Grades 3-5
SCIENCE CURRICULUM

Middle Township Public Schools
216 S. Main Street
Cape May Court House, NJ 08210

Born: April 2018 Revised: April 2022

Grade 3

Middle Township School District Science Curriculum	
Content Area: Science	
Course Title: Elementary	**Grade Level: 3**
Unit 1: Hereditary: Inheritance of Various Traits	25 Days
Unit 2: Interdependent Relationships in Ecosystems	20 Days
Unit 3: Motion and Stability: Forces and Interactions	18 Days
Unit 4: Weather and Climate	22 Days

Introduction:

The performance expectations in third grade help students formulate answers to questions such as: What kinds of traits are passed on from parent to offspring? What happens to plants and animals when the environment changes? How do equal and unequal forces on an object affect the object? How can we protect people from weather-related hazards?" Third grade performance expectations include PS2, LS1, LS2, LS3, LS4, ESS2, ESS3, ETS1, and ETS2 Disciplinary Core Ideas from the NRC Framework.

Students are able to identify traits that organisms pass on to their offspring, determine ways that the environment changes plants and animals, and create solutions for problems that the changing environment causes for organisms. Students develop an understanding of the similarities and differences in organisms' life cycles. In addition, students use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. Students determine the effects of balanced and unbalanced forces on the motion of an object and the cause-and-effect relationships of electrical or magnetic interactions to define a simple design problem that can be solved with magnets. Students organize and use data to describe typical weather conditions expected during a particular season. By applying their understanding of weather-related hazards and climate change, students are able to make a claim about the merit of a design solution that reduces the impact of such hazards.

The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; energy and matter; systems and system models; interdependence of science, engineering, and technology; science is a human endeavor; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the third grade performance expectations, students will demonstrate grade-appropriate proficiency in asking questions, developing, and using models, planning and

carrying out investigations, analyzing and interpreting data, constructing explanations, and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

SUBJECT: Science
GRADE LEVEL: 3
UNIT 1 TITLE: Inheritance and Variation of Traits
LENGTH OF STUDY: 17 Lessons

Unit 1: Hereditary: Inheritance and Variation of Traits	**Duration: 25 Days**

Standards/Learning Targets

Focus Standards (Major Standards)

3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. [Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.]

3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.]

3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment. [Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight.]

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. [Clarification Statement: Examples of cause-and-effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring]

Science and Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.	**LS1.B: Growth and Development of Organisms** • Reproduction is essential to the continued existence of every kind of	**Patterns** • Patterns of change can be used to make predictions.

• Develop models to describe phenomena. **Connections to Nature of Science** **Scientific Knowledge is Based on Empirical Evidence** • Science findings are based on recognizing patterns. **Analyzing and Interpreting Data** Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. • Analyze and interpret data to make sense of phenomena using logical reasoning. **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Use evidence (e.g., observations, patterns) to support an explanation.	organism. Plants and animals have unique and diverse life cycles. **LS3.A: Inheritance of Traits** • Many characteristics of organisms are inherited from their parents. **LS3.B: Variation of Traits** • Different organisms vary in how they look and function because they have different inherited information. **LS3.A: Inheritance of Traits** • Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. **LS3.B: Variation of Traits** • The environment also affects the traits that an organism develops. **LS4.B: Natural Selection** • Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.	• Similarities and differences in patterns can be used to sort and classify natural phenomena. **Cause and Effect** • Cause and effect relationships are routinely identified and used to explain change.

Supporting and Additional Standards

Engineering Standards should be incorporated throughout science activities, lessons, and tasks

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

MS.LS1.B; 4. ESS1.C; MS.LS2.A; MS.LS4.A; MS.ESS1.C ; MS.ESS2.B; 1.LS3.A; 1.LS3.B; MS.LS3.A; MS.LS3.B

Primary Interdisciplinary Connections

6.1.2.CivicsCM.3: Explain how diversity, tolerance, fairness, and respect for others can contribute to individuals feeling accepted.
6.1.2.HistoryUP.3: Use examples from the past and present to describe how stereotyping and prejudice can lead to conflict.
Articulation of DCIs across grade-levels:
Infused within the unit are connections to the NJSLS for Mathematics, Language Arts Literacy

ELA/Literacy —
RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS3-1) (3-LS3-2) (3-LS4-2)
RI.3.2 Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS3-1) (3-LS3-2) (3-LS4-2)
RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS3-1) (3-LS3-2) (3-LS4-2)
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). (3-LS1-1)
W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS3-1) (3-LS3-2) (3-LS4-2)
SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS3-1) (3-LS3-2) (3-LS4-2)
SL.3.5 Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details. (3-LS1-1)

Mathematics —
MP.2 Reason abstractly and quantitatively. (3-LS3-1) (3-LS3-2) (3-LS4-2)
MP.4 Model with mathematics. (3-LS1-1) (3-LS3-1) (3-LS3-2) (3-LS4-2)
3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. (3-LS4-2)
3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS3-1) (3-LS3-2)
3.NBT Number and Operations in Base Ten (3-LS1-1)
3.NF Number and Operations—Fractions (3-LS1-1)

Computer Science and Design Thinking Standards

- **8.1.5.AP.4**: Break down problems into smaller, manageable sub-problems to facilitate program development.
- **8.2.5.NT.4**: Identify how improvement in the understanding of materials science impacts technologies.

Career Readiness, Life Literacies, and Key Skills

- **9.4.5.CT.1**: Identify and gather relevant data that will aid in the problem-solving process.
- **9.4.5.CI.1**: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Evidence of Student Learning

Performance Tasks/Use of Technology:

- Lab activities
- Data Analysis to show patterns in traits between parents and offspring. Can use websites such as Data Nugget
- Science journals with observations and illustrations of Life Cycles.
- Venn Diagram for Traits using Google Draw or Jamboard
- Technology integration:
  - SMART Board activities
  - Google Forms quizzes
  - Kahoot games
  - YouTube videos
  - Flipgrid activities

Other Assessments

Formative

- Do Now: Life Cycle
- Exit Tickets: Animal Traits
- Written Assignments
- Student Reflections
- Observations
- Think-Pair-Share

S**ummative**

- NGSS Performance Assessment Task
- Lab Activities Report
- Inspire Assessment
- State Standardized Assessments (PARCC)

Benchmark

Alternative

- Project Based Learning: Sock Seeds
- Portfolios/Learning logs
- Presentations of Animal Traits/Life Cycles on Flipgrid

<table>
<tr><th colspan="2">Knowledge and Skills</th></tr>
<tr><th>Content</th><th>Skills</th></tr>
<tr><td>Unit Essential Questions
• Do all living things have the same life cycle?
• Are there advantages to being different?
• What kinds of traits are passed on from parent to offspring?
• How do environmental changes affect organisms?

Enduring Understandings
Students will know...
• Organisms go through different stages throughout their life.
• Certain traits provide organisms advantages in surviving, finding mates, and reproducing.
• Organisms have similar traits that they inherit from their parents and these traits can vary among organisms of similar species.
• When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.</td><td>Unit Goals:

Students will be able to...
• Identify patterns in the similarities and differences in the Life Cycles of organisms by completing a Venn Diagram to compare the life cycle of two animals with at least three details in each area of the graphic organizer.
• Collect, organize, and analyze data to show evidence that traits are inherited from parents. Data will include at least 3 traits.
• Identify at least four environmental factors that influence traits in organisms.
• Identify at least five traits that assist organisms in surviving, finding mates, and reproducing.</td></tr>
<tr><th colspan="2">Instructional Plan</th></tr>
<tr><th>Suggested Activities</th><th>Resources</th></tr>
<tr><td>3-LS1-1.
Choose an animal and have students draw and label the life cycle.

