SCN773 Science 7 (BA-2/23/2017)

Middle Schools > 2017-2018 > Grade 7 > Science > SCN773 Science 7 (BA)

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STATEMENT OF PURPOSE

The purpose of this course . . .

The Grade 7 Science course of study is designed to continue scaffolding the Middle School student's development of scientific knowledge and skills.

A student-centered, hands-on approach, which has been developed in conjunction with the scientific method and the constructivist learning theory, will be the basis for instruction. In addition, the students will have numerous opportunities to demonstrate their understanding in written form, as well as other related avenues that reflect each student's particular strength and learning style.

The curriculum places strong emphasis on inquiry-based learning in an effort to prepare each student for the type of science learning he or she will encounter in the future. Also, the concept and laboratory skills taught in the Middle School Life Science classroom provide a solid foundation for High School science learning. Separately we assess students to gauge progress and inform instruction for students in grades 6 through 8 are administered once per quarter.

RATIONALE

The7th grade Science Curriculum is designed to afford each student the opportunity to assess and strengthen his or her knowledge and skills in order to develop a big picture understanding of the concepts being studied. The program is designed to address the needs of all students whether they display a natural aptitude for science learning or have found it to be challenging.

This course is aligned with the New Jersey Student Learning Standards for Science (NJSLS-(also known as the Next Generation Science Standards SEPS, CCC, (NGSS)), the New Jersey Student Learning Standards for Technology and the New Jersey Student Learning Standards for Language Arts Literacy for History/Social Studies, Science and Technical Subjects. 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 ADAPTATIONS: 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 the role science plays in the study of life.
- learn how cell structures are adapted for their function.
- learn how cellular information passes from one generation to the next.
- learn how living and non-living factors shape ecosystems and affect how organisms interact.
- learn what characteristics and traits define the major kingdoms.
- learn how the structures of animals allow them to obtain and manage the essential needs of life.
- learn the evidences for evolution and natural selection.
- take an active role in the acquisition of Science knowledge, skills and practices.
- develop strong problem-solving and critical thinking skills.

SKILL OBJECTIVES

Following Directions requires that students be able to follow both written and verbal directions.

Reading Illustrations requires that students be able to obtain information from photographs, drawings, diagrams, charts, and graphs.

Building Science Vocabulary requires that students be able to recognize and use science words with particular emphasis on understanding prefixes, suffixes, and root words.

Finding the Main Idea requires that students be able to pick out key information after reading a passage in the text.

Observing requires that students be able to use one or more senses to note, and then describe the properties of an object or event.

Comparing and Contrasting requires that students be able to tell how items or events are similar or different.

Classifying requires that students be able to arrange items into groups of similar characteristics based on a varying number of criteria.

Sequencing requires that students be able to arrange items or events in order according to a particular characteristic, such as size.

Measuring requires that students be able to accurately use measuring equipment, and to understand the concept of a standard unit.

Recording Data requires that students be able to organize data in a logical way so that results can be interpreted and reviewed.

Hypothesizing requires that students be able to suggest solutions to problems or anticipate happenings based on past experience, previously collected information, or by simply making an educated guess.

Inferring and Problem Solving requires that students be able to propose an explanation based on observations and data.

Concluding and Generalizing requires that students be able to summarize and explain the significance of observations and experimental results.

GENERAL PERSONAL SAFETY

The science classroom contains potential dangers that can be avoided 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.

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

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.

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

Burns from either hot or caustic materials should be flooded immediately ad 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.

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

Cleanliness and order should be maintained.

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

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

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

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

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

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.

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.

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.

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.

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.

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.

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.

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

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

SAFETY CHECKLIST FOR TEACHERS

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

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

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

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

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

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

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

_____ 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?

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

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

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

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

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

_____ Have you inspected all glassware for cracks or defects?

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

_____ Do students know how to dispose of broken glassware?

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

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

_____ Do you keep flame far from flammable liquids?

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

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

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

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

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

EVALUATION / ASSESSMENT

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.

Course: **SCN773**

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. Apply the characteristics of living things to determine if something is living, non-living or dead.
2. Use the microscope to provide evidence of the existence of cells.
3. Design a model to show relative cell sizes.
4. Evaluate how the number of cells an organism has relates to its size and complexity.
5. Identify and understand the functionality of animal and plant cell components.
6. Explain how the components of the cell contribute to maintaining a cell's internal processes, maintaining the structure of the cell, and controlling what enters and leaves cell.
7. Explain how the cell process of mitosis enables cells to make identical copies of themselves.
8. Describe how mass is conserved in a chemical reaction, and model how the total number of atoms does not change.
9. Identify and explain the systems of the body and how they work together to maintain homeostasis.
10. Model how interacting body systems allow us to move.
11. Make connections among the systems that move materials throughout the body.
12. Analyze how systems work together how systems work together to control body functions.
13. Distinguish between the forms of DNA.
14. Model how sexual reproduction produces offspring with genetic variations.

15. Predict the genetic composition of an organism produced through asexual reproduction.
16. Determine the effect of a mutation on the protein being produced.
17. Evaluate genetic similarities between organisms as evidence of evolutionary development.
18. Model how some organisms are more likely to survive in their environment than others based on their adaptations and behaviors.
19. Use mathematical representations as evidence that populations shift over time due to environmental changes.
20. Explore how humans can influence which genes are inherited, which can lead to population shifts.
21. Construct an argument supported by evidence for how increases in human population impacts natural resources and its impact on the ecosystem.
22. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems (biomes).
23. Analyze and interpret properties of substances before and after chemical reaction and how they impact the cycling of matter in the ecosystem.
24. Construct, test, and modify a device that releases or absorbs thermal energy by chemical processes (composting).
25. Compare and contrast biotic vs abiotic components in an ecosystem.
26. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
27. Develop a model to describe the cycling of energy in an ecosystem

