East Newark Public School

Science Curriculum
Grade 6

Revised 2022

Equity Statement:

East Newark Public School District does not discriminate on the basis of race, color, creed, religion, sex, ancestry, or national origin. The East Newark Board of Education ensures that all students enrolled in the schools of this district shall be afforded equal educational opportunities in strict accordance with the law. No student shall be denied access to or benefit from any educational program or activity on the basis of the student's race, color, creed, religion, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, gender identity or expression, socioeconomic status, or disability. The Board directs the Superintendent to allocate faculty, administrators, support staff members, curriculum materials, and instructional equipment supplies among classes of this district in a manner that ensures equivalency of educational opportunity throughout this district. The school district's curricula will eliminate discrimination, promote mutual acceptance and respect among students, and enable students to interact effectively with others, regardless of race, color, creed, religion, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, gender identity or expression, socioeconomic status, or disability.

Course Description:

The East Newark Public School sixth grade science program is designed to introduce and develop a foundation in science through three major units of study. Students will gain an understanding of many important areas of Life, Earth, and Physical Sciences, and will utilize and understand scientific processes. All courses are designed to prepare students for The New Jersey Student Learning Assessment in Science, their middle school science courses, and for solving simple scientific problems and issues in their everyday lives.

The material is presented at a moderate pace and can be adjusted for various levels taught. Lessons are based on discussions and student- driven activities. Hands-on activities are meant to show connections to real-life science applications, and to promote critical thinking and problem solving skills. Students who are placed in this course based on ESL placement will also receive appropriate accommodations based upon their ESL level. Students receiving Special Education services will receive modifications and accommodations to information and assessments as indicated in their Individual Education Plan.

Course Modifications:
The course instructor will determine, with the assistance of administrators, teacher assistants/aides, educational specialists, and/or special education teachers, what modifications will be made for his/her students. Such examples of modifications can include, but not be limited to:

- Extended time as needed
- Modification of tests and quizzes
- Preferential seating
- Alternative/Formative assessment (projects)
- Effective teacher questioning (ranging from simple recall to higher order critical thinking questions)
- Supplemental materials
- Cooperative learning
- Teacher tutoring
- Peer tutoring
- Differentiated Instruction

Best Practices:

Best practices come from research-based, effective methodologies in presenting material in a manner to engage all students in the learning process. Thorough planning and collaborative discussions about instructional practices are part of the ongoing practice of teachers. Student activities and practices that reflect effective methodology include, but are not limited to, providing students with:

- Regular opportunities to investigate topics in depth
- The ability to exercise choice and responsibility by choosing their own topics
- Opportunities for active participation in the classroom and the community
- Exploration of open-ended questions that challenge their thinking
- Opportunities for reading, writing, observing, discussing, and debating ideas
- Activities that include independent inquiry and cooperative learning
- Assessment of student learning that promotes lifelong responsible citizenship rather than the sole memorization of facts

Strategies and tools to read and comprehend informational text

Grade 6 Scope and Sequence:

Unit	Estimated Pacing
Exploring Life	10 Weeks
Exploring Earth	5 Weeks
Exploring Energy	5 Weeks

Marking Period	Unit Title	Recommended Instructional Days
1	Exploring Life	Approximately 10 weeks

NJSLS - Science: *TItle*	NJSLS - Science: *Performance Expectations*	Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-S within Unit
From Molecules to Organisms: Structures and Processes	• **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. • **MS-LS1-4:** Use arguments 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-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.	**Essential Question/s:** 1. What are living things and what do they need? 2. How do the parts of a cell work together to enable it to survive? 3. How is the classification of living things related to the structure of their cells? 4. How do inherited traits become adaptations? 5. How do environmental and genetic factors influence the growth of organisms? 6. What structures help ensure the survival of plants, and what is the function of each? 7. How do living things interact with each other and the environment? 8. What effect does resource availability have on organisms and populations of organisms in an ecosystem? 9. What are the requirements of living things? 10. How do organisms compete for resources? 11. What is the effect of predators in an ecosystem? 12. What are the mutually beneficial relationships in an ecosystem? 13. How is matter and energy transferred in food webs? 14. What is the relationship among producers, consumers, and decomposers? **Activity Description**: • Use a graphic organizer to describe the six characteristics of all living things. • Learn the functions of the parts of a cell - label plant and animal cells appropriately with descriptions. • Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. • Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
Ecosystems: Interactions, Energy, and Dynamics	• **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.	
FOUNDATION Disciplinary: *Core Idea*	**FOUNDATION Disciplinary: *Statement***	
LS1.A: Structure and Function	All living things are made up of cells, which is the smallest unit that can be said to be	

	alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).	● Use light microscopes to observe the features of plant and animal cells. ● Choose an ecosystem and draw a picture (with labels) of biotic and abiotic factors. ● Identify the characteristics of mammals and determine if they are common to all mammals. ● Learn how animal species are adapted to their environments. Choose one animal to investigate and create a GoogleSlides Presentation. ● Dissect owl pellets; learn about owl adaptations. ● Determine how a plant's structure determines its survival. Create a GoogleSlides Presentation that discusses two plants and how their structure and adaptations help it to survive. ● Use a Venn Diagram to describe how different plants are alike and different. ● Define what inheritance means as it relates to traits and how environmental factors influence traits. Create a chart of inherited vs. acquired traits. ● Learn about genetic mutations and analyze how they lead to variations in populations. ● Battle of the beaks game - simulation of variation in traits. ● Analyze how the availability of resources determines population size - Roadrunners and coyotes demonstration. ● Use a graphic organizer to differentiate between mutualism, commensalism, and parasitism. ● Use a graphic organizer to differentiate between producers, consumers, decomposers. ● Draw your own food chain and then work in small groups to make a food web out of the individual food chains. ● 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. ● 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. **Interdisciplinary Connections: Content: ;NJSLS#:** ELA/Literacy - ● RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. (MS-LS1-6)
LS1.B: Growth and Development of Organisms	● Animals engage in characteristic behaviors that increase the odds of reproduction. ● Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction.	
LS1.C: Organization for Matter and Energy Flow in Organisms	Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use.	
PS3.D: Energy in Chemical Processes and Everyday Life	The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen. (secondary)	
LS2.A: Interdependent Relationships in Ecosystems	● Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. ● In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. ● Growth of organisms and population increases are limited by access to resources.	
FOUNDATION **Science and Engineering Practices:** ***Core Idea***	**FOUNDATION** **Science and Engineering Practices:** ***Statement***	

Planning and Carrying Out Investigations	Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation.
Engaging in Argument from Evidence	Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.
Constructing Explanations and Designing Solutions	Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
Analyzing and Interpreting Data	Analyze and interpret data to provide evidence for phenomena
FOUNDATION **Crosscutting Concepts:** ***Core Idea***	**FOUNDATION** **Crosscutting Concepts:** ***Statement***
Scale, Proportion, and Quantity	Phenomena that can be observed at one scale may not be observable at another scale.
Cause and Effect	Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.
Energy and Matter	Within a natural system, the transfer of energy drives the motion and/or cycling of matter.
Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***
• Self-Awareness • Self-Management • Responsible Decision Making • Social Awareness • Relationship Skills	• Emotional Awareness • Internal Regulation • Behavior Control • Goal Persuance • Appreciating Social and Environment Diversity

- 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. (MS-LS1-6)
- 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-LS1-6)
- 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-LS2-1)
- WHST.6-8.9 - Draw evidence from informational texts to support analysis, reflection, and research. (MS-LS1-6)

Mathematics -

- 6.SP.A.2 - Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. (MS-LS1-5)
- 6.SP.B.4 - Summarize numerical data sets in relation to their context. (MS-LS1-5)
- 6.EE.C.9 - Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (MS-LS1-1)

Technology -

- 8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.
- 8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).

• Motivation	• Adaptive Behavior • Communication • Social Engagement • Constructive Thinking • Consequence Evaluation • Respect for Self and Others • Enthusiasm • Initiative • Resilience	

Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
<u>Formative Assessments:</u> • Participation in class discussions/debates • Exit tickets • Quizzes • In-class assignments/activities • Presentations • Group assignments • IXL results	**<u>Benchmarks:</u>** • CER assignments **<u>Summative Assessments:</u>** • Unit test • Unit project • Lab activities

Differentiated Student Access to Content:
Teaching and Learning *Resources/Materials*

