

# Science

# Grade 4

**Prepared by:**

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# Science

## Grade 4

### Course Description:

The fourth-grade science curriculum is aligned with the New Jersey Student Learning Standards and focuses on the science content and practices essential for college and career readiness. The students will engage in practices to build, expand, and apply their knowledge of scientific phenomena. Units will cover concepts related to the changes to the Earth's surface due to weathering and erosion and the formation of fossils. Concepts also include types of natural resources, models of waves, transfer of information and energy, and lastly systems for survival for plants and animals. Lessons will be taught through the process of the 5 E's: Engage, Explore, Explain, Elaborate, and Evaluate. Lessons will also be taught with hands-on activities and experiments to deepen student scientific understanding.

### Course Sequence:

Unit Title	Pacing
Unit 1: The Changing Earth	33 days
Unit 2: Resources	23 days
Unit 3: Waves and Information	18 days
Unit 4: Transfer of Energy	15 days
Unit 5: Systems for Survival	15 days
Total	104 days

### Pre-requisite:

Grade 3 Science

**UNIT # 1****Overview****Content Area: Science****Unit Title: The Changing Earth****Grade Level(s): 4**

**Core Ideas:** In this unit of study, students will understand weathering, erosion, deposition and how they cause Earth's features to change. The students will identify different types of landforms and how they are created. The students will identify types of fossils, how they are created, and what they can tell us about Earth's past.

**Standards (Content and Technology)****CPI#:****Statement:****Performance Expectations (NJSLs)**

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.
4-ESS2-2	Analyze and interpret data from maps to describe patterns of Earth's features.
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.

**Career Readiness (9.2) Life Literacies, and Key Skills (standard 9.1, 9.4)**

9.2.5.CAP.4	Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.
9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

**Technology Literacy (standard 8 or 9.4.(TL))**

8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
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**Interdisciplinary Connection**

RI.4.7	Interpret information presented visually, orally, or quantitatively 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.
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
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.

**Cross-cultural Statements/Mandates (Amistad, Holocaust, LGBT/Disabilities, SEL, etc...)**

Amistad Mandate: References to this mandate are made by studying Louis R. Purnell. He is the first African American paleontologist.

**Unit Essential Question(s):**

- How can evidence of the effects of weathering or the rate of erosion by water, ice, wind or vegetation be observed or measured?
- How and why is Earth constantly changing?
- How do earth's major systems interact?
- How do living organisms alter Earth's processes and structures?

**Enduring Understandings/Disciplinary Core Ideas:**

- Water, ice, wind, living organisms, and gravity break rocks, soil, and sediments into smaller particles and move them around.
- Rainfall helps to shape the land and affects types of things found in a region.
- Living things affect the physical characteristics of their regions.

<ul style="list-style-type: none"> <li>• What can maps tell us about the features of the world?</li> <li>• Why do the continents move, and what causes earthquakes and volcanoes?</li> <li>• How and why is Earth constantly changing?</li> <li>• What can rock formations tell us about the past?</li> <li>•</li> </ul> <p><b>Science and Engineering Practices:</b></p> <ul style="list-style-type: none"> <li>• Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-ESS2-1)</li> </ul> <p><b>Crosscutting Concepts:</b></p> <ul style="list-style-type: none"> <li>• Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS2- 1)</li> </ul>	<ul style="list-style-type: none"> <li>• Maps can help locate the different land and water features of Earth.</li> <li>• The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns.</li> <li>• Most earthquakes and volcanoes occur in nads that are often along the boundaries between continents and oceans.</li> <li>• Major mountain chains form inside continents or near their edges.</li> <li>• Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes.</li> <li>• The presence and location of certain fossil types indicate the order in which rock layers were formed.</li> </ul>
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**Evidence of Learning**

**Formative Assessments:** entrance/exit tickets, teacher observations

**Summative/Benchmark Assessment(s):** labs, quizzes, tests

**Alternative Assessments:** modified versions of formative and summative, oral, notebook work

**Resources/Materials:** Discovery Education online techbook, interactive websites, Teachers Pay Teachers, Google Classroom, Document Camera, Smart Board

