute a serious threat if the teacher and students have a thorough knowledge of the potential hazards, exercise prudent care and foresight, and use of common sense. Accident prevention must be included in the performance of every task, and safety instruction must be an integral part of the overall science program.

1. Precautions should be taken to protect those in the classroom from injury from hot or corrosive materials.

a. In order to reduce the danger from caustic or hot liquids, students and teachers handling such materials should wear protective aprons (plastic or neoprene), goggles and should roll sleeves (which can absorb the liquid) tightly to above the elbow.

b. Students should never be permitted to work with concentrated acids or bases.

c. Burns from either hot or caustic materials should be flooded immediately and for at least ten minutes with copious amounts of cold water. Following flooding of the burn, the victim should be escorted to the school nurse as quickly as possible. Clothing which has absorbed caustic materials should

be removed as soon as feasible. The school nurse should be called immediately.

2. Eating anything in the laboratory should be prohibited since it entails an intolerable hazard from toxic materials.

3. Cleanliness and order should be maintained.

a. Extraneous objects should be moved from work surface. Accidents tend to be intensified by clutter.

b. Glassware and other hardware should be maintained in a clean condition. Chemical residues may constitute a reactive hazard.

c. Students should be required to thoroughly wash their hands with soap and water following a laboratory session.

4. There are several devices for protecting students and instructors against the corrosive or toxic effects of chemical reagents.

a. Aprons should be worn by all students working in a laboratory, especially when working with corrosive reagents.

b. Gloves should be worn by students when working with concentrated corrosive reagents. Gloves have a tendency to reduce dexterity, which may be a hazard in itself. Gloves are generally rubber or plastic.

c. Long hair can be a serious hazard in the laboratory and should be covered or contained. Fire and reduced visibility are just two of the hazards that result from long hair.

d. Loose clothing is another potential hazard in the laboratory. Loose clothing is less controllable that tight-fitting clothing. Glassware can be knocked off benches, clothing can come into contact with open flame and manual dexterity can be reduced.

5. In a demonstration experiment using any flammable liquid such as alcohol, care must be taken to ensure that any flame in the room is a safe distance from the volatile liquid.

6. Demonstrations involving explosive or potentially explosive substances must be so arranged as to shield everyone from any danger. Use the safety shield to protect observers and the face shield and goggles to protect the demonstrators. Size of apparatus and quantities of reagents used in

demonstration should be consistent with safe practice.

7. Observers should be evacuated from seats directly in front of the demonstration table, even if the possibility is remote that injury to them might occur from splattering of chemicals, inhalation of fumes, etc.

8. All persons performing science activities involving hazards to the eyes must wear approved eye protection devices. All persons in dangerous proximity must likewise be equipped.

9. Chemicals should never be tasted (or placed on the tongue or lips) nor should laboratory glassware be used as drinking vessels.

10. Sandals and open-toe shoes should not be permitted in laboratory areas unless they have a protective covering.

MARKING PERIOD GRADES

Long and Short Term Assessments which may include: 90%

- Tests, quizzes, and/or worksheets
- Authentic assessments
- Technology applications
- Projects, reports, presentations
- Laboratory investigations
- Data Analysis
- Analysis of assigned readings

Daily Assessments which may include: 10%

- Active engagement in class activities
- Demonstration of knowledge and understanding of course material
- Skills and safety practices during lab investigations
- Do Now/Exit Questions
- Homework

Class type

Assessment

FINAL GRADE ASSESSMENT

5 day/week required courses

Quarterly assessment

Quarterly assessments will take place at the end of each marking period, and will be counted as a major assessment for the marking period, similar to a unit assessment. No more than 2 assessments will be administered per day during quarterlies and semesterlies.

SAFETY CHECKLIST FOR TEACHERS

This checklist is presented to assist teachers in preparing safety procedures for the laboratory.

1. _____ Do you brief your students concerning safety procedures prior to each laboratory?

2. _____ Is there a copy of student safety guidelines posted in the lab? Are students familiar with the contents and know how to use it?

3. _____ Have the students received a copy of safety procedures? Are the students required to keep the procedures in their notebooks for easy reference?

4. _____ Are you present at all times when students are working in a classroom or laboratory? Lab work should never be done without supervision.

5. _____ Do you emphasize the importance of traits and attitudes concerning observation, precision, and alertness?

6. _____ Do your students follow a procedure for checking out the laboratory at the end of a class or the school day?

7. _____ Are the students aware that it is unsafe to touch the face, mouth, eyes and other parts of the body while working in a laboratory situation?

8. _____ Are proper safety measures used when heating a liquid confined in a container?

9. _____ Is everything stored in easily handled, labeled containers? This includes water (tap and distilled) and waste materials.

10. _____ Have students obtained ALL the equipment they will need before beginning lab work?

11. _____ Are commercial spill kits or other materials available to control spills?

12. _____ Do you know where the safety features of this room are located?

13. _____ Have you inspected all glassware for cracks or defects?

14. _____ If glassware is to be heated, do you make sure it is Pyrex?

15. _____ Do students know how to dispose of broken glassware?

16._____ Do you allow time for students to clean their equipment and area properly?

17. _____ Do you insist that the students wear goggles when heating materials and/or working with chemicals?

18. _____ Do you keep flame far from flammable liquids?

19._____ Do you and your students wear all necessary protective clothing?

20._____ Do you insist that students NOT eat, drink, chew gum, or apply cosmetics in the lab area?

21._____ Are students thoroughly familiar with the operation of the equipment before they begin the experiment?

22._____ Have you checked all electrical connections BEFORE turning on the current?

23._____ Have you discussed with all your students their responsibilities in the laboratory?

Course: SCN663

In accordance with district policy as mandated by the New Jersey Administrative Code and the New Jersey Core Curriculum Content Standards, the following are proficiencies required for the successful completion of the above named course.

The student will:

1. identify a problem and define the criteria and constraints of the problem.

2. brainstorm, evaluate competing design solutions, develop a solution, and build a prototype to solve a problem.

3. test a self-designed prototype and analyze collected data from multiple tests to identify the best features of each design.

4. redesign a prototype based on data collected from prior testing to create a new solution that better meets the criteria for success.

5. compare weathering and erosion.

6. differentiate between mechanical and chemical weathering.

7. compare the different types of mass movements.

8. demonstrate the effects of water on rock.

9. understand the effects of wind erosion.

10. identify glacial erosion impact on rocks.

11. understand effects of wave erosion.

12. understand the components of soil and the process of soil formation.

13. discuss soil as a valuable natural resource and explain how to conserve it.

14. observe minerals and rocks in the real world.

15. differentiate between a mineral and a rock.

16. describe how minerals are formed through crystallization.

17. evaluate how everyday items are constructed from mineral resources.

18. compare and contrast how rocks form.

19. classify rocks into major rock groups.

20. design a model to demonstrate how rocks change.
21. discuss prior knowledge on the topic of geologic time.
22. describe what fossils are.
23. explain what fossils show.
24. use the Law of Superposition to describe rock layers.
25. describe the different ways rocks change by folding, faulting, and unconformities.
26. analyze and interpret the Geologic time Scale.
27. explain features and characteristics of early Earth.
28. describe how Earth and its inhabitants have changed since the birth of the planet.
29. analyze and compare fossil images to modern day organisms.
30. hypothesize why organisms of the same species have varying traits.
31. explain Darwin's Hypothesis.
32. describe the factors that cause natural selection.
33. describe the evidence that supports the theory of evolution.
34. model the phenomenon of natural selection.
35. describe the structure of the Earth the differentiate between continental and oceanic crust.
36. construct an argument using evidence to support the theory of continental drift, seafloor spreading, and the theory of plate tectonics.
37. explain the causes of earthquakes, volcanoes and mid-ocean ridges based on their locations.
38. analyze the effects of volcanoes.
39. model the movement of tectonic plates and explain the force that causes plate movement.

40. design, build, test, and evaluate a model of an earthquake-safe structure. Describe the effects that earthquakes have on the Earth and on human-made structures.

41. explore what puts the Water Cycle into motion.

42. classify electromagnetic waves based on wavelength and explain how electromagnetic waves are absorbed and reflected by Earth's surface and atmosphere.

43. understand and model the three types of heat transfer-convection, conduction, and radiation.

44. describe characteristics of air masses and fronts.

45. collect and analyze meteorological data for various US cities.

46. develop and interpret a climograph.

47. model the change of seasons.

48. model rotation, revolution, and eclipses.

49. model and describe the phases of the Moon.

50. create a scale model of the solar system.

