

Science

Unit	Energy
Unit Duration	8 weeks
Unit Goals	
NJSLS	<ul style="list-style-type: none"> ● 4-PS3-1 Use evidence to construct an explanation relating the speed of an object to the energy of that object. <i>[Assessment Boundary: Assessment does not include quantitative measures of changes in the speed of an object or on any precise or quantitative definition of energy.]</i> ● 4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. <i>[Assessment Boundary: Assessment does not include quantitative measurements of energy.]</i> ● 4-PS3-3 Ask questions and predict outcomes about the changes in energy that occur when objects collide. <i>[Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.] [Assessment Boundary: Assessment does not include quantitative measurements of energy.]</i> ● 4-PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. <i>[Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.] [Assessment Boundary: Devices should be limited to those that convert motion energy to electric energy or use stored energy to cause motion or produce light or sound.]</i>
Science & Engineering Practices	<ul style="list-style-type: none"> ● Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. ● Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. ● Use evidence (e.g., measurements, observations, patterns) to construct an explanation. ● Apply scientific ideas to solve design problems.
Disciplinary Core Ideas	<p>PS3.A: Definitions of Energy</p> <ul style="list-style-type: none"> ● The faster a given object is moving, the more energy it possesses. (4-PS3-1) ● Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2), (4-PS3-3) <p>PS3.B: Conservation of Energy and Energy Transfer</p>

	<ul style="list-style-type: none"> ● Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2), (4- PS3-3)
<p>Cross Cutting Concepts</p>	<p>Energy and Matter</p> <ul style="list-style-type: none"> ● Energy can be transferred in various ways and between objects. (4-PS3-1), (4-PS3-2), (4-PS3-3), (4-PS3-4) <p>Influence of Science, Engineering and Technology on Society and the Natural World</p> <ul style="list-style-type: none"> ● Engineers improve existing technologies or develop new ones. (4-PS3-4) <p>Science is a Human Endeavor</p> <ul style="list-style-type: none"> ● Most scientists and engineers work in teams. (4-PS3-4) ● Science affects everyday life. (4-PS3-4)
<p>Connections to NJSLs – English Language Arts</p>	<ul style="list-style-type: none"> ● RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. ● RI.4.3 Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. ● RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. ● W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. ● W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic. ● W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. ● W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
<p>Connections to NJSLs - Mathematics</p>	<ul style="list-style-type: none"> ● 4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
<p>21st Century and Career Integration</p>	<ul style="list-style-type: none"> ● 9.1.4.A.1 Explain the difference between a career and a job, and identify various jobs in the community and the related earnings. ● 9.1.4.F.1 Demonstrate an understanding of individual financial obligations and community financial obligations.

Resources and Technology Integration

- Mystery Science – Electricity, Light & Heat
- Brain Pop
- <https://www.openscienced.org/curriculum/elementary-school/explore-the-curriculum/>

Assessments

- Ask questions
- Define problems
- Develop and use models
- Plan and carry out investigations
- Analyze and interpret data
- Formative assessment
- Teacher observation
- Class discussion
- Venn diagram

Unit	Waves and Their Applications in Technologies for Information Transfer
Unit Duration	8 weeks
Unit Goals	
NJSLS	<ul style="list-style-type: none"> ● 4-PS4-1 Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. <i>[Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.] [Assessment Boundary: Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.]</i> ● 4-PS4-2 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. <i>[Assessment Boundary: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.]</i>

	<ul style="list-style-type: none"> ● 4-PS4-3 Generate and compare multiple solutions that use patterns to transfer information. <i>[Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.]</i>
<p>Science & Engineering Practices</p>	<ul style="list-style-type: none"> ● Develop a model using an analogy, example, or abstract representation to describe a scientific principle. ● Develop a model to describe phenomena. ● Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.
<p>Disciplinary Core Ideas</p>	<p>PS4.A: Wave Properties</p> <ul style="list-style-type: none"> ● Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach. (Note: This grade band endpoint was moved from K–2.) (4-PS4-1) ● Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1) <p>PS4.B: Electromagnetic Radiation</p> <ul style="list-style-type: none"> ● An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2) <p>PS4.C: Information Technologies and Instrumentation</p> <ul style="list-style-type: none"> ● Digitized information can be transmitted over long distances without significant degradation. ● High-tech devices, such as computers or cell phones, can receive and decode information--convert it from digitized form to voice—and vice versa. (4-PS4-3)
<p>Cross Cutting Concepts</p>	<p>Patterns</p> <ul style="list-style-type: none"> ● Similarities and differences in patterns can be used to sort and classify natural phenomena. (4-PS4-1) ● Similarities and differences in patterns can be used to sort and classify designed products. (4-PS4-3) <p>Interdependence of Science, Engineering, and Technology</p> <ul style="list-style-type: none"> ● Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4-3) <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> ● Science findings are based on recognizing patterns. (3-LS1-1)
<p>Connections to NJSLs – English Language Arts</p>	<ul style="list-style-type: none"> ● RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. ● RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.