**Key Vocabulary:** weathering, erosion, deposition, sediment, landforms, mountains, valleys, volcano, coast, island, plain, plateau, canyon, peninsula, delta, desert, lake, river, prehistoric, fossil, extinct, ancient, preserve, sedimentary rock

**Suggested Pacing Guide**

<b>Lesson Name/Topic</b>	<b>Student Learning Objective(s)</b>	<b>Suggested Tasks/Activities:</b>	<b>Day(s) to Complete</b>
Vocab	Define key vocabulary.	<ul style="list-style-type: none"> <li>• Online interactive glossary</li> </ul>	1
Weathering	Define weathering and identify its causes.	<ul style="list-style-type: none"> <li>• Fill-in notes</li> <li>• Sugar cube experiment</li> </ul>	3
Erosion	Define erosion and identify its causes.	<ul style="list-style-type: none"> <li>• Fill-in notes</li> <li>• Virtual lab</li> </ul>	3
Deposition	Define deposition and identify its causes.	<ul style="list-style-type: none"> <li>• Fill-in notes</li> <li>• Glacier experiment</li> </ul>	3
Earth's Features Change	Understand how weathering, erosion, and deposition cause Earth's features to change.	<ul style="list-style-type: none"> <li>• Fill-in notes</li> <li>• Discovery Education article</li> <li>• Discovery Education exploration</li> </ul>	3
Landforms	Identify types of landforms and how they form.	<ul style="list-style-type: none"> <li>• Fill-in notes</li> <li>• Flocabulary</li> </ul>	3
Review and Assessment	Demonstrate knowledge of weathering, erosion, deposition, and landforms.	<ul style="list-style-type: none"> <li>• Review activities</li> <li>• Teacher-made assessment</li> </ul>	2
Vocab	Define key vocabulary.	<ul style="list-style-type: none"> <li>• Online interactive glossary</li> </ul>	1
Types of Fossils	Identify the different types of fossils.	<ul style="list-style-type: none"> <li>• Fill-in notes</li> <li>• Discovery Education videos</li> <li>• Flocabulary</li> </ul>	3
Formation of Fossils	Explain how fossils form.	<ul style="list-style-type: none"> <li>• Fill-in notes</li> <li>• Brain Pop</li> <li>• Create your own fossil lab</li> <li>• Virtual lab</li> </ul>	4
Age of a Fossil	Explain the age of a fossil.	<ul style="list-style-type: none"> <li>• Fill-in notes</li> <li>• Discovery Education exploration</li> </ul>	2
Earth's Past	Understand how fossils can help us learn about the Earth in the past.	<ul style="list-style-type: none"> <li>• Fill-in notes</li> <li>• Generation Genius video</li> </ul>	3

		<ul style="list-style-type: none"> <li>● Super Teacher Worksheets article</li> </ul>	
Review and Assessment	Demonstrate knowledge of types of fossils, how they form, and what they can teach us about the past.	<ul style="list-style-type: none"> <li>● Review activities</li> <li>● Teacher-made assessment</li> </ul>	2
<b>Teacher Notes:</b>			
<b>Additional Resources:</b> Flocabulary, Brain Pop, Generation Genius, Mystery Science, Super Teacher Worksheets, IXL			
<b>Differentiation/Modification Strategies</b>			
<b>Students with Disabilities</b>		<b>English Language Learners</b>	
<ul style="list-style-type: none"> <li>● Consult with case managers and follow student IEP</li> <li>● Allow errors</li> <li>● Rephrase questions, directions, and explanations</li> <li>● Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>● Accept participation at any level</li> </ul>		<ul style="list-style-type: none"> <li>● Consult student ELL Plan</li> <li>● Assign a buddy, same language or English speaking</li> <li>● Allow errors in speaking</li> <li>● Rephrase questions, directions, and explanations</li> <li>● Allow extended time to answer questions</li> <li>● Accept participation at any level</li> </ul>	
<b>Gifted &amp; Talented Students</b>		<b>Students at Risk</b>	
<ul style="list-style-type: none"> <li>● Consult with G and T teacher</li> <li>● Provide extension activities</li> <li>● Build on students' intrinsic motivations</li> </ul>		<ul style="list-style-type: none"> <li>● Consult with I &amp; RS, classroom teacher(s), and guidance counselors as needed</li> <li>● Follow I &amp; RS procedures/action plans</li> <li>● Provide extended time to complete tasks</li> <li>● Provide rewards as necessary</li> </ul>	
<b>504 Students</b>		<b>Other:</b>	
<ul style="list-style-type: none"> <li>● Consult 504 Plan and follow accommodations/modifications</li> <li>● Allow errors</li> <li>● Rephrase questions, directions, and explanations</li> <li>● Allow extended time to answer questions</li> <li>● Accept participation at any level</li> </ul>			