SCN663 Curriculum

Unit	Essential Questions	Enduring Understanding	Suggested Activities	Evaluation / Assessment	Resources
Introduction to the Engineering Design Process *(Week 1, 2 Weeks)*	a) How do engineers and scientists solve problems?	a) Scientist and engineers use the same general process to solve problems.	• Students will be introduced to the Egg Drop Engineering Design Challenge: Students will be presented with the problem of preventing an egg from breaking when dropped off the second story of the school. Students will review criteria and constraints for the problem. After reviewing the problem, students will perform research on design techniques, materials, and real life applications (i.e. padding in helmets, parachutes, Mars Exploration Rover landing mechanism). • Students will brainstorm and sketch multiple designs to solve the Egg Drop Engineering Design Challenge, then evaluate their designs to determine how well each design meets the criteria and constraints of the problem. Students will pick one design and then build their prototype using chosen materials. • Students will test their self-designed prototype for the Egg Drop Design Challenge. Students will collect data on each other student's prototype design and test results (i.e. design features and survival of egg). They will then analyze the data collected to determine which characteristics yield the best results. • Students will redesign their prototype based on the data they collected and analyzed during prototype testing.	**Written: Essay** Student-written description identifying the problem and the criteria and constraints of the problem. **Performance: Authentic Task** Brainstorm sketches, of prototype. **Written: Essay** Written student rationale explaining design evaluations and final design choice. **Written: Informative** Data table based on the test results of the class. Bar graph showing success rate of various design features. **Written: Informative** Final sketch of prototype and rationale explaining how and why the design was chosen.	See LC Infusions Attachments

Standards: **NJ: 2016 SLS: Science NJ: MS Engineering Design MS-ETS1 Engineering Design Performance Expectations**

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.
NGSS: Science and Engineering Practices
NGSS: 6-8
Practice 1. Asking questions (for science) and defining problems (for engineering)
Asking questions and defining problems in 6–8 builds on K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.
Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information.
Practice 2. Developing and using models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
Evaluate limitations of a model for a proposed object or tool.
Practice 3. Planning and carrying out investigations
Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.
Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim.
Practice 4. Analyzing and interpreting data
Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.
Construct, analyze, and/or interpret graphical displays of data and/or large data sets to identify linear and nonlinear relationships.
Practice 5. Using mathematics and computational thinking
Mathematical and computational thinking in 6–8 builds on K–5 experiences and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments.
Use digital tools (e.g., computers) to analyze very large data sets for patterns and trends.
Practice 6. Constructing explanations (for science) and designing solutions (for engineering)
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.
Construct an explanation that includes qualitative or quantitative relationships between variables that predict(s) and/or describe(s) phenomena.
Practice 8. Obtaining, evaluating, and communicating information
Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.
Critically read scientific texts adapted for classroom use to determine the central ideas and/or obtain scientific and/or technical information to describe patterns in and/or evidence about the natural and designed world(s).
NGSS: Crosscutting Concepts
NGSS: 6-8
Crosscutting Statements
6. Structure and Function – The way an object is shaped or structured determines many of its properties and functions.
Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.

21st Century Skills:
NJ: 2014 SLS: 21st Century Life and Careers
NJ: All Grades
Career Ready Practices
Career Ready Practices
CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP6. Demonstrate creativity and innovation.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

CRP9. Model integrity, ethical leadership and effective management.

CRP12. Work productively in teams while using cultural global competence.

Minerals and Rocks *(Week 3, 5 Weeks)*	a) How are rocks formed and what processes act together to change rock?	b) Rocks are constantly changing by the natural processes that occur beneath and above Earth's surface.	• Introductory lesson: Students view video clips and images of various aspects of geology to peak interest. • Separate items based on what is thought to be a mineral and what is thought to be a rock; and provide written reasoning. Whole class discussion. Minerals made of one thing; rocks are made of many minerals. Five factors of minerals. (RW) • Mineral Formation- Considering the factors of minerals how are minerals formed in nature? Show and explain examples of minerals formation; magma cools, hot water and gas cool, water evaporates. Use crystal candy demonstration to show relationship between crystal size and formation time. • Annotation mini-lesson using "Hidden Worlds" article, compare & contrast Venn diagram, and mini-lesson on CER leads into a research-based paragraph written response. (RW) • Review/Introduction of Metacognitive Reading Strategies to support annotations (RW)	**Formative:** **Performance: Authentic Task** Teacher-designed pre-assessment based on students' prior knowledge of rocks and minerals. Teacher-designed formative assessment focusing on why a mineral is a mineral Teacher generated formative assessment focusing on the relationship between time and mineral crystal size. **Performance: Authentic Task** Students choose objects in the classroom and describe how minerals	See Literacy Infusions Attachments:

			• Everyday Minerals- “Know its Roots” Students identify everyday items they know to have mineral origins. Facilitated discussion to follow. Students then collaborate everyday items they believe to have no mineral origins. Model the linear connection each item has to the minerals origin. Extension activity, students identify four items at home and explain its’ connection to mineral resources. • Mineral Distribution- Students observe world map of natural resources. Construct an explanation that describes the even distribution around the planet as a result of past geologic processes. (RW) • Igneous Rock Formation- Observe igneous rock samples. Determine what factors can be use to separate the igneous rocks and group them accordingly with written reasoning. Identify and explain how igneous rocks are classified by where they form and mineral content. (RW) • Sedimentary Rock Formation- Observe various sedimentary rock samples, to determine what they are made from and theorize how they are made. Use observations to walk through the sedimentary rock cycle. Create a model the sedimentary rock cycle. • Metamorphic Rock Formation- Looking at the metamorphic rock samples determine how they are changed, provide written reasoning. Extreme heat and pressure create physical and chemical changes. • Classifying Rocks- Separate the rocks intro the three rock groups, write down reasoning for grouping. (RW) • Rocks are classified by how they are formed. Reading the rocks texture provides evidence of formation; determine grain size, grain shape, grain pattern.	are a part of each chosen object. Pet Rock Project: Students choose a rock from the natural environment (backyard, schoolyard, park, etc.). Students analyze their rock, report on characteristics of their rock, and hypothesize how their rock formed Engineering Design Challenge: Modeling the Rock Cycle **Summative: Other: Teacher Observation** Teacher generated summative assessment focusing on rocks and minerals 6th_Annotation.pdf hidden_worlds_assignment.docx Pet_Rock_Project_Packet.docx	

			• Students Design an experiment using items that will show the same processes rocks go through during the rock cycle. • Model The Rock Cycle- Chocolate or Crayon Rock Cycle. Model the formations each rock group. • The Pet Rock Project (see all resources in appendices) (RW) • Peer conference guide for Pet Rock narrative description(RW) • Sensory detail lesson Metamorphic vs. Non-metamorphic, igneous, sedimentary rocks (RW)		

Standards: **NJ: 2016 SLS: English Language Arts**
NJ: Grade 6
Reading: Informational Text
Key Ideas and Details
NJSLSA.R1 Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
RI.6.1 Cite textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text.
Craft and Structure
NJSLSA.R4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
RI.6.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.
NJSLSA.R9 Analyze and reflect on how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.
RI.6.9 Compare, contrast and reflect on (e.g. practical knowledge, historical/cultural context, and background knowledge) one author's presentation of events with that of another (e.g., a memoir written by and a biography on the same person).
Writing
NJSLSA.W3 Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
W.6.3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.
W.6.3a. Engage and orient the reader by establishing a context and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically.
W.6.3b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters.
W.6.3c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another.
W.6.3d. Use precise words and phrases, relevant descriptive details, and sensory language to convey experiences and events.
W.6.3e. Provide a conclusion that follows from the narrated experiences or events.

Production and Distribution of Writing
NJSLSA.W4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
W.6.4. Produce clear and coherent writing in which the development, organization, voice, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
NJSLSA.W5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
W.6.5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
NJSLSA.W6 Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
W.6.6. Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.
Research to Build and Present Knowledge
NJSLSA.W7 Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
W.6.7. Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.
NJSLSA.W8 Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
W.6.8. Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.
NJSLSA.W9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.6.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.
Range of Writing
NJSLSA.W10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
W.6.10. Write routinely over extended time frames (time for research, reflection, metacognition/self correction, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline- specific tasks, purposes, and audiences.
NJ: 2016 SLS: Science
NJ: MS Earth & Space Sciences
MS-ESS2 Earth's Systems
Performance Expectations

MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

MS-ESS3 Earth and Human Activity
Performance Expectations

MS-ESS3-1. Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

NJ: 2014 SLS: Technology
NJ: Grades 6-8
8.1 Educational Technology

8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.