3-LS3-1.
Compare and contrast 2 animals' traits using a Venn diagram

3-LS4-2.
Have students explain the following statement in a paragraph:</td><td>Resources for on-grade students:
• Inspire on-level resources
• Mystery Science Materials
https://mysteryscience.com/animals/mystery-4/trait-variation-inheritance-artificial-selection/30

Resources for students approaching grade level expectations:
• Inspire approaching resources
• New Jersey Center for Teaching and Learning</td></tr>
</table>

Examples of cause-and-effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring. Read Aloud "All Kinds of Children" to talk about diversity and human traits that are acquired from parents. 3-LS1-1. From Seed to Flower (5 min. video) see explanation below. https://nj.pbslearningmedia.org/resource/tdc02.sci.life.colt.plantsgrow/from-seed-to-flower/#.WXYSztorJD8 The growth and development of a plant is one of the most spectacular events in nature. Yet, because it happens so slowly, over the course of days or weeks, it is difficult to observe in real time. This video segment depicts plant growth in time-lapse format, allowing the viewer to observe in just a few seconds some of the most important life stages of a plant, from germination to the formation of a flower, and several phases in between. Footage from NOVA: "The Shape of Things."	https://njctl.org/materials/units/inheritance-of-traits-1/open=Presentation Resources for students exceeding grade level expectations: • Inspire exceeding resources • Data Nuggets http://datanuggets.org/
Suggested Options for Differentiation	
English Language Learners: • Provide pictures and well labeled models • Speak slowly and gesture when necessary • Pre-teach vocabulary words • Provide visual models/examples of projects • Extended Time • Reduce reading load	**Special Education**: • Follow specific IEP accommodations and modifications • Multi-sensory instruction • Strategic grouping • Pre-teach concepts • Scaffolding Questioning • Small group for assessments • Check ins during experiments to help refocus
Students with 504 Plans: • Check ins during experiments to help refocus • Follow specific 504 accommodations and modifications	**Gifted and Talented**: • Open ended questions to activate higher level thinking • Higher level texts ReadWorks Articles

• Strategic grouping • Simplify written and verbal directions • Multi-sensory instruction	• Student interest-driven activities abcya.com • Problem solving/design challenges • Use more complex concepts • Enrichment opportunities to push assessment boundaries
Students At Risk of School Failure: • Strategic grouping • Pre-teach concepts • Multi-sensory instruction • Small group for assessments • Allow alternate assignments • Check ins during experiments to help refocus • High interest options/topics BrainPOP.com • Provide incentives to increase motivation and collaboration	

Core Instructional and Supplemental Materials

Core Texts
- Nat Geo Exploring Science
- Mystery Science

Supplemental Texts/Materials for Students On-Grade/ Meeting Expectations
- Tiger Math: Learning to Graph from a Baby Tiger. Ann Whitehead Nagda and Cindy Bickel. Henry Holt (2000).
- Demonstrations
- Online games
- Plants
- Life Cycle models
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Supplemental Texts/Materials for Students Approaching Grade Level Expectations
- Science Comics: Dinosaurs (Facts and Feathers): MK Reed/Joe Flood
- Scholastic News
- YouTube videos
- Plants

- Life Cycle models
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Supplemental Texts/Materials for Students Exceeding Grade Level Expectations

- Readworks Articles
- Comprehension worksheets
- Plants
- Life Cycle models
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Teacher Notes: Texts listed above are suggestions and may be supplemented/substituted with other district-approved choices.

SUBJECT: Science
GRADE LEVEL: 3
UNIT 2 TITLE: Interdependent Relationships in Ecosystems
LENGTH OF STUDY: 20 Lessons

Unit 2: Interdependent Relationships in Ecosystems	**Duration: 20 Days**
Standards/Learning Targets	
Focus Standards (Major Standards)	
3-LS2-1. Construct an argument that some animals form groups that help members survive. **3-LS4-1.** Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major	

fossil types and relative ages.]

less well, and some cannot survive at all. [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]

3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change. [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]

Science and Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Engaging in Argument from Evidence Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). • Construct an argument with evidence, data, and/or a model. • Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. **Analyzing and Interpreting Data** Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. • Analyze and interpret data to make sense of phenomena using logical reasoning.	**LS2.D: Social Interactions and Group Behavior** • Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size (Note: Moved from K–2). **LS4.A: Evidence of Common Ancestry and Diversity** • Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (Note: moved from K-2) Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. **LS4.C: Adaptation** • For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. **LS2.C: Ecosystem Dynamics, Functioning, and Resilience**	**Cause and Effect** • Cause and effect relationships are routinely identified and used to explain change. **Scale, Proportion, and Quantity** • Observable phenomena exist from very short to very long time periods. **Connections to Nature of Science** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** • Science assumes consistent patterns in natural systems. **Systems and System Models** • A system can be described in terms of its components and their interactions. **Connections to Engineering, Technology, and Applications of Science**

	• When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. (secondary) **LS4.D: Biodiversity and Humans** • Populations live in a variety of habitats, and change in those habitats affect the organisms living there.	**Interdependence of Engineering, Technology, and Science on Society and the Natural World** • Knowledge of relevant scientific concepts and research findings is important in engineering.

Supporting and Additional Standards

3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]

3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.

3-ESS3-1 Make a claim about the merit of a design solution that reduces the impacts of climate change and/or a weather-related hazard. [Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.]

Engineering Standards should be incorporated throughout science activities, lessons, and tasks

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.

Articulation of DCIs across grade-levels:

1.LS1.B; MS.LS2.A 4.ESS1.C; MS.LS4.A; MS.ESS1.C; MS.ESS2.B; K.ESS3.A; 2.LS2.A; 2.LS4.D; MS.LS2.A; MS.LS4.B; MS.LS4.C; MS.ESS1.C; K.ETS1.A; 4.ESS3.B; 4.ETS1.A; MS.LS2.C; MS.LS4.C; MS.ESS3.C

Primary Interdisciplinary Connections

ELA/Literacy —

RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS2-1) (3-LS4-1) (3-LS4-3) (3-LS4-4)

RI.3.2 Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS4-1) (3-LS4-3(3-LS4-4))

RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS2-1) (3-LS4-1) (3-LS4-3) (3-LS4-3) (3-LS4-4)

W.3.1 Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS2-1) (3-LS4-1) (3-LS4-3) (3-LS4-4)

W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-1) (3-LS4-4)

W.3.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-LS4-1)

SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS4-3) (3-LS4-4)

Mathematics —

MP.2 Reason abstractly and quantitatively. (3-LS4-1) (3-LS4-3) (3-LS4-4)

MP.4 Model with mathematics. (3-LS2-1) (3-LS4-1) (3-LS4-4)

MP.5 Use appropriate tools strategically. (3-LS4-1)

3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "How many more" and "how many less" problems using information presented in scaled bar graphs. (3-LS4-3)

3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS4-1)

3.NBT Number and Operations in Base Ten. (3-LS2-1)

Computer Science and Design Thinking Standards

- **8.1.5.AP.4**: Break down problems into smaller, manageable sub-problems to facilitate program development.
- **8.1.5.DA.5**: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Career Readiness, Life Literacies, and Key Skills

- **9.4.5.CT.1**: Identify and gather relevant data that will aid in the problem-solving process.
- **9.4.5.CI.1**: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