SCN 773 Curriculum

Unit	Essential Questions	Enduring Understanding	Suggested Activities	Evaluation / Assessment	Resources

From Molecules to Organisms– Part 1-Basis of Life *(Week 1, 8 Weeks)*	a) What does it mean to be alive? b) How can you see what is unseen?	a) Living things are made of cells and share common characteristics that distinguish them between non-living things b) Scientific knowledge is generated and validated from visible and non-visible observations	• (Growth vs. Fixed Mindset article) Read and annotate text "You Can Grow Your Intelligence" Mini lesson on annotation (RW) • Review of Metacognitive Reading Strategies to support annotations (RW) • Nature hike (Collect samples) • Think-pair-share (work in increasingly larger groups to develop a list of characteristics that all living things share) • Tube lens (Uranium Dioxide) • Measure reflection and refraction of light, lens and eye • Parts, usage and magnification of the microscope • Apply scientific explorations of Leeuwenhoek, Schleiden, Schwann, and Virchow and develop an explanation of how their discoveries led to the Cell Theory, timeline. • Crime Scene Creatures - determine how microscopes can be used to identify "unseen" evidence at crime scenes • Engineering Design Challenge: Design your own simple microscope (drop of water, tape, two pencils, specimen to be seen) • Argumentative writing - Should NASA send humans to Mars? Is engineering needed in the advancement of science? • Compare the cell sizes of an animal cell, bacteria, and virus (Atoms, protists) • Compare 2 organisms under the microscope and explain why one is more complex than the other using evidence • Compare/Contrast Research Based Paragraph on Prokaryotic and Eukaryotic	**Written: Informative** Construct an argument based on evidence to explain why an item is living/dead or non-living (graded on accuracy of response based on teacher rubric) **Performance: Skill Demonstration** Utilize microscope skills in teacher generated summative (possibly microscope practical) **Performance: Authentic Task** Assessed using a teacher designed rubric **Project: Visual Arts** Student designed poster assessed by teacher generated rubric **Performance: Authentic Task** Microscope drawings and comparative analysis graded with teacher rubric	See LC Infusions Attachments

			Cells (RW). Use of a Venn Diagram as Pre-Writing (RW) • Research-Based Paragraph to determine if the model of the cell shown is Eukaryotic or Prokaryotic based on its characteristics (evidence) (RW) • CER Writing Models (RW) • Microscope Mysteries Activity that utilizes microscopes skills to collect observations/evidence to determine the specimen the students are viewing. (Live Protists) RBP (RW) -		

Standards: **NJ: 2016 SLS: English Language Arts**
NJ: Grade 7
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.7.1 Cite several pieces of 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.7.3. Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).
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.7.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.
NJSLSA.R5 Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
RI.7.5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to the development of the ideas.
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.7.1.10. **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
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.7.2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

W.7.2a. Introduce a topic; 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).
W.7.2b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.
W.7.2c. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.
W.7.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.
W.7.2e. Establish and maintain a formal style/academic style, approach, and form.
W.7.2f. Provide a concluding statement or section that follows from and supports 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.7.4. 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.7.5. 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, focusing on how well purpose and audience have been addressed.
NJSLSA.W6 Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
W.7.6. Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.
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.7.7. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.
NJSLSA.W9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.7.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.7.9b. Apply grade 7 Reading standards to literary nonfiction (e.g. “Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims”).
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.7.10. 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: Literacy in History/Social Studies, Science, & Technical Subjects 6-12
NJ: Grades 6-8
Reading: Science & Technical Subjects
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.
RST.6-8.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
NJ: 2016 SLS: Science
NJ: MS Life Science
MS-LS1 From Molecules to Organisms: Structures and Processes
Performance Expectations

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

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.
NJ: 2014 SLS: Technology
NJ: Grades 6-8
8.1 Educational Technology
E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.

8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
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 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
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.
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
ESS1: Earth's Place in the Universe
ESS1.B: Earth and the Solar System
The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. (MS-ESS1-2),(MSESS1-3)

21st Century Skills:

NJ: 2014 SLS: 21st Century Life and Careers
NJ: All Grades
Career Ready Practices
Career Ready Practices
CRP1. Act as a responsible and contributing citizen and employee.

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.

From Molecules to Organisms– Part 2-Cells *(Week 9, 8 Weeks)*	a) What are cells made of and how is cell structure related to cell function? b) Why is mitosis important for life to continue? c) Where do the materials for chemical reactions come from?	a) How the different parts of the cell contribute to cell function as whole, such as: i. Maintaining a cell's internal processes, for which it needs energy. ii. Maintaining the structure of the cell and controlling what enters and leaves cell. iii. Functioning together as parts of a system that determines cellular function. b) How cells make exact copies of themselves through the process of mitosis c) Mass is conserved in chemical reactions (Law of conservation of mass)	• Students interpret diagram and infer the function of the cell membrane as a boundary that controls what enters and leaves the cell. • Students demonstrate the functions of the cell membrane creating a kinesthetic model. • Ask students to relate the job of strainer to the role of a cell membrane. • Cheek vs elodea lab. • Simulated snail/Elodea lab - computer - Develop the interrelationship between snail (animal) and elodea (plant). • Cell project - Students create an analogy between cell and city, amusement park, factory. • Read, annotate (RW) and analyze Rutgers studies, compare studies and data to serve as evidence as groups create and present models articulating the function of cell organelles (Mitochondria, Nucleus, Vacuole, Chloroplast). • Research-Based Paragraph on Rutgers Cell Organelle Functions Activity where students will look at evidence and research clues to try to determine the function of each cell organelle, practice collecting evidence, making observations and communicating their claims in writing. (RW) • Determine cause and effect of CO_2 and O_2 cycle - Elodea Photosynthesis/ Animal Respiration Lab using Bromothymol Blue. • Pond Water Exploration – Investigate local bodies of water to find living things, create a trading card of most notable find to share with class. • Cell Cycle Engage activity- students view diagrams of the 6 stages of the cell cycle and as a group try to order them and explain what is happening in each phase, review. • Stem Mom: Engineering Cell Division http://www.stemmom.org/2013/11/engineering-cell-division-ngss-lesson.html • cell Division Gizmo Mitosis simulation	**Formative: Other: Teacher Rubric** Cell Project – Teacher generated rubric Teacher generated formative assessment focusing on interrelationship of organelles within a cell Teacher generated formative assessment focusing on how organelles maintain homeostasis by controlling what enters and leaves a cell **Performance: Authentic Task** Pond Water Trading Card – (graded for accuracy using teacher rubric) Construct an argument based on evidence to explain why cells are able to generate identical copies of themselves (graded on accuracy of response based on teacher rubric) Develop a model to show how mass is conserved in chemical reactions (graded on accuracy of response based on teacher rubric)	See LC Infusions Attachments