8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
NGSS: Science and Engineering Practices
NGSS: 6-8
Practice 2. Developing and using models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
Evaluate limitations of a model for a proposed object or tool.
Practice 4. Analyzing and interpreting data
Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.
Construct, analyze, and/or interpret graphical displays of data and/or large data sets to identify linear and nonlinear relationships.
Practice 6. Constructing explanations (for science) and designing solutions (for engineering)
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.
Construct an explanation that includes qualitative or quantitative relationships between variables that predict(s) and/or describe(s) phenomena.
Practice 7. Engaging in argument from evidence
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).
Compare and critique two arguments on the same topic and analyze whether they emphasize similar or different evidence and/or interpretations of facts.
Practice 8. Obtaining, evaluating, and communicating information
Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.
Critically read scientific texts adapted for classroom use to determine the central ideas and/or obtain scientific and/or technical information to describe patterns in and/or evidence about the natural and designed world(s).
NGSS: Crosscutting Concepts
NGSS: 6-8
Crosscutting Statements
1. Patterns – Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.
Macroscopic patterns are related to the nature of microscopic and atomic-level structure.
4. Systems and System Models – A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.
Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.
5. Energy and Matter: Flows, Cycles, and Conservation – Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior.
Matter is conserved because atoms are conserved in physical and chemical processes.
NGSS: Disciplinary Core Ideas
NGSS: 6-8
PS1: Matter and Its Interactions
PS1.A: Structure and Properties of Matter

Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1) **ETS1: Engineering Design** **ETS1.B: Developing Possible Solutions** A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4) (secondary to MS-PS1-6) 					
NJ: 2014 SLS: 21st Century Life and Careers **NJ: All Grades** **Career Ready Practices** **Career Ready Practices** CRP4. Communicate clearly and effectively and with reason. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. 					
Weathering and Erosion *(Week 8, 6 Weeks)*	a) How do the processes of weathering and erosion shape Earth's surface?	a) Weathering breaks down rock by different chemical and mechanical processes to form sediment, and erosion moves sediment from one location to another using the force of gravity.	● Survey students with a KWL chart. Create interest and curiosity within students about weathering and erosion. ● Observe examples of landforms/features created by weathering and erosion in real world via property walk, colored images, as well as online animations or videos. ● Have students share places and examples of where they have seen weathering and erosion in their everyday lives. ● Mechanical/Chemical Weathering- Have students sort images of both kinds of weathering and provide written reasoning for their groupings. Discuss their explanations and relate to physical and chemical changes. ● Students complete Figure 2, page 40/41 in Earth's Surface workbook, and discuss various types of mechanical weathering. ● Students complete Figure 3 and 4, pages 42/43 in Earth's Surface workbook to explore chemical weathering. ● Complete Lifesaver Lab to show mechanical & chemical weathering, Clay Lab to model mechanical	**Formative: Other: Teacher Observation** Teacher generated pre-assessment Teacher generated formative assessment differentiating between mechanical and chemical weathering Teacher generated formative assessment describing differences in mass movements/the cause of mass movements Lab questions as formative assessment **Performance: Lab Assignment** Lab activity questions	See Literacy Infusion Attachments:

			weathering,or Alka seltzer Lab to show chemical weathering (see suggested links below). Students will pair and share where they have seen examples of weathering in their daily lives. ● Students will observe video clips and pictures, take notes and then kinesthetically demonstrate various examples of mass movement (landslides, mudflows, slumps, creeps). (RW) ● Differentiate the hazards posed between gradual and sudden movements. ● Topic experts: Students in groups will receive a picture of a specific type of mass movement. Using their books as a resource students will explain why the event in the picture is happening and what contributed to the type of erosion and how we impact it. Groups will then develop a way to kinesthetically model their mass movement. Then, each group will teach what they learned to the class. They will kinesthetically model their type of mass movement and explain how humans impact their type of mass movement. (RW) ● Excite students having them complete "Crumpled paper water erosion" activity. Students write down observations. Connect observations to runoff on a mountain. ● Discuss where students have seen water erode Earth; side of street, edges of lake, beach waves, Grand Canyon. Discuss various types of water erosion. ● Students will then experiment with water erosion by completing the "River and Sugar Cube Lab." Explore pictures of sinkholes. Students construct explanation of sinkhole, facilitated discussion to follow. (RW) ● Students complete activities to predict, model, and draw conclusions about how wind reshapes Earth's surface including "Wind Erosion lab" and "Wind Deflation lab" using various sized soil/sand particles. Conclude winds contribution to erosion and deposition. (RW) ● Use the Wind Erosion lesson in text to connect to prior knowledge. Find similar question throughout erosion lessons, on pg 90. Use pg 91, abrasion to	River and sugar cube lab questions Wave Erosion Design Challenge-students create a design to slow down barrier beach erosion from the longshore drift. Soil Conservation Scenario Based Design Challenge: Students are given a scenario where they play the part of a landscaper. Students must design a blueprint of a garden for a client whose backyard is on a hillside. The design must use soil conservation techniques to prevent soil erosion.	

			recall glacial abrasion, and the agent of mechanical weathering.(RW) ● Review/ and label what abrasion is in text. Use page 92 to connect what wind erosion creates that helps prevent wave erosion. Complete and discuss Apply It on pg 93. ● Students will complete "Apply It" and "Figure 2" on pages 82 and 83 in workbook text. (RW) ● Completion of "Soap lab" will model effects of glacial impact on Earth's surface by having students predict, model, draw conclusions. Facilitated discussion and images to show evidence of glacial impacts cause both erosion and deposition nearby Parsippany and east coast. ● Photographs from Fairview Lakes, students infer what this is evidence of. Discuss the Glacial retreat causing land features in the area: Glacial Hill with Moranie Dr., Deleware Water Gap, Great Lakes, Central Park. Discuss the translation of Parsippany itself. Students fill out the Glacier Notes on back on lab sheet. Students complete Glacier Lab. ● Students will observe pictures to understand how waves erode and change the Jersey Shore. ● Discuss coastal parts of country focusing on NJ, barrier islands, longshore drift, and formation of sand bars. ● Demonstrate how waves erode barrier beaches and have students identify the problem with this happening. ● Wave Erosion Design Challenge in which students create a design to slow down barrier beach erosion from the longshore drift. ● Students observe soil from outside using a stereoscope and magnifying lens. Through their investigation, students deduce that soil is made of rock particles and organic matter and complete "Contents of Soil Lab." ● Students will explain how soil forms through weathering (mechanical and chemical) and erosion (mass movement, wind, water, glaciers, and waves) of rocks. (RW)		

			● Make connections from previously learned material about weathering and erosion and how it forms soil. (RW) ● Engage students using “Dust Bowl” nonfiction literacy activity, and facilitate whole class discussion of soil and its value related to fertility. Students watch the PBS video on youtube.com called the “Dust Bowl.” It explains what happened after the dust bowl and precautions farmers took. (RW) ● Relate differences in soil to what makes soil valuable noting texture and ability to hold water. Use “Figure 4” on page 51 to lead discussion to the processes that break down rock and create valuable soil. ● Evaluate understanding using “Apply It” on page 54. ● Discuss reasons for soil damage and loss and how geologists use techniques to conserve soil. Students will complete Conservation Lab: “How Can You Keep Soil from Washing Away?” activity exploring conservation methods where students are given a scenario and need to protect their garden from water erosion. Students should discuss “Think it Over” #1, 2. ● Soil Conservation Scenario Based Design Challenge: Students are given a scenario where they play the part of a landscaper. Students must design a garden for a client who’s backyard is on a hillside. The design must use soil conservation techniques to prevent soil erosion. ● "Winnifred" gravestone weathering writing prompt for research based paragraph. (RW) ● Beach Erosion persuasive project- Students make a poster persuading an audience to either save the Jersey Shore beaches from wave erosion, or to let the natural process take its course. Students will write a research based persuasive paragraph. (RW)		
NJ: 2016 SLS: English Language Arts **NJ: Grade 6**					

Standards: **Reading: Informational Text**

Key Ideas and Details

NJSLSA.R1 Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

RI.6.1 Cite textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text.

NJSLSA.R2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

RI.6.2. Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.

NJSLSA.R3 Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

RI.6.3. Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).

Craft and Structure

NJSLSA.R4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

RI.6.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.

NJSLSA.R8 Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.

RI.6.8. Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.

NJSLSA.R9 Analyze and reflect on how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

RI.6.9 Compare, contrast and reflect on (e.g. practical knowledge, historical/cultural context, and background knowledge) one author's presentation of events with that of another (e.g., a memoir written by and a biography on the same person).

Writing

Text Types and Purposes1

NJSLSA.W1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W.6.1. Write arguments to support claims with clear reasons and relevant evidence.

W.6.1a. Introduce claim(s) and organize the reasons and evidence clearly.

W.6.1b. Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.

W.6.1c. Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.

W.6.1d. Establish and maintain a formal/academic style, approach, and form.

W.6.1 e. Provide a concluding statement or section that follows from the argument presented.

NJSLSA.W2 Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

W.6.2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

W.6.2 a. Introduce a topic and organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aiding comprehension.

W.6.2b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.

W.6.2c. Use appropriate transitions to clarify the relationships among ideas and concepts.

W.6.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.