**UNIT # 2****Overview****Content Area: Science****Unit Title: Resources****Grade Level(s): 4**

**Core Ideas:** In this unit of study, students will be able to explain the difference between renewable and nonrenewable resources and be able to identify examples of each type. Students will compare and contrast the benefits of different types of natural resources on the environment.

**Standards (Content and Technology)****CPI#:****Statement:****Performance Expectations (NJSLs)**

4-ESS3-1	Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
4-ESS3-2	Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have on humans.
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on material, 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.

**Career Readiness (9.2) Life Literacies, and Key Skills (standard 9.1, 9.4)**

9.2.5.CAP.1	Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions.
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process

**Technology Literacy (standard 8 or 9.4.(TL))**

8.2.5.ED.2	Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
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**Interdisciplinary Connection**

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.
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.
MP.2	Reason abstractly and quantitatively.
MP.4	Model with mathematics.
4.OA.A.1	Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

**Cross-cultural Statements/Mandates (Amistad, Holocaust, LGBT/Disabilities, SEL, etc...)**

SEL Mandate: References to the CASEL standard responsible decision making. Students will understand how to make a reasoned judgment after analyzing the facts and data of benefits of different types of natural resources for our environment.

**Unit Essential Question(s):**

- From what natural resources are energy and fuels derived?
- In what ways does the human use of natural resources affect the environment?
- In what ways can the impacts of natural Earth processes on humans be reduced?

**Enduring Understandings/ Disciplinary Core Ideas:**

- Energy and fuels that humans use are derived from natural sources in the environment.
- The use of energy and fuels from natural sources affect the environment in multiple ways.
- Some resources are renewable over time, and others are not.

<ul style="list-style-type: none"> <li>• How do Earth’s surface processes and human activities affect each other?</li> </ul> <p><b>Science and Engineering Practices:</b></p> <ul style="list-style-type: none"> <li>• Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-ESS3-2)</li> </ul> <p><b>Crosscutting Concepts:</b></p> <ul style="list-style-type: none"> <li>• Over time, people’s needs and wants change, as do their demands for new and improved technologies. (4-ESS3-1)</li> <li>• Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands. (4-ESS3-2)</li> </ul>	<ul style="list-style-type: none"> <li>• Engineers improve existing technologies or develop new ones to increase benefits, decrease known risks, and meet societal demands.</li> <li>• A variety of hazards result from natural processes.</li> <li>• Humans cannot eliminate the hazards, but they can take steps to reduce their impacts.</li> <li>• Research on a problem should be carried out before beginning to design a solution.</li> <li>• Testing a solution involves investigating how well it performs under a range of likely conditions.</li> <li>• At whatever stage, communicating with peers about proposed solutions to a problem is an important part of the design process, and shared ideas can lead to improved designs.</li> <li>• Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.</li> <li>• Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.</li> </ul>
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**Evidence of Learning**

**Formative Assessments:** entrance/exit tickets, teacher observations

**Summative/Benchmark Assessment(s):** labs, quizzes, tests

**Alternative Assessments:** modified versions of formative and summative, oral, notebook work

**Resources/Materials:** Discovery Education online techbook, interactive websites, Teachers Pay Teachers, Google Classroom, Document Camera, Smart Board

