Englewood Public School District
Science
Grade 7
Fourth Marking Period

Unit 7: Interdependent Relationships in Ecosystems

Overview: Students build on their understandings of the transfer of matter and energy as they study patterns of interactions among organisms within an ecosystem. They consider biotic and abiotic factors in an ecosystem and the effects these factors have on a population. They construct explanations for the interactions in ecosystems and the scientific, economic, political, and social justifications used in making decisions about maintaining biodiversity in ecosystems. The crosscutting concept of *stability and change* provide a framework for understanding the disciplinary core ideas.

This unit includes a two-stage engineering design process. Students first evaluate different engineering ideas that have been proposed using a systematic method, such as a tradeoff matrix, to determine which solutions are most promising. They then test different solutions, and combine the best ideas into a new solution that may be better than any of the preliminary ideas. Students demonstrate grade appropriate proficiency in *asking questions*, *designing solutions*, *engaging in argument from evidence*, *developing and using models*, and *designing solutions*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Time Frame: 30 to 35 Days

Enduring Understandings:
Small changes in one part of an ecosystem might cause large changes in another part
The completeness, or integrity, of an ecosystem's biodiversity is often used as a measure of its health.

Essential Questions:
What happens to ecosystems when the environment changes?
How can a single change to an ecosystem disrupt the whole system?
What limits the number and variety of living things in an ecosystem/

Standards	Topics and Objectives	Activities	Resources	Assessments
(MS-LS2-4) Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	**Topics** Renewable Resources Environmental Issues Biodiversity	Students will complete the text activities: 1. Discover Activity - Can You Capture Solar Energy? 2. Lab - Cooking with Sunshine. 3. Discover Activity - Why Do They Fall?	**Text:** Prentice Hall Science Explorer: Environmental Science **Materials:** For Discover Activity - Can You Capture Solar Energy? • Water	**Formative Assessments:** • Journals • Learning/Response Logs • Discussions

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

(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-ETS1-3)
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.

Twenty-First Century Themes and Skills include:

- The Four C's
- Life and Career Skills
- Information and Media literacy
- Global Awareness
- Environmental Literacy

Objectives

Students will:

Construct an argument to support or refute an explanation for the changes to populations in an ecosystem caused by disruptions to a physical or biological component of that ecosystem.

Create design criteria for design solutions for maintaining biodiversity and ecosystem services.

4. Lab-Keeping Comfortable
5. Discover Activity - Which Bulb is More Efficient? t
6. Discover Activity - How Do You Decide?
7. Lab- Is Paper a Renewable Resource?
8. Discover Activity - What Happened to the Tuna?
9. Lab - Tree Cookie Tales
10. Discover Activity - How Much Variety is There?
11. Discover Activity - Birdseed Mining
12. Lab - Save That Soil
13. Discover Activity What's in the Trash?
14. Lab- Waste Away
15. Activity - How Acid is Your Rain?
16. Writing activity: radio public service ad for carbon monoxide or radon
17. Lab - How Does the Garden Grow?
18. Activity - Getting Clean
19. Lab- Concentrate on This!
20. Discover Activity - Can You Remove the Tea?

Students will view the video A Guide to the Energy of the Earth and complete an online assessment.
(MP.2, MS-ETS1-1, 6.1.8.C.4b)

Student will view the videos Plastic Pollution and Life Cycle of A Plastic Bottle engage in an online discussion about the issues.
(MS-ETS1-3, MS-LS2-4, WHST.6-8.1, RST.6-8.7,

- Graduated cylinder
- Clear plastic bags
- Paper pencils

For Lab - Cooking with Sunshine

- Scissors
- Glue
- 3 thermometers
- 3 dowels
- Tape
- Marshmallows
- 3 sheets of aluminum foil
- Watch
- 3 sheets of oak tag paper

For Discover Activity - Why Do They Fall?

- 15 dominoes

For Lab - Keeping Comfortable

- Watch
- Beakers
- Ice water
- Hot water
- Thermometers or temperature probes
- Containers and lids made of paper, plastic foam, plastic, glass and metal

For Discover Activity - Which Bulb is More Efficient?