W.6.2e. Establish and maintain a formal/academic style, approach, and form.

W.6.2f. Provide a concluding statement or section that follows from the information or explanation presented.

Production and Distribution of Writing

NJSLSA.W4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

W.6.4. Produce clear and coherent writing in which the development, organization, voice, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
NJSLSA.W5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
W.6.5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
NJSLSA.W6 Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
W.6.6. Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.
Research to Build and Present Knowledge
NJSLSA.W7 Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
W.6.7. Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.
NJSLSA.W8 Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
W.6.8. Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.
NJSLSA.W9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.6.9b. Apply grade 6 Reading standards to literary nonfiction (e.g., “Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not”).
Range of Writing
NJSLSA.W10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
W.6.10. Write routinely over extended time frames (time for research, reflection, metacognition/self correction, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline- specific tasks, purposes, and audiences.
NJ: 2016 SLS: Science
NJ: MS Earth & Space Sciences
MS-ESS2 Earth’s Systems
Performance Expectations

MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

MS-ESS3 Earth and Human Activity
Performance Expectations

MS-ESS3-1. Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

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-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.*

NJ: 2014 SLS: Technology

NJ: Grades 6-8
8.1 Educational Technology
8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.

8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
NGSS: Science and Engineering Practices
NGSS: 6-8
Practice 1. Asking questions (for science) and defining problems (for engineering)
Asking questions and defining problems in 6–8 builds on K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.
Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information.
Practice 2. Developing and using models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
Evaluate limitations of a model for a proposed object or tool.
Practice 4. Analyzing and interpreting data
Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.
Construct, analyze, and/or interpret graphical displays of data and/or large data sets to identify linear and nonlinear relationships.
Practice 6. Constructing explanations (for science) and designing solutions (for engineering)
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.
Construct an explanation that includes qualitative or quantitative relationships between variables that predict(s) and/or describe(s) phenomena.
Practice 7. Engaging in argument from evidence
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).
Compare and critique two arguments on the same topic and analyze whether they emphasize similar or different evidence and/or interpretations of facts.
Practice 8. Obtaining, evaluating, and communicating information
Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.
Critically read scientific texts adapted for classroom use to determine the central ideas and/or obtain scientific and/or technical information to describe patterns in and/or evidence about the natural and designed world(s).
NGSS: Crosscutting Concepts
NGSS: 6-8
Crosscutting Statements
2. Cause and Effect: Mechanism and Prediction – Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.
Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.
5. Energy and Matter: Flows, Cycles, and Conservation – Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior.
Matter is conserved because atoms are conserved in physical and chemical processes.

NGSS: Disciplinary Core Ideas
NGSS: 6-8
PS1: Matter and Its Interactions
PS1.B: Chemical Reactions
Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. (MS-PS1-2),(MS-PS1-3),(MS-PS1-5)
PS2: Motion and Stability: Forces and Interactions
PS2.B: Types of Interactions
Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects. (MS-PS2-3)

NJ: 2014 SLS: 21st Century Life and Careers
NJ: All Grades
Career Ready Practices
Career Ready Practices
CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP7. Employ valid and reliable research strategies.

CRP11. Use technology to enhance productivity.

Geologic Time *(Week 14, 4 Weeks)*	a) How has life changed throughout Earth's history?	a) Various geological features provide evidence to show how life has changed over time.	● Observe fossil samples and pictures and record observations. Discuss what information these fossils can provide. ● Lead inquiry to discuss not only organisms characteristics, but environmental factors as well. ● Video clips of past organisms to peak interest. ● Think, pair, share: What is a fossil? Whole group discussion. ● Analyze laminated sample pictures of the various types of fossils. Hypothesis what information can be obtained from one fossil type versus another. ● Identify the most common type of fossil and its formation. ● Demo for students-sugar cube mold fossil, and chocolate cast fossil.	**Formative: Written: Informative** Teacher generated pre-assessment Teacher generated formative assessment focusing on types of fossils Teacher generated formative assessment aging rock layers using the law of superposition	See Literacy Infusion Attachments:

			● Fossils Lab Activity- In this activity, students will model the process of cast and mold fossilization. They will use a small object of their choice (the "organism") to make an imprint in clay. After removing the object, students will pour plaster into the "mold" to form a 3D replica of the original object (the "cast"). ● Students will read pages 104-107 in their books and then answer analysis questions for the lab. Questions will have students analyze their models and then compare how the process they used to make the model is similar to the actual cast and mold process and how it is different. (RW) ● Final Thought Think, Pair, Share - What do all fossils have in common? ● Do Now- Why do we study fossils? ● Activity- Fossil Record webquest. ● Rock Strata Analysis/ "Who Dunit?" activity- Students will work in groups and participate in an inquiry based activity where they analyze different diagrams showing rock strata. They will hypothesize the relative ages of the rock layers and write down a rationale explaining why they ordered the layers in this way. Students will recall prior knowledge of how sedimentary rocks form to write rationale. (RW) ● "30 Year Old Mess" to explain and discuss of the Law of Superposition. Students then revise their prior hypothesis to more accurately reflect their interpretation of the Law of Superposition. (RW) ● Paleontologist work site scenario. Excavation of two sites five hundred yards from each other show the fossils and rock strata do not align. Hypothesis rationale for sites not matching. ● Read and annotate Book pages 114, 115 Figure 5 and Apply It. Use foam, paper, and carpet model to show folding. Stress force animations for faulting. Recall weathering from prior unit, students apply understanding to unconformity. (RW) ● Revisit Paleontologist work site scenario to revise rational as to why the two sites do not align. (RW)	Teacher generated formative assessment focusing on folding, faulting, unconformity Teacher generated formative assessment focusing on early Earth **Performance: Lab Assignment** Lab questions based on webquest Personal Time Scale - Correct breakdown, similar to the real geologic time scale Geologic Walk Through Time - Research project based on an Era of Earth's history.	

			● Do Now: How would you break down your life's history into segments? How has the time in your life been divided? ● Geologic Time scale Activity- (Page 128) Students will write/discuss how "eras" of their lives compare to the actual geologic time scale. (RW) ● Activity- Personal Time Scale. ● Introductory Activity- Geologic Timeline Guessing Game- In groups, students will be given 6 cards showing various events (i.e. Birth of the planet, First Lifeforms Evolve, First Fish Evolve, Mass Extinction of Dinosaurs, Modern Humans Evolve, Christopher Columbus lands on American Soil). ● They will then discuss when they believe each prehistoric/geological event happened and draw a timeline using a whiteboard showing the order in which each event happened. Each group will then be assigned one of the six events and will use a magnet to place their event on a timeline drawn on the board. Groups should try to place the events in the correct order and on the correct scale. The teacher will then adjust the events to reflect the correct order and scale and students will compare their original hypotheses to the correct timeline on the whiteboard. Whole class discussion based on various hypotheses. ● Culminating Activity-view clips of National Geographic's Documentary on Earth's History ("Best Documentary Ever"). ● Groups are assigned Eras to research. Students research geology, climate, and life on Earth during assigned Era. Students present information in "Geologic Walk Through Time". Students will summarize in paragraph format the major geological events that occurred in their assigned geologic era. (RW) ● Taking a Walk Through Geologic Time- Students will take a gallery walk to view and learn about the different Eras which their classmate's researched. ● Students will fill out a graphic organizer to record information on each era. (RW)		

			● Culminating Activity- view clips of National Geographic's Documentary on Earth's History ("Best Documentary Ever").		

Standards: **NJ: 2016 SLS: English Language Arts**
NJ: Grade 6
Reading: Informational Text
Key Ideas and Details
NJSLSA.R1 Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
RI.6.1 Cite textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text.
NJSLSA.R2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
RI.6.2. Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.
NJSLSA.R3 Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
RI.6.3. Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).
Range of Reading and Level of Text Complexity
NJSLSA.R10 Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.
RI.6.10. **By the end of the year read and comprehend literary nonfiction (see Appendix A) at grade level text-complexity (see Appendix A) or above, with scaffolding as needed.
Writing
Text Types and Purposes1
NJSLSA.W1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
W.6.1. Write arguments to support claims with clear reasons and relevant evidence.
W.6.1a. Introduce claim(s) and organize the reasons and evidence clearly.
W.6.1b. Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.
W.6.1c. Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.
W.6.1d. Establish and maintain a formal/academic style, approach, and form.
W.6.1e. Provide a concluding statement or section that follows from the argument presented.
NJSLSA.W2 Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
W.6.2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
W.6.2a. Introduce a topic and organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aiding comprehension.
W.6.2b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.
W.6.2c. Use appropriate transitions to clarify the relationships among ideas and concepts.
W.6.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.
W.6.2e. Establish and maintain a formal/academic style, approach, and form.
W.6.2f. Provide a concluding statement or section that follows from the information or explanation presented.