**Key Vocabulary:** natural resources, renewable resource, nonrenewable resource, conserve, solar energy, hydroelectric power, thermal energy, fossil fuel, sustainability

**Suggested Pacing Guide**

Lesson Name/Topic	Student Learning Objective(s)	Suggested Tasks/Activities:	Day(s) to Complete
Vocab	Define key vocabulary.	<ul style="list-style-type: none"> <li>• Online interactive glossary</li> </ul>	1
Natural Resources	Identify the difference between renewable and nonrenewable resources.	<ul style="list-style-type: none"> <li>• Fill-in notes</li> <li>• Discovery Education videos</li> <li>• Flocabulary</li> </ul>	4
Renewable Resources	Identify types of renewable resources.	<ul style="list-style-type: none"> <li>• Fill-in notes</li> <li>• Discovery Education exploration</li> <li>•</li> </ul>	3
Nonrenewable Resources	Identify types of nonrenewable resources.	<ul style="list-style-type: none"> <li>• Fill-in notes</li> <li>• Brain Pop</li> </ul>	3
Sustainability	Explain ways to conserve natural resources.	<ul style="list-style-type: none"> <li>• Fill-in notes</li> <li>• Flocabulary</li> <li>• Virtual lab</li> <li>• My Sustainable House project</li> <li>• Renewable Energy project</li> </ul>	10
Review and Assessment	Demonstrate knowledge of types of natural resources, the benefits of each, and sustainable practices.	<ul style="list-style-type: none"> <li>• Review activities</li> <li>• Teacher-made assessment</li> </ul>	2

**Teacher Notes:**

**Additional Resources:** Flocabulary, Brain Pop, Generation Genius, Mystery Science, Super Teacher Worksheets, IXL

**Differentiation/Modification Strategies**

**Students with Disabilities**

**English Language Learners**

Midland Park Public Schools

<ul style="list-style-type: none"> <li>● Consult with case managers and follow student IEP</li> <li>● Allow errors</li> <li>● Rephrase questions, directions, and explanations</li> <li>● Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>● Accept participation at any level</li> </ul>	<ul style="list-style-type: none"> <li>● Consult student ELL Plan</li> <li>● Assign a buddy, same language or English speaking</li> <li>● Allow errors in speaking</li> <li>● Rephrase questions, directions, and explanations</li> <li>● Allow extended time to answer questions</li> <li>● Accept participation at any level</li> </ul>
<p><b>Gifted &amp; Talented Students</b></p>	<p><b>Students at Risk</b></p>
<ul style="list-style-type: none"> <li>● Consult with G and T teacher</li> <li>● Provide extension activities</li> <li>● Build on students' intrinsic motivations</li> </ul>	<ul style="list-style-type: none"> <li>● Consult with I &amp;RS, classroom teacher(s), and guidance counselors as needed</li> <li>● Follow I &amp; RS procedures/action plans</li> <li>● Provide extended time to complete tasks</li> <li>● Provide rewards as necessary</li> </ul>
<p><b>504 Students</b></p>	<p><b>Other:</b></p>
<ul style="list-style-type: none"> <li>● Consult 504 Plan and follow accommodations/modifications</li> <li>● Allow errors</li> <li>● Rephrase questions, directions, and explanations</li> <li>● Allow extended time to answer questions</li> <li>● Accept participation at any level</li> </ul>	



**UNIT # 3****Overview****Content Area: Science****Unit Title: Waves and Information****Grade Level(s): 4**

**Core Ideas:** In this unit of study, students will identify the parts of a wave and types of wave. Students will understand how light and sound travel. Students will understand the types of electrical circuits and what is needed in order for electricity to flow and power objects. Students will understand that coding helps send information.

**Standards (Content and Technology)****CPI#:****Statement:****Performance Expectations (NJSLs)**

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.

4-PS4-2 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

4-PS4-3 Generate and compare multiple solutions that use patterns to transfer information.

**Career Readiness (9.2) Life Literacies, and Key Skills (standard 9.1, 9.4)**

9.2.5.CAP.4 Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.