<table>
<tr><th colspan="2">Evidence of Student Learning</th></tr>
<tr><td>Performance Tasks/Use of Technology:
Ongoing Log
Lab activities
Data collection/Data analysis to show patterns in traits between parents and offspring. Can use websites such as Data Nugget
Science journals with observations and illustrations
Graphic organizers, using Google Draw or Jamboard
Technology integration:
SMART Board activities
Google Forms quizzes
Kahoot games
YouTube videos
Flipgrid activities</td><td>Other Assessments
Formative
Do Nows
Exit tickets
Student Reflections
Teacher Observations
Written Assignments
Think- Pair- Share
Classroom Discussions/Participation
Summative
Unit Project
Performance Task NGSS (suggestion: design an ecosystem including appropriate animals, characteristics)
Lab activities report
Nat Geo Assessment
State Standardized Assessments
SGO Assessments
Benchmark

Alternative
Animal Research Project: Students choose an animal and complete a research project that includes information about the animal’s traits/behaviors that help it survive.
Presentations of Animal Traits/Life Cycles on Flipgrid</td></tr>
<tr><th colspan="2">Knowledge and Skills</th></tr>
<tr><th>Content</th><th>Skills</th></tr>
<tr><td>Unit Essential Questions
In a particular habitat, why do some organisms survive well, some survive less well, and some not survive at all?
What do fossils tell us about the organisms and the environments in which they lived?</td><td>Unit Goals:

Students will be able to...
Provide evidence that groups help animals survive.</td></tr>
</table>

• What happens to the plants and animals when the environment changes? **Enduring Understandings** *Students will know...* • There is a connection between the needs and characteristics of an organism and the habitats in which they live. Also, some animals form groups to help members survive. • Fossils provide information about the Earth and environment from long ago. • Changes in the environment affect the species that live there.	• Collect, analyze, and interpret data based on type, size, and distribution of fossil organisms. • Draw conclusions about the environment in which extinct organisms once lived and the relative age of fossils. • Predict the effects of environmental changes such as water distribution, temperature, food, and invasive species on the plants and animals that inhabit the area.

Instructional Plan	
Suggested Activities	**Resources**
3-LS2-1. Learn about ecosystems. 3-ESS3-1 Students can obtain information about animals in this Unit plan to then form solutions to problems with climate change and weather-related hazards. 3-LS4-4. Learn about climate. https://mysteryscience.com/weather/mystery-3/climate-geography-global-weather-patterns/98 3-LS4-3. Ecosystem Introduction PowerPoint: https://www.slideshare.net/allsaintsscience/3rd-gradech-3-lesson-1-what-are-ecosystems Students can make a vocabulary booklet of new vocabulary word/definition/illustration while going through above PowerPoint. 3-LS4-3.	**Resources for on-grade students**: • Nat Geo on-grade activities • Mystery Science Materials • National Science Teachers' Association https://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=6 **Resources for students approaching grade level expectations**: • Nat Geo approaching resources • New Jersey Center for Teaching and Learning • NJ Center for Teaching and Learning https://njctl.org/materials/units/ecosystems-group-behavior/ **Resources for students exceeding grade level expectations**: • Nat Geo exceeding resources • https://kids.nationalgeographic.com/ **Useful links / online resources**: • http://theoceancountylibrary.org/ • http://www.readwritethink.org/ • https://www.commonlit.org/ • https://www.activelylearn.com/

<table>
<tr><td>Exploring Garden Ecosystems video link (5min.):
see explanation below
https://www.teachingchannel.org/videos/exploring-garden-ecosystems
Students work in groups to explore attributes of ecosystems first-hand
Questions to Consider from video:
• What does the teacher do at the beginning of the lesson to manage 3 different groups doing 3 different activities?
• What advice does Ms. Reed give for outside activities and why?
• How are students informally assessed during and after the activities?</td><td>• https://www.readworks.org/</td></tr>
<tr><td colspan="2">Suggested Options for Differentiation</td></tr>
<tr><td>English Language Learners:
• Provide pictures and well labeled models
• Speak slowly and gesture when necessary
• Pre-teach vocabulary words
• Provide visual models/examples of projects
• Extended Time
• Reduce reading load</td><td>Special Education:
• Follow specific IEP accommodations and modifications
• Multi-sensory instruction
• Strategic grouping
• Pre-teach concepts
• Scaffolding Questioning
• Small group for assessments
• Check ins during experiments to help refocus</td></tr>
<tr><td>Students with 504 Plans:
• Check ins during experiments to help refocus
• Follow specific504 accommodations and modifications
• Strategic grouping
• Simplify written and verbal directions
• Multi-sensory instruction</td><td>Gifted and Talented:
• Open ended questions to activate higher level thinking
• Higher level texts ReadWorks Articles
• Student interest-driven activities abcya.com
• Problem solving/design challenges
• Use more complex concepts
• Enrichment opportunities to push assessment boundaries</td></tr>
<tr><td>Students At Risk of School Failure:
• Strategic grouping
• Pre-teach concepts
• Multi-sensory instruction
• Small group for assessments
• Allow alternate assignments</td><td></td></tr>
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• Check ins during experiments to help refocus • High interest options/topics BrainPOP.com • Provide incentives to increase motivation and collaboration	

Core Instructional and Supplemental Materials

Core Texts

- Nat Geo Exploring Science
- Mystery Science

Supplemental Texts/Materials for Students On-Grade/ Meeting Expectations

- https://scholasticnews.scholastic.com/
- https://www.youtube.com/user/scishowkids
- https://mysteryscience.com/
- https://mysterydoug.com/
- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- Demonstrations
- Online games
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Supplemental Texts/Materials for Students Approaching Grade Level Expectations

- Listening Option on Scholastic: https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- https://www.getepic.com/
- Science Comics: Dinosaurs (Facts and Feathers): MK Reed/Joe Flood
- Scholastic News
- YouTube videos
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Supplemental Texts/Materials for Students Exceeding Grade Level Expectations

- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- Readworks Articles
- Comprehension worksheets
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Teacher Notes: Texts listed above are suggestions and may be supplemented/substituted with other district-approved choices.

SUBJECT: Science
GRADE LEVEL: 3
UNIT 3 TITLE: Motion and Stability: Forces and Interactions
LENGTH OF STUDY: 18 Lessons

Unit 3: Motion and Stability: Forces and Interactions	**Duration: 18 Days**

Standards/Learning Targets

Focus Standards (Major Standards)

3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. [Clarification Statement: Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all.] [Assessment Boundary: Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.]

3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. [Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a seesaw.] [Assessment Boundary: Assessment does not include technical terms such as period and frequency.]

3-PS2-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two

objects not in contact with each other. [Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paper clips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause-and-effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.] [Assessment Boundary: Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.]

3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets. [Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.]

Science and Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • 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. • Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. **Connections to Nature of Science** **Scientific Investigations Use a Variety of Methods** • Science investigations use a variety of methods, tools, and techniques.	**PS2.A: Forces and Motion** • Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) • The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.) **PS2.B: Types of Interactions** • Objects in contact exert forces on each other. **PS2.B: Types of Interactions**	**Cause and Effect** • Cause and effect relationships are routinely identified. **Patterns** • Patterns of change can be used to make predictions. **Connections to Engineering, Technology, and Applications of Science** **Interdependence of Science, Engineering, and Technology** • Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process.

Science Knowledge is Based on Empirical Evidence • Science findings are based on recognizing patterns. **Asking Questions and Defining Problems** Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. • Ask questions that can be investigated based on patterns such as cause-and-effect relationships. • Define a simple problem that can be solved through the development of a new or improved object or tool.	• Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.	