	<ul style="list-style-type: none"> ● SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes
Connections to NJSL - Mathematics	<ul style="list-style-type: none"> ● MP.4 Model with mathematics. ● 4.G.A.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
21st Century and Career Integration	<ul style="list-style-type: none"> ● 9.1.4.A.1 Explain the difference between a career and a job, and identify various jobs in the community and the related earnings.

Resources and Technology Integration

- Mystery Science – Sound Waves, & Communication
- Brain Pop
- <https://www.openscienced.org/curriculum/elementary-school/explore-the-curriculum/>

Assessments

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- Develop and use models
- Plan and carry out investigations
- Analyze and interpret data
- Formative assessment
- Teacher observation
- Class discussion
- Venn diagram

Unit	From Molecules to Organisms: Structures and Processes
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Unit Duration	6 weeks
Unit Goals	
NJSLS	<ul style="list-style-type: none"> ● 4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. <i>[Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]</i> ● 4-LS1-2 Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. <i>[Clarification Statement: Emphasis is on systems of information transfer.] [Assessment Boundary: Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.]</i>
Science & Engineering Practices	<ul style="list-style-type: none"> ● Use a model to test interactions concerning the functioning of a natural system. ● Construct an argument with evidence, data, and/or a model.
Disciplinary Core Ideas	<p>LS1.A: Structure and Function</p> <ul style="list-style-type: none"> ● Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1) <p>LS1.D: Information Processing</p> <ul style="list-style-type: none"> ● Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)
Cross Cutting Concepts	<p>Systems and System Models</p> <ul style="list-style-type: none"> ● A system can be described in terms of its components and their interactions. (4-LS1-1), (4-LS1-2)
Connections to NJSLS – English Language Arts	<ul style="list-style-type: none"> ● W.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. ● SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.
Connections to NJSLS - Mathematics	<ul style="list-style-type: none"> ● 4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line symmetric figures and draw lines of symmetry.
21st Century and Career	<ul style="list-style-type: none"> ● MP.4 Model with mathematics. (3-LS2-1)

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Integration	<ul style="list-style-type: none"> ● 3.NBT Number and Operations in Base Ten (3-LS2-1) ● Similarities and differences in patterns can be used to sort and classify natural phenomena. (3-LS3-1) ● Cause and effect relationships are routinely identified and used to explain change. (3-LS3-2)
Resources and Technology Integration	
<ul style="list-style-type: none"> ● Mystery Science – Animal & Plant Adaptations ● Brain Pop ● https://www.openscienced.org/curriculum/elementary-school/explore-the-curriculum/ 	
Assessments	
<ul style="list-style-type: none"> ● Ask questions ● Define problems ● Develop and use models ● Plan and carry out investigations ● Analyze and interpret data ● Formative assessment ● Teacher observation ● Class discussion ● Venn diagram 	
Unit	Earth’s Features & Processes / Earth’s Systems
Unit Duration	8 weeks
Unit Goals	
NJSLS	<ul style="list-style-type: none"> ● 4-ESS1-1 Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. <i>[Clarification Statement: Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and, a canyon</i>

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	<p><i>with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.]</i> <i>[Assessment Boundary: Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time.]</i></p> <ul style="list-style-type: none"> ● 4-ESS2-1 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. <i>[Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.]</i> <i>[Assessment Boundary: Assessment is limited to a single form of weathering or erosion.]</i> ● 4-ESS2-2 Analyze and interpret data from maps to describe patterns of Earth’s features. <i>[Clarification Statement: Maps can include topographic maps of Earth’s land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]</i>
<p>Science & Engineering Practices</p>	<ul style="list-style-type: none"> ● Identify the evidence that supports particular points in an explanation. ● Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. ● Analyze and interpret data to make sense of phenomena using logical reasoning.
<p>Disciplinary Core Ideas</p>	<p>ESS2.A: Earth Materials and Systems</p> <ul style="list-style-type: none"> ● Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1) <p>ESS2.B: Plate Tectonics and Large Scale System Interactions</p> <ul style="list-style-type: none"> ● The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. (4-ESS2-2) <p>ESS2.E: Biogeology</p> <ul style="list-style-type: none"> ● Living things affect the physical characteristics of their regions. (4-ESS2-1)
<p>Cross Cutting Concepts</p>	<p>Patterns</p> <ul style="list-style-type: none"> ● Patterns can be used as evidence to support an explanation. (4-ESS2- 2) <p>Cause and Effect</p> <ul style="list-style-type: none"> ● Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS2-1)

<p>Connections to NJSL – English Language Arts</p>	<ul style="list-style-type: none"> ● RI.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. ● W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic. ● W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
<p>Connections to NJSL - Mathematics</p>	<ul style="list-style-type: none"> ● MP.2 Reason abstractly and quantitatively. ● MP.4 Model with mathematics. ● MP.5 Use appropriate tools strategically. ● 4.MD.A.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. ● 4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
<p>21st Century and Career Integration</p>	<ul style="list-style-type: none"> ● 9.1.4.A.1 Explain the difference between a career and a job, and identify various jobs in the community and the related earnings.