9.4.5.CI.4 Research the development process of a product and identify the role of failure as a part of the creative process

**Technology Literacy (standard 8 or 9.4.(TL))**

8.1.5.NI.1 Develop models that successfully transmit and receive information using both wired and wireless methods.

**Interdisciplinary Connection**

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.

SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

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.

**Cross-cultural Statements/Mandates (*Amistad, Holocaust, LGBT/Disabilities, SEL, etc...*)**

LGBTQ Mandate: References to this mandate are made by studying Alan Turing. His work led to the construction of the first true computers.

**Unit Essential Question(s):**

- How are waves used to transfer energy and information?
- How do waves travel and cause objects to move?
- Which team can design a way to use patterns to communicate with someone across the room?
- What happens when light from an object enters the eye?

**Science and Engineering Practices:**

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-PS4-3)

**Crosscutting Concepts:**

- Similarities and differences in patterns can be used to sort and classify natural phenomena. (4-PS4-1)

**Enduring Understandings/ Disciplinary Core Ideas:**

- 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.
- Waves of the same type can differ in amplitude (height of the wave) and wavelength (distance between wave peaks)
- An object can be seen when light reflected from its surface enters the eye.

**Evidence of Learning****Formative Assessments:** entrance/exit tickets, teacher observations**Summative/Benchmark Assessment(s):** labs, quizzes, tests**Alternative Assessments:** modified versions of formative and summative, oral, notebook work**Resources/Materials:** Discovery Education online techbook, interactive websites, Teachers Pay Teachers, Google Classroom, Document Camera, Smart Board**Key Vocabulary:** wave, light, sound, energy, amplitude, wavelength, matter, electromagnetic spectrum**Suggested Pacing Guide**

<b>Lesson Name/Topic</b>	<b>Student Learning Objective(s)</b>	<b>Suggested Tasks/Activities:</b>	<b>Day(s) to Complete</b>
Vocab	Define key vocabulary.	<ul style="list-style-type: none"> <li>● Online interactive glossary</li> </ul>	1
Waves	Define waves and identify different types of waves.	<ul style="list-style-type: none"> <li>● Fill-in notes</li> <li>● Discovery Education exploration</li> <li>● Flocabulary</li> <li>● Generation Genius video</li> <li>● Gummy bear wave demonstration</li> </ul>	6
Parts of a Wave	Identify the parts of a wave.	<ul style="list-style-type: none"> <li>● Fill-in notes</li> <li>● Brain Pop</li> </ul>	3
Sound Waves	Explain how sound is created.	<ul style="list-style-type: none"> <li>● Discovery Education videos</li> <li>● Teachers Pay Teachers worksheets</li> </ul>	2
Light Waves	Explain how we are able to see light.	<ul style="list-style-type: none"> <li>● Discovery Education videos</li> <li>● Teachers Pay Teachers worksheets</li> <li>● Discovery Education article</li> </ul>	2
Information Transfer	Explain the basic process for transmitting signals using sound, electromagnetic waves, and electricity.	<ul style="list-style-type: none"> <li>● Generation Genius video</li> <li>● Create pixel drawing based on coding activity</li> </ul>	2
Review and Assessment	Demonstrate knowledge of the parts of a wave, types of waves, and ways information is transferred.	<ul style="list-style-type: none"> <li>● Review activities</li> <li>● Teacher-made assessment</li> </ul>	2

**Teacher Notes:****Additional Resources:** Flocabulary, Brain Pop, Generation Genius, Mystery Science, Super Teacher Worksheets, IXL**Differentiation/Modification Strategies**