			cells Alive mitosis computer tutorial, video clip cell Division Mitosis and Meiosis (Animation) http://lab-aids.com/middle-school-curriculum/simulations/genetics_act3_sim.html ● RST Process Piece on Cells - Task: Mitosis and the role it plays in your life. Students will use 4 sources to complete the task. (RW)--Required to PW, BS, Draft, Rev, Edit, PC, Publish ● Compare/contrast mitosis to binary fission- Bacteria Bean Lab showing exponential growth. ● Snap blocks activity- Model photosynthesis and cellular respiration reactants and products using snap blocks and molecule kits for molecule building. ● Reading about the development and scientist contribution in discovering The Law of Conservation of Mass. Counting atoms to prove conservation of Mass. ● Use Periodic Table of Elements to compare the mass of reactants in photosynthesis to determine the original source of matter contributing the most mass to a tree. ● Sodium bicarbonate vs water controlled experiment on spinach leaves to discover carbon dioxide has more mass than oxygen. ● Potato osmosis investigation. ● Model movement of particles - use students to represent particles moving from high conc to low conc. (crammed in corner of room to roaming free) Relate to particles (water, food, etc.) getting around a cell. ● Modeling diffusion/osmosis - raisins in water, smelly balloons (rubber glove can be used instead of latex), starch/iodine demo through bag.		

NJSLS Standards:
NJ: 2016 SLS: English Language Arts
NJ: Grade 7
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.7.1 Cite several pieces of 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.7.2. Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of the text.
NJSLSA.R3 Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
RI.7.3. Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).
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.7.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.
NJSLSA.R5 Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
RI.7.5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to the development of the ideas.
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.7.8. Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.
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.7.9 Analyze and reflect on (e.g. practical knowledge, historical/cultural context, and background knowledge) how two or more authors writing about the same topic shape their presentations of key information by emphasizing different evidence or advancing different interpretations of facts.
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.7.1.10. **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 Purposes
NJSLSA.W1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
W.7.1. Write arguments to support claims with clear reasons and relevant evidence.
W.7.1a. Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically.
W.7.1b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.
W.7.1c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.
W.7.1d. Establish and maintain a formal style/academic style, approach, and form.

W.7.1 e. Provide a concluding statement or section that follows from and supports 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.7.2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
W.7.2 a. Introduce a topic; 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).
W.7.2b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.
W.7.2c. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.
W.7.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.
W.7.2e. Establish and maintain a formal style/academic style, approach, and form.
W.7.2f. Provide a concluding statement or section that follows from and supports 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.7.4. 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.7.5. 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, focusing on how well purpose and audience have been addressed.
NJSLSA.W6 Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
W.7.6. Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.
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.7.7. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.
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.7.8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format forcitation.
NJSLSA.W9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.7.9. 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.7.10. 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: Literacy in History/Social Studies, Science, & Technical Subjects 6-12
NJ: Grades 6-8
Reading: Science & Technical Subjects
NJSLSA.R2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
RST.6-8.2. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

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.
RST.6-8.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
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.
RST.6-8.8. Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
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.
RST.6-8.9. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
NJ: 2016 SLS: Science
NJ: MS Life Science
MS-LS1 From Molecules to Organisms: Structures and Processes
Performance Expectations

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

MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

NJ: MS Physical Science
MS-PS1 Matter and Its Interactions
Performance Expectations

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

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.

8.2 Technology Education, Engineering, Design, and Computational Thinking
D. Abilities for a Technological World: The designed world is the product of a design process that provides the means to convert resources into products and systems.

8.2.8.D.3 Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution.
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 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.
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.

21 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.

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.

From Molecules to Organism–Part 3-Human Body *(Week 17, 9 Weeks)*	a) How does structure relate to function? b) How do the individual parts relate to the system as a whole? c) How does Newton's Law of the Conservation of Matter apply to the human body? d) How do we interpret the world around us?	a) Understand the relationship between multicellular life and the levels of organization in a body b) Create connections between systems, sub-systems and a complex organism (Interdependencies) c) Energy is made as food molecules are broken apart and put back together d) Receptors collect information that the brain processes and then uses to control the body or store as a memory	• Compare cell parts with organs (Individual functions vs. working together) • Human Body webquest: http://www.msnucleus.org/membership/slideshows/bio6.html • Investigate major tissue types via microscope • Students will research and use technology (Google draw) to create a model articulating and sequencing: Cells form tissues, Tissues form organs specialized for particular body functions. • Students will research and use data and literature to argue (oral, and written: Should Tissue and Organ Engineering continue? Limitations? Precautions? Including the idea the body is a system of interacting subsystems composed of groups of cell. • Prezi presentation on major system interactions- Students watch and then create a model to visualize how the systems work together to take in necessary materials and get rid of wastes. • Human Body Systems: Informative/Explanatory Writing - Write a Research-Based Paragraph(s) to explain the function of one human body system and how disease, disorder, infection, or injury could affect the system and the human body as a whole.(RW) • Model arm- the students will use cardboard, yarn, and a fastener to model the components of an upper and lower arm - manipulate the pieces of yarn to create movement. Describe what each component of the model represents in terms of movement, then ask the students to jot down what systems are involved in movement and why (skeletal, muscular, and nervous) • Read and annotate the article "Helping Hands" (Science World) (RW). Prosthetic Arm Design Challenge- STEM -design a hand/arm that is able to pick up a pencil, empty cup and a water bottle.	**Performance: Authentic Task** Students create a model articulating and sequencing: Cells form tissues, Tissues form organs specialized for particular body functions. (graded on accuracy of response based on teacher rubric) Develop a model to show how multiple systems interact together to allow movement (skeletal, muscular, and nervous systems) (graded on accuracy of response based on teacher rubric) Develop a model to show how materials move throughout the body (graded on accuracy of response based on teacher rubric) Construct an argument based on evidence to explain which stimulus generated the fastest response time (tactile, visual, or auditory) (graded on accuracy of response based on teacher rubric) **Written: Informative** Write and informative/explanatory essay to explain the function of one human body system and how	See LC Infusions Attachments