Supporting and Additional Standards

Engineering Standards should be incorporated throughout science activities, lessons, and tasks

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.

Articulation of DCIs across grade-levels:

K.PS2.A; K.PS2.B; K.PS3.C; 5.PS2.B; MS.PS2.A; MS.ESS2.C; 1.ESS1.A; 4.PS4.A; MS.PS2.A; MS.ESS1.B; MS.PS2.B; K.ETS1.A; 4.ETS1.A

Primary Interdisciplinary Connections

ELA/Literacy -

RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-PS2-1) (3-PS2-3)

RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-PS2-3)

RI.3.8 Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence). (3-PS2-3)

SL.3.3 Ask and answer questions about information from a speaker, offering appropriate elaboration and detail. (3-PS2-3)

W.3.7 Conduct short research projects that build knowledge about a topic. (3-PS2-1) (3-PS2-2)

W.3.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-PS2-1) (3-PS2-2)

Mathematics -

MP.2 Reason abstractly and quantitatively. (3-PS2-1)

MP.5 Use appropriate tools strategically. (3-PS2-1)

3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-PS2-1)

Computer Science and Design Thinking Standards

- **8.1.5.AP.4**: Break down problems into smaller, manageable sub-problems to facilitate program development.
- **8.2.5.NT.1**: Troubleshoot a product that has stopped working and brainstorm ideas to correct the problem.

Career Readiness, Life Literacies, and Key Skills

- **9.4.5.CT.1**: Identify and gather relevant data that will aid in the problem-solving process.
- **9.4.5.IML.3**: Represent the same data in multiple visual formats in order to tell a story about the data.

Evidence of Student Learning

Performance Tasks/Use of Technology:

- Ongoing Log
- Lab activities/Hands on Activities
- Vocab Study
- Student Response System (Kahoot)
- Science journals with observations and illustrations
- Graphic organizers, using Google Draw or Jamboard
- Technology integration:

Other Assessments

Formative

- Do Nows
- Exit tickets
- Student Reflections
- Teacher Observation of students as they apply new concepts and skills looking for evidence that the students have changed their thinking or behaviors.

o SMART Board activities o Google Forms quizzes o Kahoot games o YouTube videos: https://www.youtube.com/watch?v=4I1WqXHkVgs o Flipgrid activities	• Written Assignments • Think- Pair- Share • Classroom Discussions/Participation **Summative** • Unit Project • Performance Task NGSS (suggestion: design an ecosystem including appropriate animals, characteristics) • Lab activities report • Nat Geo Assessment • State Standardized Assessments • SGO Assessments **Benchmark** **Alternative** • System Showplace: Students design and model a • system to show how the forces of a magnet can be • used.
Knowledge and Skills	
Content	**Skills**
Unit Essential Questions: • How do equal and unequal forces on an object affect the object? • How can we use our understanding of magnets to solve problems? **Enduring Understandings** *Students will know...* • There are different forces that affect the movement of an object. • Forces can be balanced or unbalanced and each has different effects on the movement of objects. • Only one variable should be assessed at a time. • Patterns can be used to predict future motion.	**Unit Goals:** *Students will be able to...* • Construct and execute an experiment to prove that motion is affected by balanced and unbalanced forces. • Make observations and collect data to prove that patterns in an object's motion can predict future motion. • Determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. • Define a simple design problem that can be solved by applying scientific ideas about magnets.

• There are relationships of electric or magnetic interactions between two objects not in contact with each other.	

Instructional Plan	
Suggested Activities	**Resources**
3-PS2-1 Have students create balloon race models and apply concepts of physics. **3-PS2-1** Have various items for students to classify as magnetic **3-PS2-2** Students can determine strength of various magnets using paper clips **3-PS2-2** Watch: Bill Nye the Science Guy Magnetism: https://www.youtube.com/watch?v=Viml1smEBks **3-PS2-2** Watch: The Magic School Bus Gets Charged in Magnetism: https://vimeo.com/channels/1205100/109149387 **3-PS2-4.** Have students examine the STEM aspects involved in constructing a new and improved swing set design. Science inquiry activities will allow students to explore the impact of balanced and unbalanced forces on motion and force. Students will gain a conceptual understanding of motion and force when they relate how the body moves to the objects explore, paying close attention to the forces each exerts and the positions maintained to keep balance.	Chromebooks SMARTboard Document Cameras Nat Geo Materials Mystery Science Materials **Resources for on-grade students**: • Nat Geo on-grade activities • Mystery Science Materials • 3rd Grade Newton's Laws Activities https://www.brighthubeducation.com/lesson-plans-grades-3-5/35812-newtons-laws-of-motion/ • New Jersey Center for Teaching and Learning https://njctl.org/materials/units/motion-and-stability/ • National Science Teachers' Association https://ngss.nsta.org/classroom-resources-results.aspx?CoreIdea=6 **Resources for students approaching grade level expectations**: • Nat Geo approaching resources • Magic School Bus https://vimeo.com/channels/1205100/109149387 • Newton's Law Printable Book https://www.teachervision.com/newtons-laws/newtons-laws-printable-book-3-6 • Bill Nye. https://www.youtube.com/watch?v=Viml1smEBks • New Jersey Center for Teaching and Learning https://njctl.org/materials/units/motion-and-stability/ **Resources for students exceeding grade level expectations**:

	• Nat Geo exceeding resources • Swing Set STEM activity https://www.pinterest.com/pin/168603579780077685/ • STEAM activity. https://www.steampoweredfamily.com/activities/physics-activities/ • https://kids.nationalgeographic.com/ **Useful links / online resources**: • http://theoceancountylibrary.org/ • http://www.readwritethink.org/ • https://www.commonlit.org/ • https://www.activelylearn.com/ • https://www.readworks.org/
Suggested Options for Differentiation	
English Language Learners: • Provide pictures and well labeled models https://www.edutopia.org/blog/ell-engagment-using-photos • Speak slowly and gesture when necessary • Pre-teach vocabulary words • Provide visual models/examples of projects • Extended Time • Reduce reading load	**Special Education:** • Follow specific IEP accommodations and modifications • Multi-sensory instruction • Strategic grouping • Pre-teach concepts • Scaffolding Questioning • Small group for assessments • Check ins during experiments to help refocus
Students with 504 Plans: • Check ins during experiments to help refocus • Follow specific504 accommodations and modifications • Strategic grouping • Simplify written and verbal directions • Multi-sensory instruction	**Gifted and Talented**: • Open ended questions to activate higher level thinking • Higher level texts ReadWorks Articles • Student interest-driven activities abcya.com • Problem solving/design challenges • Use more complex concepts • Enrichment opportunities to push assessment boundaries
Students At Risk of School Failure: • Strategic grouping • Pre-teach concepts	

• Multi-sensory instruction • Small group for assessments • Allow alternate assignments • Check ins during experiments to help refocus • High interest options/topics BrainPOP.com • Provide incentives to increase motivation and collaboration	

Core Instructional and Supplemental Materials

Core Texts

- Nat Geo Exploring Science
- Mystery Science

Supplemental Texts/Materials for Students On-Grade/ Meeting Expectations

- https://scholasticnews.scholastic.com/
- https://www.youtube.com/user/scishowkids
- https://mysteryscience.com/
- https://mysterydoug.com/
- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- Demonstrations
- Online games
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Supplemental Texts/Materials for Students Approaching Grade Level Expectations

- Listening Option on Scholastic: https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- https://www.getepic.com/
- Scholastic News
- YouTube videos
- Chromebooks
- SMARTboard
- Wonders Materials

- Mystery Science Materials

Supplemental Texts/Materials for Students Exceeding Grade Level Expectations

- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- Readworks Articles
- Comprehension worksheets
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Teacher Notes: Texts listed above are suggestions and may be supplemented/substituted with other district-approved choices.