<b>Students with Disabilities</b>	<b>English Language Learners</b>
<ul style="list-style-type: none"> <li>● Consult with case managers and follow student IEP</li> <li>● Allow errors</li> <li>● Rephrase questions, directions, and explanations</li> <li>● Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>● Accept participation at any level</li> </ul>	<ul style="list-style-type: none"> <li>● Consult student ELL Plan</li> <li>● Assign a buddy, same language or English speaking</li> <li>● Allow errors in speaking</li> <li>● Rephrase questions, directions, and explanations</li> <li>● Allow extended time to answer questions</li> <li>● Accept participation at any level</li> </ul>
<b>Gifted &amp; Talented Students</b>	<b>Students at Risk</b>
<ul style="list-style-type: none"> <li>● Consult with G and T teacher</li> <li>● Provide extension activities</li> <li>● Build on students' intrinsic motivations</li> </ul>	<ul style="list-style-type: none"> <li>● Consult with I &amp; RS, classroom teacher(s), and guidance counselors as needed</li> <li>● Follow I &amp; RS procedures/action plans</li> <li>● Provide extended time to complete tasks</li> <li>● Provide rewards as necessary</li> </ul>
<b>504 Students</b>	<b>Other:</b>
<ul style="list-style-type: none"> <li>● Consult 504 Plan and follow accommodations/modifications</li> <li>● Allow errors</li> <li>● Rephrase questions, directions, and explanations</li> <li>● Allow extended time to answer questions</li> <li>● Accept participation at any level</li> </ul>	

**UNIT # 4****Overview****Content Area: Science****Unit Title: Transfer of Energy****Grade Level(s): 4**

**Core Ideas:** In this unit of study, students will learn about how energy can be converted from one form to another. The students will learn about how electricity, light, sound, and heat can transfer energy from place to place.

**Standards (Content and Technology)****CPI#:****Statement:****Performance Expectations (NJSLs)**

4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.
4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
4-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.
4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
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.

**Career Readiness (9.2) Life Literacies, and Key Skills (standard 9.1, 9.4)**

9.2.5.CAP.3	Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
9.4.5.CI.4	Research the development process of a product and identify the role of failure as a part of the creative process.

**Technology Literacy (standard 8 or 9.4.(TL))**

8.1.5.DA.5	Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
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**Interdisciplinary Connection**

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.
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.

**Cross-cultural Statements/Mandates (Amistad, Holocaust, LGBT/Disabilities, SEL, etc...)**

Amistad Mandate: References to this mandate are made by studying Lewis H. Latimer and Granville Woods. They made contributions in the development of the telephone, incandescent light bulb, and the telegraph.

**Unit Essential Question(s):**

- How does energy move?
- What is the relationship between the speed of an object and its energy?
- How is energy transferred and conserved?
- In what ways does energy change when objects collide?

**Science and Engineering Practices:**

- Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (4-PS3-3)

**Enduring Understandings/ Disciplinary Core Ideas:**

- Energy can be transferred in various ways and between objects.
- Energy can be moved from place to place through sound, light, or electric currents.
- Energy is present whenever there is sound, light, or heat.
- Light also transfers energy from place to place.
- Energy can also be transferred from place to place by electric currents; the currents may have

<b>Crosscutting Concepts:</b> <ul style="list-style-type: none"> <li>Energy can be transferred in various ways and between objects. (4-PS3-1), (4-PS3-2), (4-PS3-3), (4-PS3-4)</li> </ul>	been produced to begin with by transforming the energy of motion into electrical energy. <ul style="list-style-type: none"> <li>The faster a given object is moving, the more energy it possesses.</li> <li>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.</li> <li>When objects collide, the contact forces transfer energy so as to change the objects' motions.</li> </ul>
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### Evidence of Learning

**Formative Assessments:** entrance/exit tickets, teacher observations

**Summative/Benchmark Assessment(s):** labs, quizzes, tests

**Alternative Assessments:** modified versions of formative and summative, oral, notebook work

**Resources/Materials:** Discovery Education online techbook, interactive websites, Teachers Pay Teachers, Google Classroom, Document Camera, Smart Board

**Key Vocabulary:** energy, energy transfer, generator, motion energy, kinetic energy, potential energy, heat, light, chemical energy, sound, mechanical energy, electrical energy