			• Chicken Wing Dissection - observe muscles, bones, and joints to see how the work together to move. • Pairs of Muscles - Bodily Kinesthetic Activities - student will move muscles to show how muscles work in pairs (extensors and flexors). • Model lung – given materials, students design a model that will demonstrate the function of the diaphragm in breathing. • Heart rate - Design an experiment to show how HR is affected by exercise, student have 10 minutes outside to collect data, so they need to design a data table, plot data on a graph, then analyze their design and talk about how they could modify their experiment. • Closed circulatory system - use the materials provided to make a closed circ. system with 2 loops (systemic and pulmonary) Discuss flow. • Students will observe a preserved mammalian heart and identify the various tissues the heart contains. The heart contains muscle, connective, and epithelial tissues. • Digestive system model- bread in a bag demo - ripping bread to demonstrate chewing, add water as saliva, mix into chime, design a way to remove water to produce "feces" • Peristalsis Model - STEM - create a simple model of esophagus and stomach. • Blood Flow - Effectiveness of the heart pumping blood - Use materials provided - design a way to model how effectively the heart pumps blood. The students will try to move as much blood as the heart does in the same amount of time. • Human Kidney Simulation (Excretory System) - simulate how blood gets filtered through a kidney. • Individually or in a group of 2-3 research information about each of the three systems (functions, organs, & "where the magic	disease, disorder, infection, or injury could affect the system and the human body as a whole (graded on accuracy of response based on teacher rubric)	

			happens" question) Digestive System: place where nutrients are absorbed Circulatory (CV) System: What is carrying the gases and nutrients to the cells; Respiratory System: Place where gas exchange occurs; Create a graphic organizer with the nervous/endocrine systems connecting the three systems and include all the researched information. ● Blood In a bottle – (The following materials will simulate the components of blood - empty water bottle, red beads, white beads, purple beads, yellow water) Analyze the components of blood and explain how materials are transported throughout the body by explaining the function of each component (RBC, WBC, platelets, and plasma) ● Narrative writing: "Journey of a Red Blood Cell." This includes figurative language, sensory details, compositional risks, etc. (RW) ● Reaction time lab- design a lab to test reaction time, test experimental design, revise design and retest. ● Memory tests (collecting sensory information for processing vs. storing memories). ● Nervous System “Telephone” Activity - Send a message from receptors though the sensory neurons to the brain and back through the motor neurons with a reaction to a stimulus. Each student gets a identification card and it is timed how long it takes the message to get to the "response" person.		

NJ: 2016 SLS: English Language Arts
NJ: Grade 7
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.7.1 Cite several pieces of 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.7.2. Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of the text.

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

RI.7.3. Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).

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.7.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.

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.7.1.10. **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

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

W.7.2a. Introduce a topic; 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).

W.7.2b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.

W.7.2c. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.

W.7.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.

W.7.2e. Establish and maintain a formal style/academic style, approach, and form.

W.7.2 f. Provide a concluding statement or section that follows from and supports the information or explanation 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.7.3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

W.7.3 a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically.

W.7.3b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters.

W.7.3c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another.

W.7.3d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.

W.7.3e. Provide a conclusion that follows from and reflects on 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.7.4. 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.7.6. Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.
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.7.7. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.
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.7.8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format forcitation.
NJSLSA.W9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.7.9. 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.7.10. 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: Literacy in History/Social Studies, Science, & Technical Subjects 6-12
NJ: Grades 6-8
Writing
Text Types and Purposes
NJSLSA.W1 Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
WHST.6-8.1. Write arguments focused on discipline-specific content.
NJSLSA.W6 Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
WHST.6-8.6. Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.
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.
WHST.6-8.7. Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
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.
WHST.6-8.8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
NJ: 2016 SLS: Science
NJ: MS Life Science
MS-LS1 From Molecules to Organisms: Structures and Processes
Performance Expectations

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

MS-LS1-7. Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

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

NJ: MS Physical Science
MS-PS2 Motion and Stability: Forces and Interactions
Performance Expectations

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

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.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.
F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

8.1.8.F.1 Explore a local issue, by using digital tools to collect and analyze data to identify a solution and make an informed decision.
8.2 Technology Education, Engineering, Design, and Computational Thinking
D. Abilities for a Technological World: The designed world is the product of a design process that provides the means to convert resources into products and systems.

8.2.8.D.1 Design and create a product that addresses a real world problem using a design process under specific constraints.
8.2.8.D.2 Identify the design constraints and trade-offs involved in designing a prototype (e.g., how the prototype might fail and how it might be improved) by completing a design problem and reporting results in a multimedia presentation, design portfolio or engineering notebook.
8.2.8.D.3 Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution.

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 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 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.
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.
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.
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)
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)

NJ: 2014 SLS: 21st Century Life and Careers
NJ: All Grades
Career Ready Practices
Career Ready Practices
CRP3. Attend to personal health and financial well-being.