SUBJECT: Science
GRADE LEVEL: 3
UNIT 4 TITLE:
LENGTH OF STUDY: 22 Lessons

Unit 4: Weather and Climate	**Duration: 22 Days**

Standards/Learning Targets

Focus Standards (Major Standards)

3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]

3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.

3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.
[Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods]

Science and Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Analyzing and Interpreting Data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. • Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and other reliable media to explain phenomena. **Engaging in Argument from Evidence** Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). • Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.	**ESS2.D: Weather and Climate** • Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. • Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. **ESS3.B: Natural Hazards** • A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)	**Patterns** • Patterns of change can be used to make predictions. **Cause and Effect** • Cause and effect relationships are routinely identified, tested, and used to explain change. **Connections to Engineering, Technology, and Applications of Science** **Influence of Engineering, Technology, and Science on Society and the Natural World** • Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). **Connections to Nature of Science** **Science is a Human Endeavor** • Science affects everyday life.

Supporting and Additional Standards

Engineering Standards should be incorporated throughout science activities, lessons, and tasks

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.

Articulation of DCIs across grade-levels:
K.ESS2.D; 4.ESS2.A; 5.ESS2.A; MS.ESS2.C; MS.ESS2.D; K.ESS3.B; K.ETS1.A; 4.ESS3.B; 4.ETS1.A; MS.ESS3.B

Primary Interdisciplinary Connections

Primary Interdisciplinary Connections: Infused within the unit are connections to the NJSLS for Mathematics, Language Arts Literacy

ELA/Literacy —
RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-ESS2-2)
RI.3.9 Compare and contrast the most important points and key details presented in two texts on the same topic. (3-ESS2-2)
W.3.1 Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-ESS3-1)
W.3.7 Conduct short research projects that build knowledge about a topic. (3-ESS3-1)
W.3.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-ESS2-2)

Mathematics —
MP.2 Reason abstractly and quantitatively. (3-ESS2-1) (3-ESS2-2) (3-ESS3-1)
MP.4 Model with mathematics. (3-ESS2-1) (3-ESS2-2) (3-ESS3-1)
MP.5 Use appropriate tools strategically. (3-ESS2-1)
3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-ESS2-1)
3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in bar graphs. (3-ESS2-1

Computer Science and Design Thinking Standards

- **8.1.5.AP.4**: Break down problems into smaller, manageable sub-problems to facilitate program development.
- **8.2.5.ITH.4**: Describe a technology/tool that has made the way people live easier or has led to a new business or career.

Career Readiness, Life Literacies, and Key Skills

- **9.2.5.CAP.8**: Identify risks that individuals and households face
- 9**.4.5.CI.1**: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Evidence of Student Learning

Performance Tasks/Use of Technology:

- Ongoing Log
- Lab activities/Hands on Activities
- Vocab Study
- Student Response System (Kahoot)
- Science journals with observations and illustrations
- Graphic organizers, using Google Draw or Jamboard
- Technology integration:
  - SMART Board activities
  - Google Forms quizzes
  - Kahoot games
  - YouTube videos: https://www.youtube.com/watch?v=Uo8lbeVVb4M
  - Flipgrid activities

Other Assessments

Formative

- Do Nows
- Exit tickets
- Student Reflections
- Teacher Observation of students as they apply new concepts and skills looking for evidence that the students have changed their thinking or behaviors.
- Written Assignments
- Think- Pair- Share
- Classroom Discussions/Participation

S**ummative**

- Unit Project
- Performance Task NGSS (suggestion: design an ecosystem including appropriate animals, characteristics)
- Lab activities report
- Nat Geo Assessment
- State Standardized Assessments
- SGO Assessments

Benchmark

Alternative

- Students create a Flipgrid to show a detailed weather report of a weather-related hazard. The report should include precautions that should be taken.

<table>
<tr><th colspan="2">Knowledge and Skills</th></tr>
<tr><th>Content</th><th>Skills</th></tr>
<tr><td>Unit Essential Questions:
• What is the typical weather near our home?
• How can we protect people from weather-related hazards?

Enduring Understandings
Students will know...
• Weather can include conditions related to average temperature, precipitation, wind speed, and direction for certain areas.
• There is a difference between climate and weather.
• Different regions of the world have different climates.
• Weather impacts the environment and creates weather-related hazards.</td><td>Unit Goals:
Students will be able to...
• Create data tables and graphical displays and use these to analyze the weather conditions during a certain span of time.
• Gather data to assist in analyzing different climates.
• Design a solution to prevent weather-related hazards.</td></tr>
<tr><th colspan="2">Instructional Plan</th></tr>
<tr><th>Suggested Activities</th><th>Resources</th></tr>
<tr><td>3-ESS2-1. Students observe and record different types of clouds.

3-ESS2-1. Students practice using thermometers, make homemade thermometers, and use thermometers to record and graph temperature data.

3-ESS2-1. In this investigation, students collect weather data for two weeks. They will start seeing patterns and be able to make predictions.

3-ESS3-1Readworks Weather article and questions: Nonfiction It’s Raining It’s Pouring! (Teacher Guide and Answer Key included).

https://www.livebinders.com/media/get_centered/NDkxNzU5Mw==

Magic School Bus: https://www.youtube.com/watch?v=AoErCgjX1kg</td><td>Chromebooks
SMARTboard
Document Cameras
Nat Geo Materials
Mystery Science Materials

Resources for on-grade students:
• Nat Geo on-grade activities
• Mystery Science Materials
• 3rd Grade Newton's Laws Activities https://www.brighthubeducation.com/lesson-plans-grades-3-5/35812-newtons-laws-of-motion/
• New Jersey Center for Teaching and Learning https://njctl.org/materials/units/weather-climate/
• National Science Teachers’ Association https://njctl.org/materials/units/weather-climate/</td></tr>
</table>

	Resources for students approaching grade level expectations: • Nat Geo approaching resources • Magic School Bus https://www.youtube.com/watch?v=AoErCgjX1kg • Bill Nye. https://www.youtube.com/watch?v=Viml1smEBks https://www.dailymotion.com/video/x3jyuu5 • New Jersey Center for Teaching and Learning https://njctl.org/materials/units/motion-and-stability/ **Resources for students exceeding grade level expectations**: • Nat Geo exceeding resources • https://kids.nationalgeographic.com/ **Useful links / online resources**: • http://theoceancountylibrary.org/ • http://www.readwritethink.org/ • https://www.commonlit.org/ • https://www.activelylearn.com/ • https://www.readworks.org/
Suggested Options for Differentiation	
English Language Learners: • Provide pictures and well labeled models https://www.edutopia.org/blog/ell-engagment-using-photos • Speak slowly and gesture when necessary • Pre-teach vocabulary words • Provide visual models/examples of projects • Extended Time • Reduce reading load	**Special Education:** • Follow specific IEP accommodations and modifications • Multi-sensory instruction • Strategic grouping • Pre-teach concepts • Scaffolding Questioning • Small group for assessments • Check ins during experiments to help refocus
Students with 504 Plans: • Check ins during experiments to help refocus • Follow specific504 accommodations and modifications • Strategic grouping	**Gifted and Talented**: • Open ended questions to activate higher level thinking • Higher level texts ReadWorks Articles • Student interest-driven activities abcya.com

• Simplify written and verbal directions • Multi-sensory instruction	• Problem solving/design challenges • Use more complex concepts • Enrichment opportunities to push assessment boundaries
Students At Risk of School Failure: • Strategic grouping • Pre-teach concepts • Multi-sensory instruction • Small group for assessments • Allow alternate assignments • Check ins during experiments to help refocus • High interest options/topics BrainPOP.com • Provide incentives to increase motivation and collaboration	

Core Instructional and Supplemental Materials

Core Texts

- Nat Geo Exploring Science
- Mystery Science

Supplemental Texts/Materials for Students On-Grade/ Meeting Expectations

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- https://www.youtube.com/user/scishowkids
- https://mysteryscience.com/
- https://mysterydoug.com/
- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- Demonstrations
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- https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- Readworks Articles
- Comprehension worksheets
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- SMARTboard
- Wonders Materials
- Mystery Science Materials

Teacher Notes: Texts listed above are suggestions and may be supplemented/substituted with other district-approved choices.