### Suggested Pacing Guide

Lesson Name/Topic	Student Learning Objective(s)	Suggested Tasks/Activities:	Day(s) to Complete
Vocab	Define key vocabulary.	<ul style="list-style-type: none"> <li>Online interactive glossary</li> </ul>	1
Types of Energy	Identify different types of energy.	<ul style="list-style-type: none"> <li>Fill-in notes</li> <li>Discovery Education explorations</li> <li>Discovery Education articles</li> </ul>	3
Energy Transfer	Explain the difference between potential and kinetic energy.	<ul style="list-style-type: none"> <li>Fill-in notes</li> <li>Marble demonstration</li> <li>Energy transfer lab</li> </ul>	4
Collisions	Explain the change in energy during collisions.	<ul style="list-style-type: none"> <li>Fill-in notes</li> <li>Rube Goldberg Machine DIY activity</li> </ul>	3
Electricity	Create closed circuits to show the flow of electricity.	<ul style="list-style-type: none"> <li>Snap circuits</li> </ul>	2
Review and Assessment	Demonstrate knowledge of types of energy and energy transfer.	<ul style="list-style-type: none"> <li>Review activities</li> <li>Teacher-made assessment</li> </ul>	2

### Teacher Notes:

**Additional Resources:** Flocabulary, Brain Pop, Generation Genius, Mystery Science, Super Teacher Worksheets, IXL

### Differentiation/Modification Strategies

Students with Disabilities	English Language Learners
<ul style="list-style-type: none"> <li>Consult with case managers and follow student IEP</li> <li>Allow errors</li> <li>Rephrase questions, directions, and explanations</li> <li>Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>Accept participation at any level</li> </ul>	<ul style="list-style-type: none"> <li>Consult student ELL Plan</li> <li>Assign a buddy, same language or English speaking</li> <li>Allow errors in speaking</li> <li>Rephrase questions, directions, and explanations</li> <li>Allow extended time to answer questions</li> <li>Accept participation at any level</li> </ul>
Gifted & Talented Students	Students at Risk
<ul style="list-style-type: none"> <li>Consult with G and T teacher</li> <li>Provide extension activities</li> <li>Build on students' intrinsic motivations</li> </ul>	<ul style="list-style-type: none"> <li>Consult with I &amp; RS, classroom teacher(s), and guidance counselors as needed</li> <li>Follow I &amp; RS procedures/action plans</li> <li>Provide extended time to complete tasks</li> <li>Provide rewards as necessary</li> </ul>
504 Students	Other:

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>● Consult 504 Plan and follow accommodations/modifications</li><li>● Allow errors</li><li>● Rephrase questions, directions, and explanations</li><li>● Allow extended time to answer questions</li><li>● Accept participation at any level</li></ul> |  |
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**UNIT # 5****Overview****Content Area: Science****Unit Title: Systems for Survival****Grade Level(s): 4****Core Ideas:** In this unit of study, students will classify animals and identify parts of plants. Structures of plants and animals will be identified and understand the purpose of the adaptations.**Standards (Content and Technology)****CPI#:****Statement:****Performance Expectations (NJSL)**

4-LS1-1

Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

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.

**Career Readiness (9.2) Life Literacies, and Key Skills (standard 9.1, 9.4)**

9.2.5.CAP.1

Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.

9.4.5.CI.3

Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity

**Technology Literacy (standard 8 or 9.4.(TL))**

8.1.5.DA.5

Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

**Interdisciplinary Connection**

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.

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.

**Cross-cultural Statements/Mandates (*Amistad, Holocaust, LGBT/Disabilities, SEL, etc...*)**

LGBTQ Mandate: References to this mandate are made by studying Walter Westman. He studied botany and ecology.

**Unit Essential Question(s):**

- How do internal and external parts of plants and animals help them to survive, grow, behave, and reproduce?
- How do the structures of organisms enable life's functions?
- How and why do organisms interact with their environment and what are the effects of these interactions?
- How do animals receive and process different types of information from their environment in order to respond appropriately?

**Science and Engineering Practices:**

- Construct an argument with evidence, data, and/or a model. (4- LS1-1)

**Crosscutting Concepts:**

- A system can be described in terms of its components and their interactions. (4-LS1-1), (4-LS1-2)

**Enduring Understandings/ Disciplinary Core Ideas:**

- A system can be described in terms of its components and their interactions.
- Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.
- 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.