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**

• iScience (Frog) Textbook
  ○ Chapter 6, Lessons 1-2
  ○ Chapter 7, Lessons 1-2
  ○ Chapter 8, Lessons 1-3
  ○ Chapter 10, Lessons 1-3
• Teacher created reading guides and presentations
	• Modified/leveled readings from iScience (Frog) Textbook
	  ○ Chapter 6, Lessons 1-2
	  ○ Chapter 7, Lessons 1-2
	  ○ Chapter 8, Lessons 1-3
	  ○ Chapter 10, Lessons 1-3
	• Teacher created reading guides and presentations
		• Translated and modified readings from iScience (Frog) Textbook
		  ○ Chapter 6, Lessons 1-2
		  ○ Chapter 7, Lessons 1-2
		  ○ Chapter 8, Lessons 1-3
		  ○ Chapter 10, Lessons 1-3
		• Translated teacher created reading guides and presentations
			• iScience (Frog) Textbook
			  ○ Chapter 6, Lessons 1-2
			  ○ Chapter 7, Lessons 1-2
			  ○ Chapter 8, Lessons 1-3
			  ○ Chapter 10, Lessons 1-3
			• Teacher created reading guides and presentations

Supplemental Resources

- Chromebooks
- SmartBoard
- IXL
- Teacher Online Resources
- Newsela.com
- Quizlet

- Kahoot
- Applicable educational videos
- https://www.cellsalive.com/
- http://www.biology4kids.com/index.html
- Cells Rap
- https://www.ngssphenomena.com/
- Owl pellets and dissection tools

Differentiated Student Access to Content:
Recommended *Strategies & Techniques*

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**
• Encourage creative expression and thinking by allowing students to choose how to approach a problem or assignment. • Jigsaws • Think-Pair-Share • Boost engagement with material by providing opportunities of differentiation, group work and alternative assignments/assessments where appropriate • Provide feedback utilizing a growth mindset and praise what is done correctly based upon effort, attitude and strategy.	• Provide graphic organizers for additional support or encourage students to create digital multimedia to showcase knowledge. • Use prompts and model directions • Provide opportunities to model talk during read alouds, and scaffold talk during whole class and small group discussions • Extended time for revisions or opportunity to identify and develop areas of personal interest	• Utilize visual supports and graphic organizers • Use prompts and model directions • Provide opportunities to model talk during read alouds, and scaffold talk during whole class and small group discussions • Device used for translation purposes • Provide additional wait time for student responses to questions to allow students the ability to undergo the process of translation between languages, composition of response and attempted response.	• Encourage students to explore concepts in depth and encourage independent studies or investigations. • Modeling or independent student-led research • Use of higher leveled text and/or writing assignments • Utilize differentiation in the areas of acceleration, enrichment, and grouping

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS

Disciplinary Concept:

Core Ideas:	Information and Media Literacy
Performance Expectation/s:	• **9.4.8.IML.7**: Use information from a variety of sources, contexts, disciplines, and cultures for a specific purpose. • **9.4.8.IML.12**: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.

Career Readiness, Life Literacies, & Key Skills Practices

- Act as a responsible and contributing community members and employee.
- Attend to financial well-being.
- Consider the environmental, social and economic impacts of decisions.

	• Demonstrate creativity and innovation. • Utilize critical thinking to make sense of problems and persevere in solving them. • Model integrity, ethical leadership and effective management • Plan education and career paths aligned to personal goals. • Use technology to enhance productivity increase collaboration and communicate effectively. • Work productively in teams while using cultural/global competence.

Marking Period	**Unit Title**	**Recommended Instructional Days**
2	Exploring Earth	Approximately 5 weeks

NJSLS - Science: ***TItle***	**NJSLS - Science:** ***Performance Expectations***	**Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-S within Unit**
Earth's Systems	• **MS-ESS2-1**: Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. • **MS-ESS2-2**: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. • **MS-ESS2-4**: Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. • **MS-ESS2-5**: Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. • **MS-ESS2-6**: Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	**Essential Question/s:** 1. What are the composition and the structure of the atmosphere? 2. How is water distributed in the hydrosphere? 3. What are Earth systems? 4. What are the composition and the structure of the geosphere? 5. How does the water cycle show interactions of Earth systems? 6. How does weather show interactions of Earth systems? 7. What factors interact and influence weather and climate? 8. How does the motion of air masses influence the weather? 9. How does the atmosphere affect weather patterns? 10. How can the weather be predicted? 11. How does the ocean influence weather? 12. What causes seasons on Earth? 13. How do solar and lunar eclipses differ? 14. How does gravity influence the shape and the motion of objects in the solar system? 15. What objects are in the solar system? 16. How does Earth compare with other objects in the solar system? 17. What are stars? 18. How does the Sun compare to other stars? 19. Where is Earth located in the universe? 20. How is the universe structured?
Earth's Place in the Universe	• **MS-ESS1-1:** Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar	