Production and Distribution of Writing
NJSLSA.W4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
W.6.4. Produce clear and coherent writing in which the development, organization, voice, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
NJSLSA.W5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
W.6.5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
Research to Build and Present Knowledge
NJSLSA.W7 Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
W.6.7. Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.
NJSLSA.W9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.6.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.
NJ: 2016 SLS: Science
NJ: MS Earth & Space Sciences
MS-ESS1 Earth's Place in the Universe
Performance Expectations

MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

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

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

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

NJ: MS Life Science
MS-LS4 Biological Evolution: Unity and Diversity
Performance Expectations

MS-LS4-1. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

NJ: 2014 SLS: Technology
NJ: Grades 6-8
8.1 Educational Technology
8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.

8.1.8.A.2 Create a document (e.g. newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for usability.

8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
8.1.8.A.5 Create a database query, sort and create a report and describe the process, and explain the report results.
B. Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.

8.1.8.B.1 Synthesize and publish information about a local or global issue or event (ex. telecollaborative project, blog, school web).
NGSS: Science and Engineering Practices
NGSS: 6-8
Practice 1. Asking questions (for science) and defining problems (for engineering)
Asking questions and defining problems in 6–8 builds on K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.
Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information.
Practice 2. Developing and using models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
Evaluate limitations of a model for a proposed object or tool.
Practice 6. Constructing explanations (for science) and designing solutions (for engineering)
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.
Construct an explanation that includes qualitative or quantitative relationships between variables that predict(s) and/or describe(s) phenomena.
Practice 7. Engaging in argument from evidence
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).
Compare and critique two arguments on the same topic and analyze whether they emphasize similar or different evidence and/or interpretations of facts.
Practice 8. Obtaining, evaluating, and communicating information
Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.
Critically read scientific texts adapted for classroom use to determine the central ideas and/or obtain scientific and/or technical information to describe patterns in and/or evidence about the natural and designed world(s).
NGSS: Crosscutting Concepts
NGSS: 6-8
Crosscutting Statements
1. Patterns – Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.
Macroscopic patterns are related to the nature of microscopic and atomic-level structure.
2. Cause and Effect: Mechanism and Prediction – Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.
Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.
3. Scale, Proportion, and Quantity – In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.
Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

NJ: 2014 SLS: 21st Century Life and Careers **NJ: All Grades** **Career Ready Practices** **Career Ready Practices** CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP7. Employ valid and reliable research strategies. CRP11. Use technology to enhance productivity. 					
Evolution *(Week 18, 4 Weeks)*	a) What evidence supports evolution?	a) Over time, environmental pressures cause better adapted individuals of the same species to be naturally selected to successfully reproduce and survive.	• Analyze fossil images from various related organisms to determine evolutionary sequence. • Sequencing How Species Evolve Over Time: In groups, students will participate in a station activity based on the evolutionary phases of various species (Horse, elephant, and whale). At each station, there will be 6 cards. Each card will show a different stage in a particular species' evolutionary path. Students will be directed to properly order the cards to show a possible sequence of that species' evolutionary path. They will then take notes on their observations, and record the possible benefits of features that develop during the species' evolution. For the evolution of the whale, students will be asked which feature provides evidence that the whole evolved from an organism that once had legs (vestigial hip bones). • Based on student observations and inferences a Research-Based Paragraph will be written for the above activity. (RW). • In groups, students will look at pictures of various organisms in their natural environments. Pictures will indicate the species name and where on Earth each species lives. They will pick out and list	**Formative: Other: Teacher Observation** Teacher generated pre-assessment Teacher generated formative assessment on vocabulary found in chapter Teacher generated formative assessment on natural selection Teacher generated formative and assessment focusing on the evidence that supports the theory of evolution. **Performance: Lab Assignment** Students hypotheses will be checked Peppered Moth lab and lab questions	See Literacy Infusion Attachments:

			different features that will help the organisms survive. ● Students will complete an in-class writing prompt explaining the evidence that supports the theory of evolution (RW). ● Students will then hypothesize why some organisms of the same species have different traits. ● Using pages 166-170 in the Cells and Heredity book use Darwin's Galapagos Expedition to explain diversity amongst species. ● Using pages 172 – 175 to explain the different factors that cause natural selection. ● Darwin's Game of Survival: Who Wants to Live a Million years? ● Students will use page 177 in book and the NOVA "Guess the Species" website to explain how similarities between species during embryonic stages of development suggest that vertebrate species are related and share a common ancestor. ● Students will use page 179 in book and "Homologous Structures Matching Card Game" to explain how similarities in body structure between species suggests that vertebrate species are related and share a common ancestor. ● Students will model the phenomenon of natural selection by performing the Peppered Moth Simulation (Gizmo). Students will make predictions and collect, analyze, and graph data on population size and time. Students will evaluate data and draw conclusions from the simulation (RW). ● Students will complete an in-class writing prompt explaining the process of Natural Selection (RW).		
Standards: **NJ: 2016 SLS: English Language Arts** **NJ: Grade 6**					

Writing
Text Types and Purposes1
NJSLSA.W1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
W.6.1. Write arguments to support claims with clear reasons and relevant evidence.
W.6.1a. Introduce claim(s) and organize the reasons and evidence clearly.
W.6.1b. Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.
W.6.1c. Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.
W.6.1d. Establish and maintain a formal/academic style, approach, and form.
W.6.1 e. Provide a concluding statement or section that follows from the argument presented.
NJSLSA.W2 Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
W.6.2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
W.6.2 a. Introduce a topic and organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aiding comprehension.
W.6.2b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.
W.6.2c. Use appropriate transitions to clarify the relationships among ideas and concepts.
W.6.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.
W.6.2e. Establish and maintain a formal/academic style, approach, and form.
W.6.2f. Provide a concluding statement or section that follows from the information or explanation presented.
Production and Distribution of Writing
NJSLSA.W4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
W.6.4. Produce clear and coherent writing in which the development, organization, voice, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
Research to Build and Present Knowledge
NJSLSA.W7 Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
W.6.7. Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.
NJ: 2016 SLS: Science
NJ: MS Life Science
MS-LS4 Biological Evolution: Unity and Diversity
Performance Expectations

MS-LS4-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

MS-LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.

MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

NJ: 2014 SLS: Technology

NJ: Grades 6-8
8.1 Educational Technology
8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.

8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
8.1.8.A.5 Create a database query, sort and create a report and describe the process, and explain the report results.
NGSS: Science and Engineering Practices
NGSS: 6-8
Practice 1. Asking questions (for science) and defining problems (for engineering)
Asking questions and defining problems in 6–8 builds on K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.
Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information.
Practice 2. Developing and using models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
Evaluate limitations of a model for a proposed object or tool.
Practice 4. Analyzing and interpreting data
Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.
Construct, analyze, and/or interpret graphical displays of data and/or large data sets to identify linear and nonlinear relationships.
Practice 5. Using mathematics and computational thinking
Mathematical and computational thinking in 6–8 builds on K–5 experiences and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments.
Use digital tools (e.g., computers) to analyze very large data sets for patterns and trends.
Practice 6. Constructing explanations (for science) and designing solutions (for engineering)
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.
Construct an explanation that includes qualitative or quantitative relationships between variables that predict(s) and/or describe(s) phenomena.
Practice 7. Engaging in argument from evidence
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).
Compare and critique two arguments on the same topic and analyze whether they emphasize similar or different evidence and/or interpretations of facts.
Practice 8. Obtaining, evaluating, and communicating information
Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.
Critically read scientific texts adapted for classroom use to determine the central ideas and/or obtain scientific and/or technical information to describe patterns in and/or evidence about the natural and designed world(s).
NGSS: Crosscutting Concepts
NGSS: 6-8
Crosscutting Statements

2. Cause and Effect: Mechanism and Prediction – Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.
Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.
6. Structure and Function – The way an object is shaped or structured determines many of its properties and functions.
Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.
7. Stability and Change – For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.
Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales, including the atomic scale.

NJ: 2014 SLS: 21st Century Life and Careers
NJ: All Grades
Career Ready Practices
Career Ready Practices
CRP4. Communicate clearly and effectively and with reason.