**Evidence of Learning****Formative Assessments:** entrance/exit tickets, teacher observations**Summative/Benchmark Assessment(s):** labs, quizzes, tests**Alternative Assessments:** modified versions of formative and summative, oral, notebook work

<b>Resources/Materials:</b> Discovery Education online techbook, interactive websites, Teachers Pay Teachers, Google Classroom, Document Camera, Smart Board		<b>Key Vocabulary:</b> fruit, roots, stem, leaf, flower, vertebrate, invertebrate, adaptation, physical adaptation, behavioral adaptations, learned behavior, camouflage, mimicry, migration, instinct, habitat	
<b>Suggested Pacing Guide</b>			
<b>Lesson Name/Topic</b>	<b>Student Learning Objective(s)</b>	<b>Suggested Tasks/Activities:</b>	<b>Day(s) to Complete</b>
Vocab	Define key vocabulary.	<ul style="list-style-type: none"> <li>● Online interactive glossary</li> </ul>	1
Growth and Development	Explain how different types of animals grow and change over time.	<ul style="list-style-type: none"> <li>● Fill-in notes</li> <li>● Discovery Education articles</li> <li>● Discovery Education videos</li> </ul>	3
Physical Features	Describe the features that make animals unique from other living things.	<ul style="list-style-type: none"> <li>● Fill-in notes</li> <li>● Discovery Education videos</li> <li>● Flocabulary</li> </ul>	3
Adaptations	Identify features that help plants and animals adapt to their environment.	<ul style="list-style-type: none"> <li>● Fill-in notes</li> <li>● Generation Genius video</li> </ul>	3
Shelter and Defense	Explain why different animals use different kinds of shelters based on their needs.	<ul style="list-style-type: none"> <li>● Fill-in notes</li> <li>● Discovery Education articles</li> <li>● Discovery Education videos</li> </ul>	3
Review and Assessment	Demonstrate knowledge of how plants and animals grow and develop and adapt to their environment based on their needs.	<ul style="list-style-type: none"> <li>● Review activities</li> <li>● Teacher-made assessment</li> </ul>	2
<b>Teacher Notes:</b>			
<b>Additional Resources:</b> Flocabulary, Brain Pop, Generation Genius, Mystery Science, Super Teacher Worksheets, IXL			
<b>Differentiation/Modification Strategies</b>			
<b>Students with Disabilities</b>		<b>English Language Learners</b>	
<ul style="list-style-type: none"> <li>● Consult with case managers and follow student IEP</li> <li>● Allow errors</li> <li>● Rephrase questions, directions, and explanations</li> <li>● Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>● Accept participation at any level</li> </ul>		<ul style="list-style-type: none"> <li>● Consult student ELL Plan</li> <li>● Assign a buddy, same language or English speaking</li> <li>● Allow errors in speaking</li> <li>● Rephrase questions, directions, and explanations</li> <li>● Allow extended time to answer questions</li> <li>● Accept participation at any level</li> </ul>	
<b>Gifted &amp; Talented Students</b>		<b>Students at Risk</b>	
<ul style="list-style-type: none"> <li>● Consult with G and T teacher</li> <li>● Provide extension activities</li> <li>● Build on students' intrinsic motivations</li> </ul>		<ul style="list-style-type: none"> <li>● Consult with I &amp; RS, classroom teacher(s), and guidance counselors as needed</li> <li>● Follow I &amp; RS procedures/action plans</li> <li>● Provide extended time to complete tasks</li> <li>● Provide rewards as necessary</li> </ul>	
<b>504 Students</b>		<b>Other:</b>	
<ul style="list-style-type: none"> <li>● Consult 504 Plan and follow accommodations/modifications</li> <li>● Allow errors</li> <li>● Rephrase questions, directions, and explanations</li> <li>● Allow extended time to answer questions</li> <li>● Accept participation at any level</li> </ul>			