- 60-watt incandescent light bulb
- 15-watt compact fluorescent bulb
- Thermometer

For Discover Activity - How Do You Decide?

Summative Assessments:
Unit quizzes and test

Students will receive a grade for analysis questions for the following labs: *Cooking with Sunshine, Keeping Comfortable, Is Paper a Renewable Resource?, Tree Cookie Tales, Save That Soil, Waste Away, How Does the Garden Grow?*, and *Concentrate on This!*
Discussion questions, Critiques, Rubric

Students' understanding will be gauged based on responses to online assessment and discussion after watching the following videos: *A Guide to the Energy of the Earth, Plastic Pollution, Life Cycle of A Plastic Bottle.*
Multiple choice, Self-Assessments, Polling

Benchmark Assessment:
Exact Path

Alternative Assessments:
Students will demonstrate engineering skills and an understanding of biodiversity by completing the *PBL Scenario.*
Peer Assessments, Diagnostic Tests, Simulations

Students will develop a

		9.2.8.B.3) Students will watch **5 Extremely Invasive Species** to introduce the *PBL Scenario*. Student will problem solve the *PBL Scenario:* You are a cargo inspection agent working in Guam to prevent the introduction of non-native species to your island. People coming into your territory often do not understand why you must spend so much time checking their cargo. Working in small groups, develop a public service announcement and media campaign to explain to the public how devastating the introduction of non-native species can be to an island ecosystem. Research how the region has been affected by invasive species. Connect with experts in the field to further your understandings. Use video clips, podcasts, and other authentic media to help explain the impact. Focus your message on how non-native species can become invasive and affect the biodiversity of the island. (8.2.8.B.4, 7.NS.A.1, 9.2.8.B.3) **Enrichment Activities:** Students will conduct Virtual Biodiversity Labs on Island Biogeography, Stream Diversity, and Plant Diversity. (MS-LS2-5)	• Paper • Pencil For Lab- Is Paper a Renewable Resource? • Newspaper • Eggbeater • Plastic wrap • Water • Screen • Square pan • Mixing bowl • Microscope • Microscope slide For Discover Activity - What Happened to the Tuna? • Data table • Paper • Pencil For Lab - Tree Cookie Tales • Tree cookies • Colored pencils • Metric ruler • Calculator • Hand lens For Discover Activity - How Much Variety is There? • Different kinds of seeds • Paper cups • Paper plates For Discover Activity - Birdseed Mining • Birdseed • Pans • Various size beads • Pencil • Paper	model that generates data for the iterative testing of competing design solutions. Model, Rubric, Charts, Data Tables, Graphs

		Students conduct hands on activities related to School Yard Biodiversity. (8.1.8.A.2, MP.2)	• Calculator For Lab - Save That Soil • Newspaper • 2 blocks • Loose soil • Water • Sod • "Rainmaker" • 2 unbreakable pans For Discover Activity What's in the Trash? • Plastic trash bag, • Pictures of most common household waste For Lab- Waste Away. • Measuring cup • Small pebbles • Plastic wrap • 5 rubber bands • Heavy duty plastic bag • Metric ruler • Cheesecloth Water • Red food coloring • Soil • Scissors • Newspaper • Tweezers • 12 sponges • 3 transparent, wide-mouth jars For Activity - How Acid is Your Rain? • Rainwater • Plastic cups • PH paper • Lemon juice

For Lab - How Does the Garden Grow?

- Plastic Petri dishes
- Wax pencil
- Potting soil
- Acid solution
- 20 radish seeds
- Oil solution
- Detergent solution
- Salt solution
- Day-old tap water
- Masking tape
- Metric ruler

For Activity - Getting Clean

- Graduated cylinder
- Water
- Food coloring
- Sugar
- Clear plastic cups

For Lab- Concentrate on This!

- 9 test tubes
- Water
- Test tube racks
- Food coloring
- 10-mL graduated cylinder

For Discover Activity - Can You Remove the Tea?