Plate Tectonics, Earthquakes and Volcanoes *(Week 23, 8 Weeks)*	a) How has Earth's surface changed by moving plates, earthquakes and volcanic eruptions?	a) Tectonic movements caused by convection currents within Earth's mantle causes different types of geological features and events at Earth's surface.	● Compare a cracked egg to the structure of the Earth ● View interactive websites to discuss structure of Earth diagram ● Create and label a model of Earth's interior ● Explore Alfred Wegener's Puzzling Evidence Lab Activity. Students will observe and analyze scientific evidence used by Wegener. Students will read and interpret maps and map symbols. Students will use the evidence to try to reconstruct the continents. Students will utilize multiple sources that describe the evidence supporting Wegener's Hypothesis to complete an RST. (RW) ● View "How Sonar Works" animation. Students will comprehend how sound waves "see through" water to map the ocean floor. ● Observe and discuss maps related to plate tectonics using Interactive Plate Tectonics Map ● Diagram and label the types of plate boundaries ● View convection currents using video.	**Formative: Other: Teacher Observation** Teacher generated formative assessment focusing on the different layers of earth and the differences between continental and oceanic crust Teacher generated formative assessment focusing on continental drift Teacher generated formative assessment focusing on plate boundaries	See Literacy Infusion Attachments:

			● Observe locations of recent earthquakes on world map ● Analyze and interpret data about locations of earthquakes and volcanoes to draw comparisons in cause (textbook lab) ● Model types of seismic waves using slinky ● Interactive website-Dynamic Earth, View animations to learn about plate tectonics and their movement ● Diagram and label the three types of stress forces and the landforms they create ● Compare types of lava by viewing video clips of aa and pahoehoe lava ● Analyze effect of viscosity and resulting landforms – model using cold and warm molasses ● Compare types of volcanic eruptions by viewing video clips and animations of quiet and explosive eruptions ● *Earthquakes Living Lab – The Theory of Plate Tectonics (Explore & Elaborate)* ● Examine real world locations earthquakes/volcanoes/mid-ocean ridge. ● Hot-spot animation ● Identify evidence that proves tectonic plates are moving in different directions (convergent, divergent, transform) ● Model movement of fluids in a convection tube/ Density bottle project ● Earthquake Proof Structure design challenge: Students research the effects that earthquakes have on buildings as well as architectural features used to prevent earthquake damage. Students use their research to design, build, test, evaluate, and redesign a model of an earthquake-safe structure using provided materials. (RW)	Teacher generated formative assessments **Summative: Other: Teacher Observation** Students use of the engineering design process loop will be graded as a summative assessment. **Formative: Performance: Lab Assignment** Hypothesis for Alfred Wegener's Puzzling Evidence Lab Activity may be used as formative assessment	

Standards: **evidence consistent with scientific ideas, principles, and theories.**
Construct an explanation that includes qualitative or quantitative relationships between variables that predict(s) and/or describe(s) phenomena.
Practice 7. Engaging in argument from evidence
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).
Compare and critique two arguments on the same topic and analyze whether they emphasize similar or different evidence and/or interpretations of facts.
Practice 8. Obtaining, evaluating, and communicating information

Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.
Critically read scientific texts adapted for classroom use to determine the central ideas and/or obtain scientific and/or technical information to describe patterns in and/or evidence about the natural and designed world(s).
NGSS: Crosscutting Concepts
NGSS: 6-8
Crosscutting Statements
4. Systems and System Models – A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.
Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.
5. Energy and Matter: Flows, Cycles, and Conservation – Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior.
Matter is conserved because atoms are conserved in physical and chemical processes.
6. Structure and Function – The way an object is shaped or structured determines many of its properties and functions.
Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.
NGSS: Disciplinary Core Ideas
NGSS: 6-8
ESS2: Earth's Systems
ESS2.A: Earth Materials and Systems
All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (MS-ESS2-1)
PS1: Matter and Its Interactions
PS1.A: Structure and Properties of Matter
Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1)
PS2: Motion and Stability: Forces and Interactions
PS2.A: Forces and Motion
For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law). (MS-PS2-1)
PS3: Energy
PS3.C: Relationship Between Energy and Forces
When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object. (MS-PS3-2)
PS4: Waves and Their Applications in Technologies for Information Transfer
PS4.A: Wave Properties
A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude. (MS-PS4-1)
ETS1: Engineering Design
ETS1.B: Developing Possible Solutions
A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4) (secondary to MS-PS1-6)
ETS1.C: Optimizing the Design Solution
Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design. (MS-ETS1-3 (secondary to MS-PS1-6)

NJ: 2014 SLS: 21st Century Life and Careers **NJ: All Grades** **Career Ready Practices** **Career Ready Practices** CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP11. Use technology to enhance productivity. 					
Meteorology *(Week 31, 4 Weeks)*	a) How does the Sun's energy drive weather and warming processes?	a) The Sun's energy heats Earth's surface and atmosphere which is the cause of all weather.	• Complete a mini-project in which students write a narrative that describes one possible path that a water molecule can take through the water cycle (personification). (RW) • Classify electromagnetic waves based on their wavelengths. Predict what might happen if a forested area was replaced with an asphalt parking lot. • Flashlight demonstration - Students observe how the intensity of light on a given area of graph paper changes as the angle of flashlight's beam is manipulated. Students connect this demonstration to the unequal heating of the Earth due to tilt, rotation, and shape of the planet. • Ocean Currents Experiment: Students will predict what will happen when they place a blue ice cube in a glass of clear warm-hot water. After making their predictions, they perform the experiment and record their results/observations both by writing and drawing. They will then explain why their results occurred. Finally, they will connect how changes in density and temperature can form currents in the ocean.	**Performance: Authentic Task** Poster or comic strip of water cycle Engineering Design Process Challenge - Solar Oven **Formative: Other: Teacher Observation** Teacher generated formative assessment focusing on electromagnetic waves Teacher generated formative assessment focusing on air masses and fronts Collection of data will be checked as a formative assessment. Graph will be graded as a formative assessment.	See Literacy Infusion Attachments:

			• Engineering Design Challenge-Design a Solar Oven: Students will use the engineering design process loop and work in groups to demonstrate their understanding of the three types of heat transfer by creating a solar oven to cook food. Students will summarize the problem, brainstorm, develop a solution, test and evaluate their designs, reflect, and redesign. (RW) • Analyze a map of the United States showing the four main types of air masses. Students will decode descriptor words for air masses and then identify each type of air mass on map. • Use the interactive fronts website or diagrams of fronts to determine the movements of air masses involved in each front and the weather associated with each type of front. (RW) • Collect data for an assigned city on temperature, humidity, wind speed, pressure, precipitation, weather events , and cloud cover. The class will create a data bank using google forms over the course of a set number of days. Once all data is collected, students will analyze data and make connections between the interactions of air masses. • Classify six major types of climate. Students will receive data from one of the six major types of climate. Students will graph the information and in a Research Based response, they will identify the climate region based on their observations. (RW)		

1. Explore what puts the Water Cycle into motion.
2. Classify electromagnetic waves based on wavelength and explain how electromagnetic waves are absorbed and reflected by Earth's surface and atmosphere.
3. Understand and model the three types of heat transfer- convection, conduction, and radiation.
4. Describe characteristics of air masses and fronts.

5. Collect and analyze meteorological data for various US cities.
6.Develop and interpret a climograph.

NJ: 2016 SLS: English Language Arts
NJ: Grade 6
Reading: Informational Text
Key Ideas and Details
NJSLSA.R1 Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
RI.6.1 Cite textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text.
NJSLSA.R3 Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
RI.6.3. Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).
Craft and Structure
NJSLSA.R4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
RI.6.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.
Integration of Knowledge and Ideas
NJSLSA.R7 Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.
RI.6.7. Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
NJSLSA.R8 Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
RI.6.8. Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.
NJSLSA.R9 Analyze and reflect on how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.
RI.6.9 Compare, contrast and reflect on (e.g. practical knowledge, historical/cultural context, and background knowledge) one author's presentation of events with that of another (e.g., a memoir written by and a biography on the same person).
Writing
Text Types and Purposes1
NJSLSA.W1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and

sufficient evidence.
W.6.1. Write arguments to support claims with clear reasons and relevant evidence.
W.6.1a. Introduce claim(s) and organize the reasons and evidence clearly.
W.6.1b. Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.
W.6.1c. Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.
W.6.1d. Establish and maintain a formal/academic style, approach, and form.
W.6.1e. Provide a concluding statement or section that follows from the argument presented.
NJSLSA.W3 Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
W.6.3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.
W.6.3a. Engage and orient the reader by establishing a context and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically.
W.6.3b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters.
W.6.3c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another.
W.6.3d. Use precise words and phrases, relevant descriptive details, and sensory language to convey experiences and events.
W.6.3e. Provide a conclusion that follows from the narrated experiences or events.
Production and Distribution of Writing
NJSLSA.W4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
W.6.4. Produce clear and coherent writing in which the development, organization, voice, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
NJSLSA.W5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
W.6.5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
NJSLSA.W6 Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
W.6.6. Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.
Research to Build and Present Knowledge
NJSLSA.W7 Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
W.6.7. Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.
NJSLSA.W8 Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.

W.6.8. Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.
NJSLSA.W9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.6.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.
Range of Writing
NJSLSA.W10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
W.6.10. Write routinely over extended time frames (time for research, reflection, metacognition/self correction, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline- specific tasks, purposes, and audiences.
NJ: 2016 SLS: Science
NJ: MS Earth & Space Sciences
MS-ESS2 Earth's Systems
Performance Expectations
MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
MS-ESS2-5. MS-ESS2-6. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
NJ: MS Physical Science
MS-PS3 Energy
Performance Expectations
MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.*
MS-PS4 Waves and Their Applications in Technologies for Information Transfer Performance Expectations
MS-PS4-1. Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.