CRP5. Consider the environmental, social and economic impacts of decisions.

CRP6. Demonstrate creativity and innovation.

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

Heredity: Inheritance & Variation of Traits *(Week 26, 7 Weeks)*	a) Are there advantages to sexual reproduction vs asexual reproduction? What would the world be like without genetic variation? b) Why do we look the way we do; why don't we all look alike? c) How can the same 4 ingredients create such a variety of products? d) How does meiosis ensure genetic variation? e) What impact can mutations have on the traits of an organism?	a) Organisms reproduce sexually to combine DNA (genetic variation=varying traits) or asexually (No variation in DNA) and transfer their genetic information to offspring b) Genes are located on the chromosomes, 2 genes are inherited for most traits. Some traits have multiple variations of genes that can be inherited. c) The 4 bases of DNA create a code for genes. Each gene controls the production of specific proteins which gives each trait d) Each parent contributes half of the genes acquired at random to the offspring to determine physical traits Genetic differences from parents result in genetic variations of inherited traits in offspring e) Genetic information can be altered because of	• -Model chromosome - super coiled colored yarn wrapped around a pipe cleaner, notes. • Assemble a DNA puzzle. • Build a model of DNA using KNEX according to a specific sequence. • DNA song • Engineering/Design DNA model. • Punnett squares- calculate probability. • Celebrity babies -meiosis • Penny Lab • Reebops Genetics: a model of Meiosis • http://www.nuffieldfoundation.org/practical-biology/making-reebops-model-meiosis • "Cells Alive" Simulation of Meiosis • Science Gizmo Inheritance. • Protein Synthesis Creature • Playdough model of a bacteria cell (DNA) • Bacterial growth (Beans & graphing) • Protein synthesis telephone activity • Mutations reading comprehension- pearson text analysis. • Karyotypes • Translating sentences to codons • Mutation activity/what happens when things go wrong? (model beneficial, neutral, or harmful changes) *This activity needs to show the structure of some blood proteins allows them to attach to oxygen, the structure of normal digestive protein allows it to break down particular food molecules). • Sickle Cell Mystery Activity & Research Based Paragraph -Students will look at DNA sequencing evidence to solve a mystery. (RW) • Timed RST (RW) - Topic: Should GMO products be labeled. • DNA replication paperclip activity **http://www.radiolab.org/story/antibodies-part-1-crispr/ (PodCast).**	**Performance: Authentic Task** Develop a model to show the structure of DNA and explain how the sequence of bases is so important for the creation of proteins (graded on accuracy of response based on teacher rubric) Simulate the creation of a "baby" by randomly combining genes through meiosis then analyze results and construct an explanation of how the traits were determined based on sexual reproduction (teacher generated rubric) Model asexual (bacterial) reproduction, graph population growth, analyze the data, and communicate the results Model the creation of proteins by decoding a sequence and translating it into a command. **Formative: Other: Teacher Observation** Teacher generated formative or summative assessment focusing on determining probability of outcome using punnett squares. **Oral: Discussion** Communicate the effects mutations can have on	See LC Infusions Attachments

		mutations, which can be helpful, harmful, or neutral. Mutations to genes = change in protein structure = change in trait		the creation of a protein (teacher generated rubric)	

NJ: 2016 SLS: English Language Arts
NJ: Grade 7
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.7.1 Cite several pieces of 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.7.2. Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of the text.
NJSLSA.R3 Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
RI.7.3. Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).
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.7.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.
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.7.8. Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.
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.7.9 Analyze and reflect on (e.g. practical knowledge, historical/cultural context, and background knowledge) how two or more authors writing about the same topic shape their presentations of key information by emphasizing different evidence or advancing different interpretations of facts.
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.7.1.10. **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 Purposes
NJSLSA.W1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W.7.1. Write arguments to support claims with clear reasons and relevant evidence.
W.7.1a. Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically.
W.7.1b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.
W.7.1c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.
W.7.1d. Establish and maintain a formal style/academic style, approach, and form.
W.7.1e. Provide a concluding statement or section that follows from and supports the argument 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.7.4. 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.7.6. Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.
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.7.7. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.
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.7.8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format forcitation.
NJSLSA.W9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.7.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.7.9b. Apply grade 7 Reading standards to literary nonfiction (e.g. “Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims”).
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.7.10. 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 Life Science
MS-LS3 Heredity: Inheritance and Variation of Traits
Performance Expectations

MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.

MS-LS3-2. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.

NJ: 2014 SLS: Technology

NJ: Grades 6-8
8.2 Technology Education, Engineering, Design, and Computational Thinking
8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
A. The Nature of Technology: Creativity and Innovation
Technology systems impact every aspect of the world in which we live.

8.2.8.A.1 Research a product that was designed for a specific demand and identify how the product has changed to meet new demands (i.e. telephone for communication - smart phone for mobility needs).
8.2.8.A.3 Investigate a malfunction in any part of a system and identify its impacts.
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 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 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.

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.
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.
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)
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)
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
CRP1. Act as a responsible and contributing citizen and employee.

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP5. Consider the environmental, social and economic impacts of decisions.

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

CRP9. Model integrity, ethical leadership and effective management.

CRP10. Plan education and career paths aligned to personal goals.