- Plastic cups
- Herbal tea
- Coffee filter
- Funnel
- Crushed charcoal

Websites:

- National Invasive Species Information Center

Videos:

		• A Guide to the Energy of the Earth • Plastic Pollution • Life Cycle of A Plastic Bottle • **5 Extremely Invasive Species** **Enrichment Lesson Plans:** See Virtual Biodiversity Labs See School Yard Biodiversity

Accommodations and Modifications:

Students with special needs: Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

ELL/ESL students: Students will be supported according to the recommendations for "can do's" as outlined by WIDA – https://www.wida.us/standards/CAN_DOs/
This particular unit has limited language barriers due to the physical nature of the curriculum.

Students at risk of school failure: Formative and summative data will be used to monitor student success at first signs of failure student work will be Reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations. More time and will be made available with a certified instructor to aid students in reaching the standards.

Gifted and Talented Students: Students excelling in mastery of standards will be challenged with complex, high level challenges related to the complexity In planning and carrying out investigations and analyzing and interpreting data.

English Language Learners	Special Education	At-Risk	Gifted and Talented
• Provide ELL students with multiple literacy strategies. • Provide a computer for written work • Speak and display terminology • Teacher modeling • Peer modeling • Word walls • Use peer readers • Give page numbers to help the students find answers • Provide two sets of textbooks, one for home and one for school • Provide visual aides • Provide additional time to complete a task • Use graphic organizers	• Use multi-sensory teaching approaches. • Utilize modifications & accommodations delineated in the student's IEP • Work with paraprofessional • Work with a partner • Provide concrete examples • Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA). • Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).	• Provide a computer for written work • Using visual demonstrations, illustrations, and models • Give directions/instructions verbally and in simple written format. Oral prompts can be given. • Peer Support • Increase one on one time • Teachers may modify instructions by modeling what the student is expected to do • Instructions may be printed out in large print and hung up for the student to see during the time of the lesson. • Review behavior expectations and make adjustments for personal space or other behaviors as needed. • Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).	• Use project-based science learning to connect science with observable phenomena. • Real world scenarios • Curriculum compacting • Inquiry-based instruction • Independent study • Higher order thinking skills • Adjusting the pace of lessons • Interest based content • Student Driven Instruction • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Structure the learning around explaining or solving a social or community-based issue. • Collaborate with after-school programs or clubs to extend learning opportunities.

Interdisciplinary Connections:

ELA-NJSLS/ELA:

WHST.6-8.1: Write arguments to support claims with clear reasons and relevant evidence. (MS-LS2-4),(MS-ETS1-1),(MS-ETS1-3)

WHST.6-8.2: Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-LS2-2)

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). (MS-ETS1-3)

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. (MS-ETS1-1)

WHST.6-8.9: Draw evidence from literary or informational texts to support analysis, reflection, and research. (MS-LS2-2),(MS-LS2-4),(MS-ETS1-3), (MS-ETS1-2)

Mathematics:
MP.2: Reason abstractly and quantitatively**.** (7-ESS1-1), (7-ESS1-2)
7.NS.1: Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

Career Ready Practices:
CRP4: Communicate clearly and effectively and with reason.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
CRP6: Demonstrate creativity and innovation.

Social Studies:
6.1.8.C.4b: Explain how major technological developments revolutionized land and water transportation, as well as the economy, in New Jersey and the nation.

Integration of Technology Standards NJSLS 8:
8.2.8.B.4: Research examples of how humans can devise technologies to reduce the negative consequences of other technologies and present your findings.
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**.**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Engaging in Argument from Evidence • Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an	**LS2.C: Ecosystem Dynamics, Functioning, and Resilience** • Ecosystems are dynamic in nature; their characteristics can vary over time.	**Stability and Change** • Small changes in one part of a system might cause large changes in another part. (MS-LS2-4),(MS-LS2-5)

explanation or a model for a phenomenon or a solution to a problem. (MS-LS2-4)

- Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-LS2-5)

Asking Questions and Defining Problems

- Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. (MS-ETS1-1)