NJ: MS Engineering Design
MS-ETS1 Engineering Design
Performance Expectations

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.
NJ: 2014 SLS: Technology
NJ: Grades 6-8
8.1 Educational Technology
8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.
8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
8.1.8.A.4 Graph and calculate data within a spreadsheet and present a summary of the results
8.1.8.A.5 Create a database query, sort and create a report and describe the process, and explain the report results.
NGSS: Science and Engineering Practices
NGSS: 6-8
Practice 1. Asking questions (for science) and defining problems (for engineering)
Asking questions and defining problems in 6–8 builds on K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.
Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information.
Practice 2. Developing and using models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
Evaluate limitations of a model for a proposed object or tool.
Practice 3. Planning and carrying out investigations
Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.
Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim.
Practice 4. Analyzing and interpreting data
Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.
Construct, analyze, and/or interpret graphical displays of data and/or large data sets to identify linear and nonlinear relationships.
Practice 5. Using mathematics and computational thinking
Mathematical and computational thinking in 6–8 builds on K–5 experiences and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments.
Use digital tools (e.g., computers) to analyze very large data sets for patterns and trends.
Practice 6. Constructing explanations (for science) and designing solutions (for engineering)
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.
Construct an explanation that includes qualitative or quantitative relationships between variables that predict(s) and/or describe(s) phenomena.
Practice 7. Engaging in argument from evidence

Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).
Compare and critique two arguments on the same topic and analyze whether they emphasize similar or different evidence and/or interpretations of facts.

Practice 8. Obtaining, evaluating, and communicating information

Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.
Critically read scientific texts adapted for classroom use to determine the central ideas and/or obtain scientific and/or technical information to describe patterns in and/or evidence about the natural and designed world(s).

NGSS: Crosscutting Concepts

NGSS: 6-8

Crosscutting Statements

1. Patterns – Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.
Macroscopic patterns are related to the nature of microscopic and atomic-level structure.

3. Scale, Proportion, and Quantity – In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.
Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

4. Systems and System Models – A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.
Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.

5. Energy and Matter: Flows, Cycles, and Conservation – Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior.
Matter is conserved because atoms are conserved in physical and chemical processes.

6. Structure and Function – The way an object is shaped or structured determines many of its properties and functions.
Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.

NGSS: Disciplinary Core Ideas

NGSS: 6-8

PS1: Matter and Its Interactions

PS1.A: Structure and Properties of Matter

Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1)

PS3: Energy

PS3.B: Conservation of Energy and Energy Transfer

When the motion energy of an object changes, there is inevitably some other change in energy at the same time. (MS-PS3-5)
PS4: Waves and Their Applications in Technologies for Information Transfer
PS4.A: Wave Properties
A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude. (MS-PS4-1)
PS4.B: Electromagnetic Radiation
When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material and the frequency (color) of the light. (MS-PS4-2)
ETS1: Engineering Design
ETS1.B: Developing Possible Solutions
A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4) (secondary to MS-PS1-6)
ETS1.C: Optimizing the Design Solution
Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design. (MS-ETS1-3 (secondary to MS-PS1-6)

Astronomy *(Week 35, 4 Weeks)*	a) How do the positions of Earth, moon, and sun affect each other?	a) Despite the great distance between objects in the solar system, the specific position of each object does greatly affect each other object.	• Use an interactive website where they will examine the main factors which affect temperature: the position of the Earth in its orbit around the Sun, the tilt of the Earth's axis of rotations, and the path of the Sun in the sky over the course of the day. Questions are provided on the website. Research-Based Paragraph response (RW) • Use clay, toothpicks and a flashlight to create the interaction between the Earth, Moon, and Sun. They will observe how rotation of Earth causes night and day, and they will observe how different positioning of the three objects cause solar and lunar eclipses.	**Performance: Lab Assignment** Lab questions for interactive seasons lab Lab questions from online activity **Performance: Authentic Task** Design Challenge: Create a to-scale model of the solar system. **Formative: Oral: Presentation**	

			• Teacher positions lamp in middle of dark room. Students use their own bodies, a styrofoam ball, and the lamp to model the different moon phases. Students then go back to classroom to complete online lab activity. Research-Based Paragraph response (RW) • Cheerio for the Planets Design Challenge- Create a to-scale model of the solar system: students use data related to distances between objects in the solar system to create their own scale model to represent these distances and better understand relationships of objects in the solar system and answer the driving question: How do you study a system that won't fit in the classroom?	Teacher generated formative assessment focusing on rotation, revolution and eclipses	

1. Model the change of seasons.
2. Model rotation, revolution, and eclipses.
3. Model and describe the phases of the Moon.
4. Create a scale model of the solar system.

NJ: 2016 SLS: English Language Arts
NJ: Grade 6
Reading: Informational Text
Key Ideas and Details
NJSLSA.R1 Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
RI.6.1 Cite textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text.
NJSLSA.R2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
RI.6.2. Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.
NJSLSA.R3 Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
RI.6.3. Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).

Craft and Structure
NJSLSA.R4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
RI.6.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.
Integration of Knowledge and Ideas
NJSLSA.R7 Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.
RI.6.7. Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
Writing
NJSLSA.W2 Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
W.6.2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
W.6.2a. Introduce a topic and organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aiding comprehension.
W.6.2b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.
W.6.2c. Use appropriate transitions to clarify the relationships among ideas and concepts.
W.6.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.
W.6.2e. Establish and maintain a formal/academic style, approach, and form.
W.6.2f. Provide a concluding statement or section that follows from the information or explanation **presented.**
Production and Distribution of Writing
NJSLSA.W4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
W.6.4. Produce clear and coherent writing in which the development, organization, voice, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
NJSLSA.W6 Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
W.6.6. Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.
Research to Build and Present Knowledge
NJSLSA.W7 Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
W.6.7. Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.
NJSLSA.W8 Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and

integrate the information while avoiding plagiarism.
W.6.8. Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.
NJSLSA.W9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.6.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.
Range of Writing
NJSLSA.W10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
W.6.10. Write routinely over extended time frames (time for research, reflection, metacognition/self correction, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline- specific tasks, purposes, and audiences.
NJ: 2016 SLS: Science
NJ: MS Earth & Space Sciences
MS-ESS1 Earth's Place in the Universe
Performance Expectations
MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system.
NJ: MS Engineering Design
MS-ETS1 Engineering Design
Performance Expectations
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.
NJ: 2014 SLS: Technology
NJ: Grades 6-8
8.1 Educational Technology
8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.

8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
NGSS: Science and Engineering Practices

NGSS: 6-8

Practice 1. Asking questions (for science) and defining problems (for engineering)

Asking questions and defining problems in 6–8 builds on K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.

Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information.

Practice 2. Developing and using models

Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

Evaluate limitations of a model for a proposed object or tool.

Practice 3. Planning and carrying out investigations

Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.

Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim.

Practice 4. Analyzing and interpreting data

Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

Construct, analyze, and/or interpret graphical displays of data and/or large data sets to identify linear and nonlinear relationships.

Practice 5. Using mathematics and computational thinking

Mathematical and computational thinking in 6–8 builds on K–5 experiences and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments.

Use digital tools (e.g., computers) to analyze very large data sets for patterns and trends.

Practice 6. Constructing explanations (for science) and designing solutions (for engineering)

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

Construct an explanation that includes qualitative or quantitative relationships between variables that predict(s) and/or describe(s) phenomena.

Practice 7. Engaging in argument from evidence

Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).

Compare and critique two arguments on the same topic and analyze whether they emphasize similar or different evidence and/or interpretations of facts.

Practice 8. Obtaining, evaluating, and communicating information

Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.

Critically read scientific texts adapted for classroom use to determine the central ideas and/or obtain scientific and/or technical information to describe patterns in and/or evidence about the natural and designed world(s).

NGSS: Crosscutting Concepts

NGSS: 6-8

Crosscutting Statements

2. Cause and Effect: Mechanism and Prediction – Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.

Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.

3. Scale, Proportion, and Quantity – In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.

Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

4. Systems and System Models – A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.

Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.

NGSS: Disciplinary Core Ideas

NGSS: 6-8

ETS1: Engineering Design

ETS1.B: Developing Possible Solutions

A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4) (secondary to MS-PS1-6)

ETS1.C: Optimizing the Design Solution

Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design. (MS-ETS1-3 (secondary to MS-PS1-6)

Appendix A Sample Authentic Assessment

(Week 1, 1 Week)

Sample Authentic Assessment

Performance: Authentic Task

Scenario:

Your neighbor works for the U.S. Geologic Survey and is very aware of your interest and knowledge in mineralogy. He shares with you that this year the organization has decided to offer a new youth program to individuals who show talent and interest in this area. As a result, you have been selected to spend a summer working with a group of scientists from the U.S. Geologic Survey.