Grade 4

Middle Township School District Science Curriculum	
Content Area: Science	
Course Title: Elementary	**Grade Level: 4**
Unit 1: Energy	25 Days
Unit 2: Earth's Systems: Processes that Shape the Earth	20 Days
Unit 3:	18 Days
Unit 4:	22 Days

Introduction

The performance expectations in fourth grade help students formulate answers to questions such as: "What are waves and what are some things they can do? How can water, ice, wind, and vegetation change the land? What patterns of Earth's features can be determined with the use of maps? How do internal and external structures support the survival, growth, behavior, and reproduction of plants and animals? What is energy and how is it related to motion? How is energy transferred? How can energy be used to solve a problem?" Fourth grade performance expectations include PS3, PS4, LS1, ESS1, ESS2, ESS3, and ETS1 Disciplinary Core Ideas from the NRC Framework.

Students are able to use a model of waves to describe patterns of waves in terms of amplitude and wavelength, and that waves can cause objects to move. Students are expected to develop understanding of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. They apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of such processes on humans. In order to describe patterns of Earth's features, students analyze and interpret data from maps. Fourth graders are expected to develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. By developing a model, they describe that an object can be seen when light reflected from its surface enters the eye. Students are able to use evidence to construct an explanation of the relationship between the speed of an object and the energy of that object. Students are expected to develop an understanding that energy can be transferred from place to place by sound, light, heat, and electric currents or from object to object through collisions. They apply their understanding of energy to design, test, and refine a device that converts energy from one form to another.

The crosscutting concepts of patterns; cause and effect; energy and matter; systems and system models; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as

organizing concepts for these disciplinary core ideas. In the fourth grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in asking questions, developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations, and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

SUBJECT: Science
GRADE LEVEL: 4
UNIT 1 TITLE: Energy
LENGTH OF STUDY: Lessons

Unit 1: Energy	**Duration: Days**
Standards/Learning Targets	
Focus Standards (Major Standards)	
4-PS3-1. **Use evidence to construct an explanation relating the speed of an object to the energy of that object.** [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.] **4-PS3-2**. **Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.** [Assessment Boundary: Assessment does not include quantitative measurements of energy.] **4-PS3-3**. **Ask questions and predict outcomes about the changes in energy that occur when objects collide.** [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.] **4-PS3-4**. **Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*** [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.] **4-ESS3-1**. **Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.** [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; nonrenewable energy resources are fossil fuels and fossil materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]	

Science and Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Asking Questions and Defining Problems Asking questions and defining problems in grades 3–5 builds from grades K–2 experiences and progresses to specifying qualitative relationships. • Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (4-PS3-3) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (4-PS3-2) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Use evidence (e.g., measurements, observations, patterns) to construct an explanation. (4-PS3-1)	**PS3.A: Definitions of Energy** • 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) **PS3.B: Conservation of Energy and Energy Transfer** • 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) • Light also transfers energy from place to place. (4-PS3-2) • Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2), (4-PS3-4) **PS3.C: Relationship Between Energy and Forces** • When objects collide, the contact forces transfer energy so as to change the objects' motions. (4-PS3-3)	**Cause and Effect** • Cause and effect relationships are routinely identified and used to explain change. (4-ESS3-1) **Energy and Matter** • Energy can be transferred in various ways and between objects. (4-PS3-1), (4-PS3-2), (4-PS3-3), (4-PS3-4) **Connections to Engineering, Technology, and Applications of Science** **Influence of Science, Engineering, and Technology on Society and the Natural World** • Engineers improve existing technologies or develop new ones. (4-PS3-4) • Over time, people's needs and wants change, as do their demands for new and improved technologies. (4-ESS3-1) **Interdependence of Science, Engineering, and Technology** • Knowledge of relevant scientific concepts and research findings is important in engineering. (4-ESS3-1) **Connections to Nature of Science** **Science Is a Human Endeavor** • Science affects everyday life. (4-PS3-4) • Most scientists and engineers work in teams. (4-PS3-4)

• Apply scientific ideas to solve design problems. (4-PS3-4) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and other reliable media to explain phenomena. (4-ESS3-1) **Asking Questions and Defining Problems** A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world(s) works and which can be empirically tested. • Identify scientific (testable) and non-scientific (non-testable) questions. • Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and other reliable media to explain phenomena. **Engaging in Argument from Evidence**	**PS3.D: Energy in Chemical Processes and Everyday Life** • The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4) **ESS3.A: Natural Resources** • Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3-1) **ETS1.A: Defining and Delimiting Engineering Problems** • Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. *(secondary to 4-PS3-4)*	

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). • Compare and refine arguments based on an evaluation of the evidence presented. • Distinguish among facts, reasoned judgment based on research findings, and speculation in an explanation.		

Supporting and Additional Standards

Engineering Standards should be incorporated throughout science activities, lessons, and tasks

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. [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.]

4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. [Assessment Boundary: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.]

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

Articulation of DCIs across grade-levels:
K.ESS2.D; 4.ESS2.A; 5.ESS2.A; MS.ESS2.C; MS.ESS2.D; K.ESS3.B; K.ETS1.A; 4.ESS3.B; 4.ETS1.A; MS.ESS3.B

Primary Interdisciplinary Connections

Primary Interdisciplinary Connections: Infused within the unit are connections to the NJSLS for Mathematics, Language Arts Literacy

ELA/Literacy -
W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (4-PS3-1)
W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-PS3-2), (4-PS3-4) (4-ESS3-1)

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. (4-PS3-1) (4-PS3-2) (4-PS3-4) (4-ESS3-1)
W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-PS3-1) (4-ESS3-1)
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. (4-PS3-1)
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. (4-PS3-1)
RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS3-1)

Mathematics -
MP.2 Reason abstractly and quantitatively. (4-ESS3-1)
MP.4 Model with mathematics. (4-ESS3-1)
4.OA.A.1 Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 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. (4-ESS3-1)
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. (4-PS3-4)

Computer Science and Design Thinking Standards

- **8.1.5.NI.1**: Develop models that successfully transmit and receive information using both wired and wireless methods.
- **8.1.5.DA.1**: Organize and display data in order to highlight relationships or support a claim
- **8.2.5.NT.4**: Identify how improvement in the understanding of materials science impacts technologies.
- **8.2.5.ETW.4**: Explain the impact that resources, such as energy and materials used to develop technology, have on the
- environment.