Developing and Using Models

- Develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs. (MS-ETS1-4)

Analyzing and Interpreting Data

- Analyze and interpret data to determine similarities and differences in findings. (MS-ETS1-3)

Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (MS-LS2-4)

- Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. (MS-LS2-5)

LS4.D: Biodiversity and Humans

- Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (secondary to MS-LS2-5)

ETS1.B: Developing Possible Solutions

- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.*(secondary to MS-LS2-5)*

ETS1.A: Defining and Delimiting Engineering Problems

- The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1)

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)
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-2), (MS-ETS1-3)

Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World

- The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. (MS-LS2-5)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-LS2-3)

Scientific Knowledge is Based on Empirical Evidence

- Science disciplines share common rules of obtaining and evaluating empirical evidence. (MS-LS2-4)

Science Addresses Questions About the Natural and Material World

- Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-LS2-5)

	• Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3) • Models of all kinds are important for testing solutions. (MS-ETS1-4) **ETS1.C: Optimizing the Design Solution** • Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design. (MS-ETS1-3)	

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Unit 8: Living Things and Body Systems

Overview: Students develop a basic understanding of the needs of living things, the role of cells in body systems, and how those systems work to support the life functions of the organism. Students will construct explanations for the interactions of systems in cells and organisms. Students understand that special structures are responsible for particular functions in organisms, and that for many organisms, the body is a system of multiple-interaction subsystems that form a hierarchy, from cells to the body. Students construct explanations for the interactions of systems in cells and organisms and for how organisms gather and use information from the environment. The crosscuttings concepts of *systems and system models* and *cause and effect* provide a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in *engaging in argument from evidence* and *obtaining, evaluating, and communicating information*. Students use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.

Time Frame: 15 to 20 Days

Enduring Understandings:
In multicellular organisms, the body is a system of multiple, interacting subsystems.
Cause-and-effect relationships may be used to predict response to stimuli in natural systems.

Essential Questions:
What are humans made of?
What is the evidence that a body is actually a system of interacting subsystems composed of groups of interacting cells?
How do organisms receive and respond to information from their environment?

Standards	Topics and Objectives	Activities	Resources	Assessments
(MS-LS1-3) **Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.** **(MS-LS1-8)** **Gather and synthesize**	**Topics** Characteristics of Living Things Stimulus/Response Body Systems Twenty-First Century Themes and Skills include:	Students will complete the text activities: 1. Is it alive? How do you know? Discussions and Demonstrations 2. Activity (p8) React! Students will view 5 Weird Involuntary Reflexes Explained to introduce the idea of stimulus/response.	**Text:** Prentice Hall Science Explorer: From Bacteria to Plants **Materials:** For Activity (p8) React! • Lemon Slices • Small Mirror **Websites:**	**Formative Assessments:** • Journals • Learning/Response Logs • Discussions • Student needs will be assessed based on responses to the From Cells to Tissues to

information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.	• The Four C's • Life and Career Skills • Information and Media literacy **Objectives** Students will: Explore sensory responses to stimuli. Use an oral and written argument supported by evidence to support or refute an explanation or a model of how the body is a system of interacting subsystems composed of groups of cells.	(7.SP.C.7, 6.1.8.C.4c, WHST.6-8.1) Students will model how the body is a system of interacting subsystems by completing the lesson From Cells to Tissues to Organs. (MS-LS1-3, 8.1.8.A.2) Students will explore body systems by visiting the website Study Jams – Human Body and Senses. (MS-LS1-8) Students will complete the Human Body 2.0 Project. (CRP4, RST.6-8.1) **Enrichment Activity:** Students will conduct an exploration of Animal Communication and discuss how animals adapt and respond to their surroundings. (WHST.6-8.8)(9.2.8.B.3)	• From Cells to Tissues to Organs • Study Jams – Human Body and Senses • Human Body 2.0 Project • Interactive Human Body **Videos:** • 5 Weird Involuntary Reflexes Explained **Enrichment Lesson Plans:** See Animal Communication **Additional Resources:** https://thisreadingmama.com/human-body-books-kids/ https://www.storyjumper.com/book/index/5033272/Human-Body-System	Organs activity. **Summative Assessments:** Unit quizzes and test Student understanding of the human body as a connected system will be demonstrated by the completion of the Human Body 2.0 Project. Drawings, Visual Representations, Rubrics, Diagnostic Tests **Benchmark Assessment:** See Unit 7 for quarterly assessment **Alternative Assessments:** Students will gather, read, and synthesize information from multiple appropriate sources about sensory receptors' response to stimuli. Think Pair Share, Journals Students will write arguments, supported by evidence, for how the body is a system of interacting subsystems composed of groups of cells. Projects, Short answer essays