Resources and Technology Integration

- Mystery Science – Earth’s Features & Processes
- Brain Pop Jr.
- <https://www.openscienced.org/curriculum/elementary-school/explore-the-curriculum/>

Assessments

- Ask questions
- Define problems
- Develop and use models
- Plan and carry out investigations
- Analyze and interpret data
- Formative assessment
- Teacher observation
- Class discussion
- Venn diagram

Unit	Engineering Design
Unit Duration	6 weeks
Unit Goals	
NJSLS	<ul style="list-style-type: none"> ● 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. ● 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. ● 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
Science & Engineering Practices	<ul style="list-style-type: none"> ● Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. ● Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. ● Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.
Disciplinary Core Ideas	<p>ETS1.A: Defining and Delimiting Engineering Problems</p> <ul style="list-style-type: none"> ● A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1)

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	<ul style="list-style-type: none"> • Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool. (K-2- ETS1-1) • Before beginning to design a solution, it is important to clearly understand the problem. (K-2- ETS1-1) <p>ETS1.B: Developing Possible Solutions</p> <ul style="list-style-type: none"> • Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions, such as climate change, to other people. (K-2-ETS1-2) <p>ETS1.C: Optimizing the Design Solution</p> <ul style="list-style-type: none"> • Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)
<p>Cross Cutting Concepts</p>	<p>Influence of Engineering, Technology, and Science on Society and the Natural World</p> <ul style="list-style-type: none"> ● People’s needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1) ● Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)
<p>Connections to NJSLS – English Language Arts</p>	<ul style="list-style-type: none"> ● RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. ● RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. ● RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. ● W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. ● W.5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. ● W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
<p>Connections to NJSLS - Mathematics</p>	<ul style="list-style-type: none"> ● MP.2 Reason abstractly and quantitatively. ● MP.4 Model with mathematics. ● MP.5 Use appropriate tools strategically. 3-5.OA Operations and Algebraic Thinking
<p>21st Century and Career Integration</p>	<ul style="list-style-type: none"> ● 9.1.4.A.1 Explain the difference between a career and a job, and identify various jobs in the community and the related earnings.
<p>Resources and Technology Integration</p>	

- WT Maker Space Curriculum
- Brain Pop
- <https://www.mastersindatascience.org/blog/the-ultimate-stem-guide-for-kids-239-cool-sites-about-science-technology-engineering-and-math/>
- <http://www.4aplus.com/stem-resources-4-students>
- <http://stem-works.com/activities>

Assessments

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Curriculum Modifications

Special Education and 504 Students

General Modifications

- Allow outlining, instead of writing for an essay or major project
- Computerized spell-check support
- Word bank of choices for answers to test questions
- Provision of calculator and/or number line for math tests
- Film or video supplements in place of reading text
- Reworded questions in simpler language
- Projects instead of written reports
- Highlighting important words or phrases in reading assignments
- Modified workload or length of assignments/tests
- Modified time demands
- Pass/no pass option
- Modified grades based on IEP

Behavioral Modifications

- Breaks between tasks
- Cue expected behavior

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	<ul style="list-style-type: none"> ● Daily feedback to student ● Use de-escalating strategies ● Use positive reinforcement ● Use proximity/touch control ● Use peer supports and mentoring ● Model expected behavior by adults ● Have parent sign homework/behavior chart ● Set and post class rules ● Chart progress and maintain data
<p>Students At Risk of School Failure - Students or groups of students who are considered to have a higher probability of failing academically or dropping out of school.</p>	<ul style="list-style-type: none"> ● Maximize use of community resources ● Connect family to school and school activities ● Support through transition ● Help develop compensating strategies ● Increase opportunity for positive peer group influences ● Supplemental courses ● Placement in small and interactive groups
<p>English Language Learner Students (ELL)</p>	<ul style="list-style-type: none"> ● Alternate Responses ● Notes in Advance ● Extended Time ● Simplified Instruction (written and verbal) ● Online Dictionary ● Use lots of visuals ● Use physical activity; model, role-play ● Repeat/Rephrase often ● Use lower level materials when appropriate
<p>Gifted & Talented Students (G&T)</p>	<p><u>Inclusion, infusion and differentiated instruction across the curriculum meets the individual needs of gifted and talented students. Gifted and talented services include:</u></p> <ul style="list-style-type: none"> ● Differentiated curriculum for the gifted learner. ● Regular classroom curricula and instruction that is adapted, modified, or replaced. ● Educational opportunities consist of a continuum of differentiated curricular options, instructional approaches and materials. ● Integrated G&T programming into the general education school day. ● Flexible groupings of students to facilitate differentiated instruction and curriculum. <p style="text-align: center;"><u>Learning Environments:</u></p> <ul style="list-style-type: none"> ● Extensive outside reading ● Active classroom discussion ● Innovative oral and written presentations

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	<ul style="list-style-type: none">● Deductive and inductive reasoning● Independent writing and research● Divergent thinking● Challenging problem solving situations● Interactive, independent and interdisciplinary activities
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