	phases, eclipses of the sun and moon, and seasons. ● **MS-ESS1-2**: Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. ● **MS-ESS1-3**: Analyze and interpret data to determine scale properties of objects in the solar system.	**Activity Description**: ● Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. ● Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. ● Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. ● Essay: Severe Weather ● MiniLab: How do plants contribute to the water cycle? (iScience pg. 89) ● Research Essay: Severe Weather ● Create a foldable to demonstrate understanding of the position of the Sun and Earth during each season. ● MiniLab: What causes eclipses? ● Green Science: Tidal Energy Research (iScience pg. 49) ● Use a Venn Diagram to compare and contrast characteristics of the inner and outer planets. ● Use a Venn Diagram to compare and contrast the Sun and other stars. ● MiniLab: How does mass affect a star? ● Lab: Planetary Revolutions (iScience pg. 64-65) ● Create a foldable to detail the characteristics of Earth's systems. ● MiniLab: What makes the geosphere unique (iScience pg. 82) ● How it works: Desalination (iScience pg. 85) **Interdisciplinary Connections: Content: ;NJSLS#:** ELA/Literacy - ● SL.8.5 - Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.(MS-ESS2-1) ● RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS2-5) ● 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-ESS1-3) ● 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. (MS-ESS2-
FOUNDATION **Disciplinary:** ***Core Idea***	**FOUNDATION** **Disciplinary:** ***Statement***	
ESS2.A: Earth's 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. ● The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future.	
ESS2.C: The Roles of Water in Earth's Surface Processes	● Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. ● Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. ● Global movements of water and its changes in form are propelled by sunlight and gravity. ● The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and	

	currents, are major determinants of local weather patterns. ● Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.	● 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-ESS2-5) ● WHST.6-8.9 - Draw evidence from informational texts to support analysis, reflection, and research. (MS-LS1-6) Mathematics - ● MP.2 - Reason abstractly and quantitatively. (MS-ESS2-5) ● MP.4 - Model with mathematics. (MS-ESS1-1) ● 6.NS.C.5 - Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (MS-ESS2-5) ● 6.RP.A.1 - Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (MS-ESS1-1) ● 6.EE.B.6 - Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (MS-ESS1-2) Technology - ● 8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem. ● 8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
ESS2.D: Weather and Climate	● Because these patterns are so complex, weather can only be predicted probabilistically. ● Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. ● The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents.	
ESS1.A: The Universe and Its Stars	● Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models. ● Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe.	
ESS1.B: Earth and the Solar System	● This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year. ● 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.	

	● The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. ● 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.	
FOUNDATION **Science and Engineering Practices:** ***Core Idea***	**FOUNDATION** **Science and Engineering Practices:** ***Statement***	
Developing and Using Models	● Develop and use a model to describe phenomena. ● Develop a model to describe unobservable mechanisms.	
Constructing Explanations and Designing Solutions	Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe nature operate today as they did in the past and will continue to do so in the future.	
Planning and Carrying Out Investigations	Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions.	
Analyzing and Interpreting Data	Analyze and interpret data to determine similarities and differences in findings.	
FOUNDATION **Crosscutting Concepts:** ***Core Idea***	**FOUNDATION** **Crosscutting Concepts:** ***Statement***	
Stability and Change	Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale.	
Scale Proportion and Quantity	Time, space, and energy phenomena can be observed at various scales using models	

	to study systems that are too large or too small.	
Energy and Matter	Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter.	
Cause and Effect	Cause and effect relationships may be used to predict phenomena in natural or designed systems.	
Systems and System Models	Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems.	
Patterns	Patterns can be used to identify cause-and-effect relationships.	
Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***	
● Self-Awareness ● Self-Management ● Responsible Decision Making ● Social Awareness ● Relationship Skills ● Motivation	● Emotional Awareness ● Internal Regulation ● Behavior Control ● Goal Persuance ● Appreciating Social and Environment Diversity ● Adaptive Behavior ● Communication ● Social Engagement ● Constructive Thinking ● Consequence Evaluation ● Respect for Self and Others ● Enthusiasm ● Initiative ● Resilience	
Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***		**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
<u>Formative Assessments:</u> ● Participation in class discussions/debates ● Exit tickets ● Quizzes		**<u>Benchmarks:</u>** ● CER assignments **<u>Summative Assessments:</u>**