Biological Evolution: Unity & Diversity *(Week 32, 2 Weeks)*	a) Why are some organisms more likely to survive than others and how can genetic evidence be linked to evolution? b) How can humans impact the inheritance of genes in other organisms?	a) Genetic variation leads to a diverse population; some of which have beneficial traits that will lead to their survival and passing on of traits. b) Humans can affect which traits are passed on through genetic modification and engineering.	• Compare adaptations among organisms in the similar classification groups. • DNA fingerprinting • Fossil records/evidence - Fossil evidence to show the development of adaptations. • Classification of organisms based on similarities (DNA). • Evolution of more complex organisms- phylogenetic tree/cladogram. • Have a shoe-tying race WITHOUT the use of their thumbs in order to appreciate our opposable thumb adaptation. • Bird Beak Simulations- have students use different tools as beaks (tweezer, pliers, slotted spoon, etc.) and try to pick up different types of food (crack seeds, worms in dirt, catch popcorn flies, pull ants out of log (toothpicks in Styrofoam), etc. • Galapagos Finch investigation. • Marine iguana - “untamed science video clip” - analysis of features that allow survival in water vs land. • Design a Plant Activity - Explore plant examples to identify specialized structures that increase chances of survival and ability to reproduce. • Peppered moth computer simulation and evaluation of data. • Bird Beak Simulation - Simulate adaptations in beak shape and compete against each other for food (limited resource) - determine population shifts based on data.	**Other: Teacher Observation** Model a physical limitation (like not have opposable thumbs) and determine what impact the adaptation would have on the survival of an organism (graded on accuracy of response based on teacher rubric) Carry out an investigation to model how different adaptations impact populations. Use data as evidence to evaluate how the adaptations impact population shifts. (graded on accuracy of response based on teacher rubric) Design a plant and identify special adaptations that would increase chances of survival. Construct an explanation to explain importance of adaptations (teacher generated weighted checklist that evaluates the accuracy of explanations) Construct and argument base on evidence (data from simulation) to	See LC Infusions Attachments

			• Genetic Engineering Research, Debate, & Argumentative Writing Activity (PBS video, Botany of desire) • Selective Breeding Analysis with dog traits. • Research-Based Paragraph on Natural Selection (Finches/Beaks) (RW) Students will analyze the effects on population by looking at models to determine an answer to the following scenario: If large seed plants died out, what would happen to birds with large beaks?	explain population shifts in an ecosystem based on environmental changes (graded on accuracy of response based on teacher rubric) Debate the impact of genetic engineering on the ecosystem. Construct an argument based on evidence about how humans have influenced population shifts in an ecosystem (graded on accuracy of response based on teacher rubric)	

NJ: 2016 SLS: English Language Arts
NJ: Grade 7
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.7.1 Cite several pieces of 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.7.3. Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).
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.7.7. Compare and contrast a text to an audio, video, or multimedia version of the text, analyzing each medium's portrayal of the subject (e.g., how the delivery of a speech affects the impact of the words).
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.7.1.10. **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

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.7.2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
W.7.2a. Introduce a topic; 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).
W.7.2b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.
W.7.2c. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.
W.7.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.
W.7.2e. Establish and maintain a formal style/academic style, approach, and form.
W.7.2f. Provide a concluding statement or section that follows from and supports 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.7.4. 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.7.6. Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.
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.7.7. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.
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.7.8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format forcitation.
NJSLSA.W9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.7.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.7.9b. Apply grade 7 Reading standards to literary nonfiction (e.g. “Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims”).
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.7.10. 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: Literacy in History/Social Studies, Science, & Technical Subjects 6-12
NJ: Grades 6-8
Writing
Text Types and Purposes
NJSLSA.W1 Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
WHST.6-8.1. Write arguments focused on discipline-specific content.

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.
WHST.6-8.2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
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.
WHST.6-8.4. Produce clear and coherent writing in which the development, organization, voice, and style are appropriate to task, purpose, and audience.
NJSLSA.W6 Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
WHST.6-8.6. Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.
NJ: 2016 SLS: Science
NJ: MS Earth & Space Sciences
MS-ESS1 Earth's Place in the Universe
Performance Expectations

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-LS1 From Molecules to Organisms: Structures and Processes
Performance Expectations

MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

MS-LS4 Biological Evolution: Unity and Diversity
Performance Expectations

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.

MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

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.
E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.

8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

8.1.8.F.1 Explore a local issue, by using digital tools to collect and analyze data to identify a solution and make an informed decision.
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.
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.
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.
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)
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
CRP1. Act as a responsible and contributing citizen and employee.

CRP4. Communicate clearly and effectively and with reason.

CRP5. Consider the environmental, social and economic impacts of decisions.

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

CRP9. Model integrity, ethical leadership and effective management.

CRP11. Use technology to enhance productivity.

Ecosystems: Interactions, Energy, & Dynamics *(Week 32, 9 Weeks)*	a) How does a system of living and nonliving things operate to meet the needs of the organisms in an ecosystem? b) How and why do humans interact with their environment, and what are the effects of these interactions? c) How does energy flow through an ecosystem?	a) Living things depend on one another and the abiotic factors for survival and renewal of ecosystem components b) Human influence can impact availability of natural resources and impact population shifts in organisms. c) Energy and matter is recycled within the ecosystem	• **Succession game** 1) Each student becomes a biotic factor in Hardwood tree forest (insects, mammals, pine tree, hardwood trees, lichens, and grasses) 2) The teacher will read a card that has a scenario related to succession (examples: did not cut your lawn for 50 years, volcanic eruption, forest fire etc.) The biotic factors listed above will receive or lose points depending on the scenario. 3) After all cards have been read students will calculate the points. 4) As a group, discuss the results based on succession • **Research and present a biome** to class, create a poster or 3D model as visual aid. • **Biomes:** Disney Biomes- Observe scenes from Disney video clips to identify the name of the biome, and biotic/abiotic factors • **Human Impact on Ecosystems** Create a skit/play with environmental issue (deforestation, oil spills, air pollution, etc.) Use the legend “Little Dear” as a model for skit • **Biodiversity in the rainforest**. Using bacteria to produce antibiotics and insulin etc. • Group presentation for uses Biotic Resources – ex. Rubber tree, root beer, medicines from rainforest, fossil fuel, etc. • **Photosynthesis/cellular respiration balanced inverse equations**- relate to conservation of matter. Use blocks to show how the number of atoms in the reactants are		See LC Infusions Attachments