Accommodations and Modifications:

Students with special needs: Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning.
The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

ELL/ESL students: Students will be supported according to the recommendations for "can do's" as outlined by WIDA –

https://www.wida.us/standards/CAN_DOs/
This particular unit has limited language barriers due to the physical nature of the curriculum.

Students at risk of school failure: Formative and summative data will be used to monitor student success at first signs of failure student work will be Reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations. More time and will be made available with a certified instructor to aid students in reaching the standards.

Gifted and Talented Students: Students excelling in mastery of standards will be challenged with complex, high level challenges related to the complexity In planning and carrying out investigations and analyzing and interpreting data.

English Language Learners	**Special Education**	**At-Risk**	**Gifted and Talented**
● Speak and display terminology ● Teacher modeling ● Peer modeling ● Provide ELL students with multiple literacy strategies. ● Word walls ● Use peer readers ● Give page numbers to help the students find answers ● Provide a computer for written work ● Provide two sets of textbooks, one for home and one for school ● Provide visual aides ● Provide additional time to complete a task ● Use graphic organizers	● Utilize modifications & accommodations delineated in the student's IEP ● Work with paraprofessional ● Use multi-sensory teaching approaches. ● Work with a partner ● Provide concrete examples ● Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA). ● Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia,	● Using visual demonstrations, illustrations, and models ● Give directions/instructions verbally and in simple written format. Oral prompts can be given. ● Peer Support ● Increase one on one time ● Teachers may modify instructions by modeling what the student is expected to do ● Instructions may be printed out in large print and hung up for the student to see during the time of the lesson. ● Review behavior expectations and make adjustments for personal space or other behaviors as needed. ● Structure lessons around questions that are authentic, relate to students' interests, social/family background	● Curriculum compacting ● Inquiry-based instruction ● Independent study ● Higher order thinking skills ● Adjusting the pace of lessons ● Interest based content ● Real world scenarios ● Student Driven Instruction ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Use project-based science learning to connect science with observable phenomena. ● Structure the learning around explaining or solving a social or community-based issue. ● Collaborate with after-school programs or clubs to extend learning opportunities.

	modeling).	and knowledge of their community. • Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).	

Interdisciplinary Connections:

ELA-NJSLS/ELA:

RST.6-8.1: Cite specific textual evidence to support analysis of science and technical texts. (MS-LS1-3)

RI.6.8: Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.(MS-LS1-3)

WHST.6-8.1: Write arguments focused on discipline content. (MS-LS1-3)
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.(MS-LS1-8)

Mathematics:
7.SP.C.7: Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

Career Ready Practices:
CRP4: Communicate clearly and effectively and with reason.

Integration of 21st Century Standards NJSLS 9:
9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

Integration of Technology Standards:
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**.**

Social Studies:
6.1.8.C.4c: Analyze how technological innovations affected the status and social class of different groups of people, and explain the outcomes that resulted.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Obtaining, Evaluating, and Communicating Information • Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (MS-LS1-8) **Engaging in Argument from Evidence** • Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. (MS-LS1-3)	**LS1.A: Structure and Function** • In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (MS-LS1-3) **LS1.D: Information Processing** • Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (MS-LS1-8)	**Systems and System Models** • Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3) **Cause and Effect** • Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8) --- ***Connections to Nature of Science*** **Science is a Human Endeavor** • Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (MS-LS1-3)