• In-class assignments/activities • Presentations • Group assignments • IXL results	• Unit test • Unit project • Lab activities • Essay

Differentiated Student Access to Content:
Teaching and Learning *Resources/Materials*

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**

• iScience (Frog) Textbook
  ○ Chapter 2, Lessons 1-3
  ○ Chapter 3, Lessons 1-2
• CK12 Online resources
• Teacher created reading guides and presentations
	• Modified/leveled readings from iScience (Frog) Textbook
	  ○ Chapter 2, Lessons 1-3
	  ○ Chapter 3, Lessons 1-2
	• CK12 Online resources
	• Teacher created reading guides and presentations
		• Translated and modified readings from iScience (Frog) Textbook
		  ○ Chapter 2, Lessons 1-3
		  ○ Chapter 3, Lessons 1-2
		• Translated CK12 articles
		• Translated teacher created reading guides and presentations
			• iScience (Frog) Textbook
			  ○ Chapter 2, Lessons 1-3
			  ○ Chapter 3, Lessons 1-2
			• CK12 Online resources
			• Teacher created reading guides and presentations

Supplemental Resources

- Chromebooks
- SmartBoard
- IXL
- Teacher Online Resources
- Newsela.com
- Quizlet
- Kahoot
- https://www.ngssphenomena.com/
- https://gpm.nasa.gov/education/weather-climate
- https://www.nsta.org/topics/climate-change
- Applicable educational videos

Differentiated Student Access to Content:
Recommended *Strategies & Techniques*

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**
• Encourage creative expression and thinking by allowing students to choose how to approach a problem or assignment. • Jigsaws • Think-Pair-Share	• Provide graphic organizers for additional support or encourage students to create digital multimedia to showcase knowledge. • Use prompts and model directions • Provide opportunities to model talk	• Utilize visual supports and graphic organizers • Use prompts and model directions • Provide opportunities to model talk during read alouds, and scaffold talk	• Encourage students to explore concepts in depth and encourage independent studies or investigations. • Modeling or independent student-led research

• Boost engagement with material by providing opportunities of differentiation, group work and alternative assignments/assessments where appropriate • Provide feedback utilizing a growth mindset and praise what is done correctly based upon effort, attitude and strategy.	during read alouds, and scaffold talk during whole class and small group discussions • Extended time for revisions or opportunity to identify and develop areas of personal interest	during whole class and small group discussions • Device used for translation purposes • Provide additional wait time for student responses to questions to allow students the ability to undergo the process of translation between languages, composition of response and attempted response.	• Use of higher leveled text and/or writing assignments • Utilize differentiation in the areas of acceleration, enrichment, and grouping

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept:**	
	Core Ideas:	Information and Media Literacy
	Performance Expectation/s:	• **9.4.8.IML.7**: Use information from a variety of sources, contexts, disciplines, and cultures for a specific purpose. • **9.4.8.IML.12**: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.
	Career Readiness, Life Literacies, & Key Skills Practices	
	• Act as a responsible and contributing community members and employee. • Attend to financial well-being. • Consider the environmental, social and economic impacts of decisions. • Demonstrate creativity and innovation. • Utilize critical thinking to make sense of problems and persevere in solving them. • Model integrity, ethical leadership and effective management • Plan education and career paths aligned to personal goals. • Use technology to enhance productivity increase collaboration and communicate effectively. • Work productively in teams while using cultural/global competence.	

<table>
<tr><th>Marking
Period</th><th colspan="2">Unit
Title</th><th>Recommended
Instructional Days</th></tr>
<tr><td>2</td><td colspan="2">Exploring Energy</td><td>Approximately 5 weeks</td></tr>
<tr><th>NJSLS - Science:
TItle</th><th colspan="2">NJSLS - Science:
Performance Expectations</th><th>Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-S within Unit</th></tr>
<tr><td>Energy</td><td colspan="2">● MS-PS3-1: Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
● MS-PS3-2: Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
● MS-PS3-4: Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.
● MS-PS3-5: Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.</td><td rowspan="3"><u>Essential Question/s:</u>
1. What is energy?
2. What is potential and kinetic energy?
3. How is energy related to work?
4. What are the different forms of energy?
5. What are waves, and how are waves produced?
6. How can you describe waves by their properties?
7. What are some ways in which waves interact with matter?
8. How does light differ from other forms of electromagnetic waves?
9. What are some ways in which light interacts with matter?
10. How do eyes change light waves into the images you see?