			the same as the products after a chemical reaction has occurred. The atoms just get rearranged. ● **Digestion/cellular respiration-** Dissect your last meal and trace each food item back to the sun ● **Composting and decomposition** ● Read and annotate about composting and prewrite using a graphic organizer how composting would be feasible in Parsippany (RW). ● Create mini-composites using 3 liter bottles ● Use evidence to explain how chemical changes took place in the compost bin. ● Plant seeds. Determine which compost is the most fertile. Evaluate how we could modify our designs to make them better (more fertile) ● **Nature hike**- record biotic and abiotic factors they observe. ● **Ecosystem Component Evaluation** – receive a box with various materials and determine what component of our ecosystem each item represents ● **Biotic and abiotic interactions**- ● Slime mold design challenge: Create a design for a maze using the rim of a plastic cup (abiotic factor) that will fit into a petri dish it must have at least 2 bends. Indicate a start point for the slime mold and a mid/finish point to place the oats (biotic factor). Students will make predictions based on what they think and will write 1-3 sentences to support their predictions (RW). Then, after the activity is completed, they will write a Research-Based Paragraph to explain whether or not their predictions were accurate. Evidence from the experiment will be used to support their responses. (RW) ● Candy rock cycle ● Water cycle – design a way to collect water using a container of wet soil/grass, plastic		

			wrap and a cup. Construct an explanation (RBP) of how water is recycled in the ecosystem (RW) ● **Food chains/Web Kit**. ● **Adventure Time Food Chain full episodes or songs** ● **Energy Flow in Ecosystems Demonstration**- To show how energy get lost as it moves through a food chain or energy pyramid (Using gatorade or soda) Set up four graduated cylinders. Pour approximately 10% of the gatorade in the first graduated cylinder (producer), 10% of the gatorade in the producer graduated cylinder will go to the primary consumer etc. ● **Energy Pyramid**- Cup activity ● **food web:** Owl pellet dissection ● **Prey-Predator Game** - 3 rounds, students will be given popsicle sticks that represent life forces. (carnivores 1, omnivores 3, herbivores 5). If a student gets tagged they will have to give the tagger one life force. (Carnivores can tag both omnivores and herbivores, omnivores can tag herbivores, & herbivores can not tag. Both the omnivores and herbivores can get plant food. If they get 5 pieces of plant food, they will get a life force). 1st - herbivore, omnivores, carnivores (in line with Energy Pyramids) 2nd - Introduce Hunters 3rd - Introduce Environmentalists ● **Limiting Factors/Competition-** Oh Deer: While outdoors play "Oh Deer" as students assume each role to visualize limited resources. Deer and resources pick shelter, food or water and find their match in the opposite line. After a natural disaster occurs get rid of a resource to visualize population decline due to competition. ● Write a Research-Based Paragraph on the topic, "Interactions Among Living things." Students will specifically determine "Was it a		

			good idea for the community to eliminate the rattlesnake population?" • Water Filtration Design - Students will be given an ecosystem challenge (oil spill, pollutionrun off, etc.) they will be asked to design a 2-3 step filtration system to purify the water, then compare the effectiveness of the filtration systems created. (Textbook) (RW)		

NJ: 2016 SLS: English Language Arts
NJ: Grade 7
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.7.1 Cite several pieces of 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.7.2. Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of 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.7.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.
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.7.1.10. **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 Purposes
NJSLSA.W1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
W.7.1. Write arguments to support claims with clear reasons and relevant evidence.
W.7.1a. Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically.
W.7.1b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.

W.7.1c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.
W.7.1d. Establish and maintain a formal style/academic style, approach, and form.
W.7.1 e. Provide a concluding statement or section that follows from and supports 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.7.2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
W.7.2 a. Introduce a topic; 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).
W.7.2b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.
W.7.2c. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.
W.7.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.
W.7.2e. Establish and maintain a formal style/academic style, approach, and form.
W.7.2f. Provide a concluding statement or section that follows from and supports 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.7.4. 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.7.5. 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, focusing on how well purpose and audience have been addressed.
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.7.7. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.
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.7.10. 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: Literacy in History/Social Studies, Science, & Technical Subjects 6-12
NJ: Grades 6-8
Reading: Science & Technical Subjects
NJSLSA.R6 Assess how point of view or purpose shapes the content and style of a text.
RST.6-8.6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.
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.
RST.6-8.7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
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.
RST.6-8.8. Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

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.
RST.6-8.9. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
Writing
Text Types and Purposes
NJSLSA.W1 Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
WHST.6-8.1. Write arguments focused on discipline-specific content.
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.
WHST.6-8.2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
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-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-ESS3 Earth and Human Activity
Performance Expectations

MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capital consumption of natural resources impact Earth's systems.

NJ: MS Life Science
MS-LS1 From Molecules to Organisms: Structures and Processes
Performance Expectations

MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

MS-LS2 Ecosystems: Interactions, Energy, and Dynamics
Performance Expectations

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

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

MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.*

NJ: MS Physical Science
MS-PS1 Matter and Its Interactions
Performance Expectations

MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.

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

MS-PS3 Energy
Performance Expectations

MS-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.

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..
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.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.
E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.

8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

8.1.8.F.1 Explore a local issue, by using digital tools to collect and analyze data to identify a solution and make an informed decision.
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 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.
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.
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
CRP1. Act as a responsible and contributing citizen and employee.

CRP2. Apply appropriate academic and technical skills.

CRP3. Attend to personal health and financial well-being.

CRP5. Consider the environmental, social and economic impacts of decisions.

CRP6. Demonstrate creativity and innovation.

CRP7. Employ valid and reliable research strategies.

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

CRP9. Model integrity, ethical leadership and effective management.

CRP10. Plan education and career paths aligned to personal goals.