Task:

You will be asked to design an experiment using the scientific method. A well organized, clear procedure will need to be established that utilizes all the appropriate mineral property tests. You will also need to investigate selected Websites and texts to research the unknown sample. You will prepare a written conclusion statement and an oral presentation that will be delivered to the U.S. Geologic Survey Committee, communicating the methods you utilized for testing the sample, along with your findings.

Specifically, you will need to describe in detail:

- Materials and procedures you will follow for testing your mystery sample
- Characteristic properties you have determined to be important in the testing/identification process
- Data gathering procedures utilized throughout the testing process
- Analysis of results, comparison to known samples, as well as final confirmation and identification of unknown mineral sample

Appendix B Sample Authentic Assessment Rubric

(Week 1, 1 Week)

Sample Authentic Assessment Rubric

Other: Teacher Observation

Sample Rubric Assessment.docx

LC Infusion Attachments

(Week 2, 1 Week)

6th Annotation.pdf
3.1 Notes outline RST SourceB.docx
3.1 Notes outline Modified RST Source.docx
Beach Erosion Project Research Questions.docx
driftin continents activity conclusion RST.docx
Evolution Activity.docx
Evolution horse elephant images.pptx
Fronts RBP 2 options.docx
hidden worlds assignment.docx
Pet Rock Project Packet.docx
PetRockAssessmentScoringGuide 2.docx
Research Based Paragraph Rubric.docx
RST Alfred Wegener.doc
Seasons Research Based Assingment ASTRONOMY.docx
Short Constructed Response Natural Selection.docx
Short Constructed Response T of EV.docx
Types of Fossils Stations booklet - V2.doc
Earthquake Safe Structure Design Challenge 2016-2017.docx

Engineering Design Process Rubric Complete 2016 2017.docx
Design Process Loop RubricCMSv2.docx
EQ building project Brainstorm.docx
EQ building project Develop Solution.docx
EQ building state problem & background research w guiding questions.docx
EQ Structure Challenge.docx
Mod Research notes.docx
Comic Sam L.jpg
Pet Rock Project Grading Rubric.docx
Pet Rock Project Packet.docx
Pet Rock Project Planning Sheet.pdf
Pet Rock Project Task Sheet copy.pdf
PetRockAssessmentScoringGuide 2.docx
PR Project Comic Strip.pptx
Storybook David.jpg
Storybook Sam S.jpg
Geologic time chart for during presentations - carbondivided.xlsx
Geologic time Gallery Walk.xlsx
RubricGeologicTimeInteractivePoster.docx
Geologic Time Trilogy Movie Poster Project 2016-2017.docx
Geologic Time Trilogy Movie Poster Scoring Guide.docx
2.3 Igneous Rock Textures.docx
2.4 Sedimentary Rocks observations station sheets v2.docx
2.5 discover activity Metamorphic rocks NGSS.doc
2.5 discover activity.rtf
3.1 Drifing Continents en Espanol .docx
3.1 Notes outline.docx
3.1 review & reinforce & QUIZ.doc
driftin continents activity conclusion.docx
Read works Continental Drift.pdf
Lifesaver lab 2016-2017 word.docx
Stream Formation Lab.docx
Claim Evidence Reasoning Resource.pdf

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TEXTBOOKS

Astronomy and Space, **Pearson Interactive Series, Pearson Education, Inc, Upper Saddle River, NJ., 2011**

Earth's Structure, Pearson Interactive Series, Pearson Education, Inc, Upper Saddle River, NJ., 2011

Earth's Surface, Pearson Interactive Series, Pearson Education, Inc, Upper Saddle River, NJ., 2011

Water and the Atmosphere, Pearson Interactive Series, Pearson Education, Inc, Upper Saddle River, NJ., 2011

SUPPLEMENTAL TEXTBOOK MATERIALS: RESOURCES

Astronomy and Space Teacher's Edition

Earth's Structure Teacher's Edition

Earth's Surface Teacher's Edition

Water and the Atmosphere Teacher's Edition

Lab Resources/Teacher's Lab edition

Scenario-Based Investigations

Big Ideas of Science Reference Library

Untamed Science Videos: Chapter Adventures

Exam View Assessment Suite

WEBSITES

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(http://streaming.discoveryeducation.com/)

World's Best: Natures Fury. BBC. 2000. Discovery Education, 25 August 2009.

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Keyhole Inc. Google Earth 5.0. May 5, 2009.

https://www.youtube.com/watch?v=R-Iak3Wvh9c&list=PLuFWAQ3SVB4Jr3DUKS-vKCDofwUcYV-Qc&index=2

https://www.youtube.com/watch?v=exS9gFXgib0.

https://sites.google.com/site/rbowensportfolio/professional-statement/pedagogical-knowledge/experience-2

Weathering and Erosion Labs: http://209.7.198.36/geologyonline/lessons/1.2/lesson.pdf

Beach erosion website- shoreline engineering: http://coastalcare.org/educate/shoreline-engineering/

Weathering animations: https://ees.as.uky.edu/sites/default/files/elearning/module07swf.swf

Online Textbook www.pearsonsuccessnet.com

Matter www.chem4kids.com

Rock Hounds with Rocky www.fi.edu/fellows/payton/rocks/index2.html

Weathering and Erosion www.geologyonline.museum.state.il.us/tools/lessons/6.3/lesson.html

Terra Server USA http://terraserver-usa.com/

Savage Earth Animation http://www.pbs.org/wnet/savageearth/animations/volcanoes/index.html

Energy Kids Page http://www.eia.doe.gov/kids/energyfacts/sources/renewable/solar.html

Droplet and the Water Cycle http://kids.earth.nasa.gov/droplet.html

Currents and Climate Animation http://trc.ucdavis.edu/biosci10v/bis10v/media/ch31/climate_currents_v2.html

Black Holes http://www.thinktechnologies.com/portfolio/demos/Blackhole.swf

Tracking ISS http://www.lizard-tail.com/isana/tracking/

Mars Rover http://marsrovers.jpl.nasa.gov/gallery/video/animation.html

Meteor showers http://meteorshowersonline.com/index.html

Stardate Astronomy http://stardate.org/

Spaceplace http://spaceplace.nasa.gov/en/kids/

ISS Explained http://i.usatoday.net/tech/graphics/iss_timeline/flash.htm

Pet Rock http://teach.fcps.net/Webquests/Rocks_and_Minerals/Pet_Show_Home.htm

Rock Key http://www.minsocam.org/msa/collectors_corner/id/rock_key.htm

Rocks http://library.thinkquest.org/J002289/index.html

NeMO Submersible http://www.pmel.noaa.gov/vents/nemo/explorer/castle.html

NeMO Pillow Lava http://www.pmel.noaa.gov/vents/nemo/explorer/concepts/pillows.html

Magnetic Flip http://www.geomag.bgs.ac.uk/reversals.html#2

Earthquakes for Kids http://earthquake.usgs.gov/learning/kids//

Measuring Earthquakes http://earthquake.usgs.gov/learning/faq/?categoryID=2

New Jersey Geological Survey http://www.state.nj.us/dep/njgs/enviroed/eqrisk.htm

Astronomy: Science on the Subway http://www.scienceonthesubway.com/

Hot Spot Animation http://www.wwnorton.com/college/geo/egeo/flash/2_10.swf

Volcanoes http://library.thinkquest.org/17457/english.html

Pompeii http://www.hbschool.com/activity/pompeii/pmpMain.html

Air Masses and Fronts http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/af/frnts/home.rxml

Storms http://www.skydiary.com/kids/

Weather http://weather.org/

Weather Wiz Kids http://www.weatherwizkids.com/wind1.htm

Relative Dating http://www.pbs.org/americanfieldguide/teachers/fossils/fossils_sum.html

Making Fossils http://www.bbc.co.uk/sn/prehistoric_life/dinosaurs/making_fossils/

Kids Konnect http://www.kidskonnect.com/content/view/93/27/

Magnetic North Pole vs. Geographic North Pole http://www1.appstate.edu/~goodmanj/4401/notes/magnets/mnvsgn.html

Interactive Volcanic Eruptions http://kids.discovery.com/games/pompeii/pompeii.html

Getting Into the Fossil Record http://www.ucmp.berkeley.edu/education/explorations/tours/fossil/5to8/Intro.html

Geologic Timescale http://www.ucmp.berkeley.edu/education/explorations/tours/geotime/index.html

Oreo Moon Phases http://analyzer.depaul.edu/paperplate/Oreo%20Moon%20Phases.htm

Phases of the Moon http://www.valdosta.edu/~cbarnbau/astro_demos/frameset_moon.html