Career Readiness, Life Literacies, and Key Skills

- **9.1.5.RMI.2**: Justify reasons to have insurance.
- **9.2.5.CAP.1**: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
- **9.4.2.CT.3**: Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
- **9.4.5.CI.1**: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Evidence of Student Learning

Performance Tasks/Use of Technology:	**Other Assessments**
• Ongoing Log • Lab activities/Hands on Activities	**Formative** • Do Nows

• Vocab Study
• Student Response System (Kahoot)
• Science journals with observations and illustrations
• Graphic organizers, using Google Draw or Jamboard
• Technology integration:
  o SMART Board activities
  o Google Forms quizzes
  o Kahoot games
  o YouTube videos
  o Flipgrid activities
	• Exit tickets
	• Student Reflections
	• Teacher Observation of students as they apply new concepts and skills looking for evidence that the students have changed their thinking or behaviors.
	• Written Assignments
	• Think- Pair- Share
	• Classroom Discussions/Participation
	
	S**ummative**
	• Unit Project
	• Performance Task NGSS
	• Summative unit test focusing on analyzing and interpreting data and information pertaining to energy and energy transfer and conversion
	• Lab activities report
	• Nat Geo Assessment
	• State Standardized Assessments
	• SGO Assessments
	
	Benchmark
	
	Alternative
	• Projects: Create a video on Flip Grid explaining where energy is present
	• Portfolio: Google slides presentation explaining how energy is transferred
	• Teacher-created assessment developed following 1:1 conference and/or review of student data/needs

Knowledge and Skills	
Content	**Skills**
Unit Essential Questions: • How can I use evidence to explain the relationship between the speed and energy of objects?	**Unit Goals:** *Students will be able to...*

Enduring Understandings *Students will know...* • The faster a given object is moving, the more energy it possesses. • That light also transfers energy from place to place. • When objects collide, the contact forces transfer energy so as to change the object's motions. • The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. • That energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.	• Demonstrate that energy can be moved from place to place by moving objects or through sound, light, or electric currents with 70% accuracy in 3 out of 5 trials. • Identify that 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 with at least 70% accuracy in 3 out of 5 trials. • Prove that energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy in 3 out of 5 trials.
Instructional Plan	
Suggested Activities	**Resources**
Resources for on-grade students: • http://ngss.nsta.org/Resource.aspx?ResourceID=191 • Students are given a scenario/problem that needs to be solved: Their school is on a field trip to the city to listen to a rock band concert. After arriving at the concert, the students find out that the band's instruments were damaged during travel. The band needs help to design and build a stringed instrument with the available materials, satisfying the following criteria and constraints: 1) Produce three different pitched sounds. 2) Include at least one string. 3) Use only available materials. 4) Be no longer than 30 cm / 1 foot. The challenge is divided into 4 activities. Each activity is designed to build on students' understanding of the characteristics and properties of sound. By using what they learn about sound from these activities, students are then encouraged to apply what they know about sound to complete the engineering design challenge.	Chromebooks SMARTboard Document Cameras Nat Geo Materials Mystery Science Materials **Resources for on-grade students**: • Nat Geo on level resources • National Science Teachers' Association • NGSS Hub https://ngss.nsta.org/Classroom-Resources.aspx **Resources for students approaching grade level expectations**: • Nat Geo Approaching Resources • https://teaching.betterlesson.com/lesson/634147/there-is-a-glacier-melting-in-the-classroom **Resources for students exceeding grade level expectations**:

Resources for students approaching grade level expectations:

- Rubber Band Car Activity
- Students are given household materials to create a moving car. They will learn how transferring energy can make things move.

Resources for students exceeding grade level expectations:

- Spool Racers
- *This resource includes three parts: a video clip from the TV show, Zoom, to introduce the activity, an essay with background information about energy, and a set of printable instructions. Students use a spool, a toothpick, a washer, a rubber band, and a pencil to build a racer. They conduct tests with the racer by varying the number of twists in the rubber band or changing other design features. These websites provide additional ideas for modifying the basic rubber band racer design:
- Nat Geo exceeding resources
- National Geographic Kids **https://kids.nationalgeographic.com/**
- **https://pbskids.org/designsquad/build/rubber-band-car/**
- **http://www.scienceworld.ca/resources/activities/popcan-porsche**

Useful links / online resources:

- http://theoceancountylibrary.org/
- http://www.readwritethink.org/
- https://www.commonlit.org/
- https://www.activelylearn.com/
- https://www.readworks.org/

Suggested Options for Differentiation

English Language Learners:

- Provide pictures and well labeled models https://www.edutopia.org/blog/ell-engagment-using-photos
- Speak slowly and gesture when necessary
- Pre-teach vocabulary words
- Provide visual models/examples of projects
- Extended Time
- Reduce reading load

Special Education:

- Follow specific IEP accommodations and modifications
- Multi-sensory instruction
- Strategic grouping
- Pre-teach concepts
- Scaffolding Questioning
- Small group for assessments
- Check ins during experiments to help refocus

Students with 504 Plans:

- Check ins during experiments to help refocus
- Follow specific504 accommodations and modifications
- Strategic grouping
- Simplify written and verbal directions
- Multi-sensory instruction

Gifted and Talented:

- Open ended questions to activate higher level thinking
- Higher level texts ReadWorks Articles
- Student interest-driven activities abcya.com
- Problem solving/design challenges
- Use more complex concepts
- Enrichment opportunities to push assessment boundaries

Students At Risk of School Failure: • Strategic grouping • Pre-teach concepts • Multi-sensory instruction • Small group for assessments • Allow alternate assignments • Check ins during experiments to help refocus • High interest options/topics BrainPOP.com • Provide incentives to increase motivation and collaboration	

Core Instructional and Supplemental Materials

Core Texts

- Nat Geo Exploring Science
- Mystery Science

Supplemental Texts/Materials for Students On-Grade/ Meeting Expectations

- https://scholasticnews.scholastic.com/
- https://www.youtube.com/user/scishowkids
- https://mysteryscience.com/
- https://mysterydoug.com/
- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- Demonstrations
- Online games
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Supplemental Texts/Materials for Students Approaching Grade Level Expectations

- Listening Option on Scholastic: https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- https://www.getepic.com/
- Scholastic News
- YouTube videos

- Chromebooks
- SMARTboard
- Mystery Science Materials

Supplemental Texts/Materials for Students Exceeding Grade Level Expectations

- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- Readworks Articles
- Comprehension worksheets
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Teacher Notes: Texts listed above are suggestions and may be supplemented/substituted with other district-approved choices.

SUBJECT: Science
GRADE LEVEL: 4
UNIT 2 TITLE: Earth Systems: Processes that Shape the Earth
LENGTH OF STUDY: Lessons

Unit 2: Earth's Systems: Processes that Shape the Earth	**Duration: Days**
Standards/Learning Targets	
Focus Standards (Major Standards)	
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. [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 with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.] [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.]	

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. [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.] [Assessment Boundary: Assessment is limited to a single form of weathering or erosion.]

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

4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.* [Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.] [Assessment Boundary: Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.] The performance expectations above were developed using the following elements from the NR

Science and Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-ESS2-1) **Analyzing and Interpreting Data** Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. • Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2)	• **ESS1.C: The History of Planet Earth** • Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1) • **ESS2.A: Earth Materials and Systems** • 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) • **ESS2.B: Plate Tectonics and Large-Scale System Interactions** • 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	• **Patterns** • Patterns can be used as evidence to support an explanation. (4-ESS1-1), (4-ESS2-2) • **Cause and Effect** • Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS2-1), (4-ESS3-2) • **Connections to Engineering, Technology, and Applications of Science** • **Influence of Science, Engineering, and Technology on Society and the Natural World** • Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands. (4-ESS3-2)

Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Identify the evidence that supports particular points in an explanation. (4-ESS1-1) • 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)	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) • **ESS2.E: Biogeology** • Living things affect the physical characteristics of their regions. (4-ESS2-1) • **ESS3.B: Natural Hazards** • A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (4-ESS3-2) • **ETS1.B: Developing Possible Solutions** • Testing a solution involves investigating how well it performs under a range of likely conditions. *(secondary to 4-ESS3-2)*	• **Connections to Nature of Science** • **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** • Science assumes consistent patterns in natural systems. (4-ESS1-1) •

Supporting and Additional Standards

Engineering Standards should be incorporated throughout science activities, lessons, and tasks

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. [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.]