<u>Activity Description</u>:
● Create a foldable to differentiate between the different forms of matter.
● MiniLab: Can a moving object do work?
● Skill Practice: Can you identify potential and kinetic energy? (iScience pg. 427)
● LaunchLab: Is energy lost when it changes form? (iScience pg. 429)
● Use a Venn Diagram to compare and contrast potential and kinetic energy?
● Green Science: Fossil Fuels and Rising CO2 (iScience pg. 435)
● Compare and contrast types of waves.
● Use a graphic organizer to describe the ways in which waves interact with matter.
● Green Science: Light (iScience pg. 468)
● LaunchLab: How can you change the sound of a straw?

Interdisciplinary Connections: Content: ;NJSLS#:

ELA/Literacy -
● RST.6-8.1- Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. (MS-PS3-1)</td></tr>
<tr><td>Waves and their Applications in Technologies for Information Transfer</td><td colspan="2">● MS-PS4-1: Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
● MS-PS4-2: Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.</td></tr>
<tr><td>FOUNDATION
Disciplinary:
Core Idea</td><td colspan="2">FOUNDATION
Disciplinary:
Statement</td></tr>
</table>

PS3.A: Definitions of Energy	• Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed. • A system of objects may also contain stored (potential) energy, depending on their relative positions. • Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present.	• 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-PS3-1) • SL.8.5 - Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-PS3-2) • RST.6-8.3 - Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (MS-PS3-4) • WHST.6-8.1 - Write arguments focused on discipline content. (MS-PS3-5) • 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. (MS-PS3-4) Mathematics - • MP.2 - Reason abstractly and quantitatively. (MS-PS3-1) • MP.4 - Model with mathematics. (MS-PS4-1) • 6.RP.A.1 - Understand the concept of ratio and use ratio language to describe a ratio relationship between two quantities. (MS-PS3-5) • 6.RP.A.2 - Understand the concept of a unit rate a/b associated with a ratio a:b with $b \neq 0$, and use rate language in the context of a ratio relationship. (MS-PS3-1) • 6.RP.A.3 - Use ratio and rate reasoning to solve real-world and mathematical problems. (MS-PS4-1) • 6.SP.B.5 - Summarize numerical data sets in relation to their context. (MS-PS3-4) Technology - • 8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem. • 8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
PS3.B: Conservation of Energy and Energy Transfer	• The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment. • When the motion energy of an object changes, there is inevitably some other change in energy at the same time.	
PS3.C: Relationship Between Energy and Forces	When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object.	
PS4.A: Wave Properties	• A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude. • A sound wave needs a medium through which it is transmitted.	
PS4.B: Electromagnetic Radiation	• When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material and the frequency (color) of the light. • The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends. • A wave model of light is useful for explaining brightness, color, and the frequency-dependent bending of light at a surface between media.	

	● However, because light can travel through space, it cannot be a matter wave, like sound or water waves.	
FOUNDATION **Science and Engineering Practices:** ***Core Idea***	**FOUNDATION** **Science and Engineering Practices:** ***Statement***	
Analyzing and Interpreting Data	Construct and interpret graphical displays of data to identify linear and nonlinear relationships.	
Developing and Using Models	● Develop a model to describe unobservable mechanisms. ● Develop and use a model to describe phenomena.	
Planning and Carrying Out Investigations	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.	
Scale, Proportion, and Quantity	Proportional relationships (e.g. speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes.	
Engaging in Argument from Evidence	Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon.	
Using Mathematics and Computational Thinking	Use mathematical representations to describe and/or support scientific conclusions and design solutions.	
FOUNDATION **Crosscutting Concepts:** ***Core Idea***	**FOUNDATION** **Crosscutting Concepts:** ***Statement***	
Scale, Proportion, and Quantity	Proportional relationships (e.g. speed as the ratio of distance traveled to time taken) among different types of quantities	

	provide information about the magnitude of properties and processes.	
Systems and System Models	Models can be used to represent systems and their interactions – such as inputs, processes, and outputs – and energy and matter flows within systems.	
Energy and Matter	Energy may take different forms (e.g. energy in fields, thermal energy, energy of motion).	
Patterns	Graphs and charts can be used to identify patterns in data.	
Structure and Function	Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.	
Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***	
● Self-Awareness ● Self-Management ● Responsible Decision Making ● Social Awareness ● Relationship Skills ● Motivation	● Emotional Awareness ● Internal Regulation ● Behavior Control ● Goal Persuance ● Appreciating Social and Environment Diversity ● Adaptive Behavior ● Communication ● Social Engagement ● Constructive Thinking ● Consequence Evaluation ● Respect for Self and Others ● Enthusiasm ● Initiative ● Resilience	

Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
<u>Formative Assessments:</u> ● Participation in class discussions/debates ● Exit tickets ● Quizzes	**<u>Benchmarks:</u>** ● CER assignments **<u>Summative Assessments:</u>**

• In-class assignments/activities • Presentations • Group assignments • IXL results	• Unit test • Unit project • Lab activities

Differentiated Student Access to Content:
Teaching and Learning *Resources/Materials*

Core Resources	**Alternate Core Resources *IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**

• iScience (Frog) Textbook
  ○ Chapter 13 - Lesson 1-2
  ○ Chapter 14 - Lesson 1-3
• CK12 Online Resources
• Teacher created reading guides and presentations
	• Modified/leveled readings from iScience (Frog) Textbook
	  ○ Chapter 13 - Lesson 1-2
	  ○ Chapter 14 - Lesson 1-3
	• CK12 Online Resources
	• Teacher created reading guides and presentations
		• Translated and modified readings from iScience (Frog) Textbook
		  ○ Chapter 13 - Lesson 1-2
		  ○ Chapter 14 - Lesson 1-3
		• CK12 Online Resources
		• Translated teacher created reading guides and presentations
			• iScience (Frog) Textbook
			  ○ Chapter 13 - Lesson 1-2
			  ○ Chapter 14 - Lesson 1-3
			• CK12 Online Resources
			• Teacher created reading guides and presentations

Supplemental Resources

- Chromebooks
- SmartBoard
- IXL
- Teacher Online Resources
- Newsela.com
- Quizlet
- Kahoot
- https://www.ngssphenomena.com/
- Applicable educational videos

Differentiated Student Access to Content:
Recommended *Strategies & Techniques*

Core Resources	**Alternate Core Resources *IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**
• Encourage creative expression and thinking by allowing students to choose how to approach a problem or assignment. • Jigsaws • Think-Pair-Share • Boost engagement with material by providing opportunities of	• Provide graphic organizers for additional support or encourage students to create digital multimedia to showcase knowledge. • Use prompts and model directions • Provide opportunities to model talk during read alouds, and scaffold talk during whole class and small group	• Utilize visual supports and graphic organizers • Use prompts and model directions • Provide opportunities to model talk during read alouds, and scaffold talk during whole class and small group discussions • Device used for translation purposes	• Encourage students to explore concepts in depth and encourage independent studies or investigations. • Modeling or independent student-led research • Use of higher leveled text and/or writing assignments

differentiation, group work and alternative assignments/assessments where appropriate ● Provide feedback utilizing a growth mindset and praise what is done correctly based upon effort, attitude and strategy.	discussions ● Extended time for revisions or opportunity to identify and develop areas of personal interest	● Provide additional wait time for student responses to questions to allow students the ability to undergo the process of translation between languages, composition of response and attempted response.	● Utilize differentiation in the areas of acceleration, enrichment, and grouping

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept:**	
	Core Ideas:	Information and Media Literacy
	Performance Expectation/s:	● **9.4.8.IML.7**: Use information from a variety of sources, contexts, disciplines, and cultures for a specific purpose. ● **9.4.8.IML.12**: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.
	Career Readiness, Life Literacies, & Key Skills Practices	
	● Act as a responsible and contributing community members and employee. ● Attend to financial well-being. ● Consider the environmental, social and economic impacts of decisions. ● Demonstrate creativity and innovation. ● Utilize critical thinking to make sense of problems and persevere in solving them. ● Model integrity, ethical leadership and effective management ● Plan education and career paths aligned to personal goals. ● Use technology to enhance productivity increase collaboration and communicate effectively. ● Work productively in teams while using cultural/global competence.	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*		LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*		Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*	x	Standards in Action: *Climate Change*