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

Appendix A Sample Authentic Assessment

(Week 1, 1 Week)

SAMPLE AUTHENTIC ASSESSMENT

Written: Report

You have a summer job as a volunteer at the Great Swamp National Wildlife Refuge. Your job is to monitor the grounds for trash that may be left behind by visitors that may negatively impact the environment, or disrupt natural habitats. One day, you come upon an organism that you've never seen before. You take the opportunity to get a closer look. Even though you've spent many days at the Wildlife Refuge and have seen many of the common organisms that inhabit this place, you are not familiar with this one and think it may be a new species to this area. You know that a common procedure when a unique organism is discovered is to observe it in its natural habitat for several hours. You take out your notebook and take detailed notes about what you see. Once detailed notes are collected, you try to use online field guides or textbook resources to try to identify the species. You tell your supervisor, who is very excited about the prospect, and he advises you to take the same approach the other environmentalists do when they identify an unusual species. He adds that you will also need to write a report and give an oral presentation to the team of environmentalists at the site to alert them to this possible new organism. He has asked you to do the following in your report and presentation:

Create a sketch and/or take a photograph of the organism
Describe, in detail, the specific habitat it was in
Describe its method of feeding
Based on its appearance, describe any structures that organism has to help it exist in the environment (adaptations)
Predict whether or not you think this organism will be able to survive and reproduce in this environment based on the characteristics of livings things.Explain your reasoning based on your observation.

Appendix B Authentic Assessment Rubric

(Week 1, 1 Week)

AUTHENITC ASSESSMENT RUBRIC

Other: Teacher Rubric

AUTHENTIC ASSESSMENT RUBRIC.docx

Science Journal

(Week 1, 1 Week)

Journal should include:

-Literacy skill based "Do Nows"
examples:
Why is it important to ask questions as you read?
What kind reading strategies can you use while reading for Science?
How can you use parts of words to determine meaning?

-Observations
examples:
Nature walks
Teacher demos

-CER Practice and analysis
examples:
Identify and Label 3 parts of CER response

-Science Skills Practice
examples:
Rounding activity
Graph interpretation
Determining intervals
Hypothesis determination

LC Infusion Attachments

(Week 1, 1 Week)

5 ANNOTATING TIPS.docx
7th Black&White Research Based Paragraph Model.docx
7th Color-coded Research Based Paragraph Model.docx
Annotating a text.docx
Application of Prokaryotic & Eukaryotic Cells RBP.docx
CER Model Packet.docx
Compare and Contrast Prokaryotic and Eukaryotic Cells.docx
Prokaryotic & Eukaryotic Packet.pdf
Reading strategies.DOC
You Can Grow Your Intelligence Article.pdf
Cell Function RBP with PW.docx
Mitosis RST.doc
Persuasive Writing G.O..ppt
RST Graphic Organizer.docx
RST Prewrite .docx
RST RUBRIC(GIBSON).pdf
The FiveParagraph Essay Formula.docx
The Writing Process.docx

Body Systems RBP.docx
DNA Detective Sickle Cell Psycho.doc
GMO RST 7th.doc
GMO Soybean Info Graphic.docx
MAP for GMO RST.docx
Sickle Cell RBP.docx
Adaptations RBP Bird Beak.docx
Compost Prewrite.docx
Interactions Among Living Things with RBP.docx
CER Handout on what it is.docx
CER Model for 6th Grade.docx
Water Filtration sources:
https://www.jpl.nasa.gov/edu/teach/activity/water-filtration-challenge/
http://tryengineering.org/lessons/filtration.pdf
https://www.teachengineering.org/lessons/view/cub_enveng_lesson06
http://www.earthday.org/wp-content/uploads/5-8-Lesson-Plan1.pdf

You Are What You Drink NGSS Lesson Plan.docx

BIBLIOGRAPHY

TEXTBOOK

Ecology and the Environment, **Pearson Interactive Series, Pearson Education, Inc, Upper Saddle River, NJ., 2011**

Cells and Heredity, **Pearson Interactive Series, Pearson Education, Inc, Upper Saddle River, NJ., 2011**

The Diversity of Life, **Pearson Interactive Series, Pearson Education, Inc, Upper Saddle River, NJ., 2011**

Human Body Systems, **Pearson Interactive Series, Pearson Education, Inc, Upper Saddle River, NJ., 2011**

SUPPLEMENTAL TEXTBOOK MATERIALS

Ecology and the Environment Teacher's Edition

Cells and Heredity Teacher's Edition

The Diversity of Life Teacher's Edition

Human Body Systems 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

RESOURCES MYSCIENCEONLINE.COM Complete teacher access to textbook and all 12 modules

WEBSITES

Bill Nye the Science Guy http://www.nyelabs.com

Education World www.Educationworld.com

Environmental Education Network, The http://www.envirolink.org/enviroed/

Franklin Institute http://sln.fe.edu

Human Anatomy http://innerbody.com

"I Can Do That" www.eurekascience.com

Journey North http://www.learner.org/jnorth

Marine Life http://www.neaq.org

Mitosis/Meiosis-The Cell Cycle www.cellsalive.com

National Science Foundation http://www.nsf.gov/

National Science Teachers Association

(NSTA) Home Page http://www.nsta.org/

New Jersey State Department of Education Model Curriculum http://www.state.nj.us/education/aps/cccs/science/mc.htm

SciLinks (Holt, textbook links) www.scilinks.org

Blood Types HSTL555

Characteristics of Living Things HSTL030

Classification HSTL205

Lymphatic System HSTL565

Meiosis HSTL120

Respiratory System HSTL575

Urinary System HSTL590-595

Web Computer Lab: Bacteria HSTL230

Science Network http://www.sln.org/

Standards

Next Generation Science Standards (NGSS) http://www.state.nj.us/education/aps/cccs/science/

Tide Pools http://edweb.sdsu.edu/triton/tidepoolunit/tidepool/html

Sample WebQuests and WebQuest Resources:

WebQuest Rubric http://edweb.sdsu.edu/webquest/webquestrubric.html

Why WebQuest? Article http://www.ozline.com/webquests/intro.html