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

Boundary: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.]

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

Articulation of DCIs across grade-levels:
K.ESS2.D; 4.ESS2.A; 5.ESS2.A; MS.ESS2.C; MS.ESS2.D; K.ESS3.B; K.ETS1.A; 4.ESS3.B; 4.ETS1.A; MS.ESS3.B

Primary Interdisciplinary Connections

Primary Interdisciplinary Connections: Infused within the unit are connections to the NJSLS for Mathematics, Language Arts Literacy

Climate Change

6.1.2.Geo.HE.1: Explain how seasonal weather changes, climate, and other environmental characteristics affect people's lives in a place or region.

ELA/Literacy -

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. (4-ESS3-2)

RI.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS2-2)

RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-ESS3-2)

W.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS2-2)

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. (4-ESS2-1)

Mathematics -

MP.2 Reason abstractly and quantitatively. (4-ESS2-1) (4-ESS3-2)

MP.4 Model with mathematics. (4-ESS2-1) (4-ESS3-2)

MP.5 Use appropriate tools strategically. (4-ESS2-1)

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-ESS2-1)

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. (4-ESS2-1) (4-ESS2-2)
4.OA.A.1 Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 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. (4-ESS3-2)

Computer Science and Design Thinking Standards

- **8.1.5.CS.2**: Model how computer software and hardware work together as a system to accomplish tasks.
- **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.

Career Readiness, Life Literacies, and Key Skills

- **9.1.5.RMI.2**: Justify reasons to have insurance.
- **9.2.5.CAP.3**: Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
- **9.4.5.CI.2**: 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

Evidence of Student Learning

Performance Tasks/Use of Technology:

- Ongoing Log
- Lab activities/Hands on Activities
- Vocab Study
- Student Response System (Kahoot)
- Science journals with observations and illustrations
- Graphic organizers, using Google Draw or Jamboard
- Technology integration:
  - SMART Board activities
  - Google Forms quizzes
  - Kahoot games
  - YouTube videos
  - Flipgrid activities

Other Assessments

Formative

- Do Nows
- Exit tickets
- Student Reflections
- Teacher Observation of students as they apply new concepts and skills looking for evidence that the students have changed their thinking or behaviors.
- Written Assignments
- Think- Pair- Share
- Classroom Discussions/Participation

S**ummative**

- Unit Project
- Performance Task NGSS
- Summative unit test focusing on analyzing and interpreting
- data and information pertaining to the processes that shape the
- Earth.
- Project demonstrating understanding of the processes that shape the Earth.

	• Lab activities report • Nat Geo Assessment • State Standardized Assessments • SGO Assessments **Benchmark** **Alternative** • Project Based Learning Unit • Unit Portfolio: Describe the effects of climate change in comic book form to prepare for a rapidly changing world. • Unit Presentation
Knowledge and Skills	
Content	**Skills**
Unit Essential Questions: • How can I reduce the impact of natural Earth processes on humans? **Enduring Understandings** *Students will know...* • The presence and location of certain fossil types indicate the order in which rock layers were formed. • Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. • Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. • Humans cannot eliminate the hazards but can take steps to reduce their impacts.	**Unit Goals:** *Students will be able to...* • Identify how local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes 3 out of 5 times. • Determine how rainfall helps to shape the land and affects the types of living things found in a region with at least 80% accuracy. • Draw conclusions about how the locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns in at least 3 out of 5 trials. • Identify how living things affect the physical characteristics of their regions with at least 75% accuracy. • Analyze how a variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions) in 3 out of 5 trials. • Identify how climate change has affected the Earth's environment with at least 75% accuracy.

Instructional Plan	
Suggested Activities	**Resources**
Resources for on-grade students: • **Climate Change**: Students are asked to share their thinking about what will happen to a fictional animal called the "divo" when the climate changes, bringing cold air and snow while killing the divo's food source. Each of the plausible answers align with commonly held misconceptions about adaptation that provide the teacher with information regarding their students' thinking that can help them plan instruction to address their misconceptions. • **https://ngss.nsta.org/Resource.aspx?ResourceID=661** • Students learn about geologic sampling by taking 'core samples' from a layer cake. The activity gives specific directions on how to prepare the Earth cake, complete with raisins, pecan, and chocolate chip fossils. Students use a rolled-up transparency film tube to carefully remove a core sample and observe the sediment layers and any fossils embedded in the sediment layers. At the end of the activity, a foil covering is taken off of the sides of the cake so that the students can observe the changes in sedimentary layers • https://ngss.nsta.org/Resource.aspx?ResourceID=599 • Students aim to make sense of glacial phenomenon through observation and analysis of a mini glacier simulation in the classroom. Prior knowledge can be elicited from the short video clip of a 'glacier calving', before engaging in data collection as they monitor the changes to the glacier model. Students primarily focus on how glacial ice moves and observes resulting changes in the landscape, collecting measurements to provide evidence of the rate of erosion. • https://teaching.betterlesson.com/lesson/634147/there-is-a-glacier-melting-in-the-classroom	Chromebooks SMARTboard Document Cameras Nat Geo Materials Mystery Science Materials **Resources for on-grade students**: • Nat Geo on level resources • National Science Teachers' Association • NGSS Hub https://ngss.nsta.org/Classroom-Resources.aspx **Resources for students approaching grade level expectations**: • Nat Geo Approaching Resources • https://teaching.betterlesson.com/lesson/634147/there-is-a-glacier-melting-in-the-classroom **Resources for students exceeding grade level expectations**: • Nat Geo exceeding resources • National Geographic Kids **https://kids.nationalgeographic.com/** • **https://pbskids.org/designsquad/build/rubber-band-car/** • **http://www.scienceworld.ca/resources/activities/popcan-porsche** **Useful links / online resources**: • http://theoceancountylibrary.org/ • http://www.readwritethink.org/ • https://www.commonlit.org/ • https://www.activelylearn.com/ • https://www.readworks.org/

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Reduce reading load</td><td>Special Education:
Follow specific IEP accommodations and modifications
Multi-sensory instruction
Strategic grouping
Pre-teach concepts
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Small group for assessments
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Follow specific504 accommodations and modifications
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Multi-sensory instruction</td><td>Gifted and Talented:
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Higher level texts ReadWorks Articles
Student interest-driven activities abcya.com
Problem solving/design challenges
Use more complex concepts
Enrichment opportunities to push assessment boundaries</td></tr>
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Pre-teach concepts
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Small group for assessments
Allow alternate assignments
Check ins during experiments to help refocus
High interest options/topics BrainPOP.com
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- https://www.getepic.com/
- Demonstrations
- Online games
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Supplemental Texts/Materials for Students Approaching Grade Level Expectations

- Listening Option on Scholastic: https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- https://www.getepic.com/
- Scholastic News
- YouTube videos
- Chromebooks
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- Mystery Science Materials

Supplemental Texts/Materials for Students Exceeding Grade Level Expectations

- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- Readworks Articles
- Comprehension worksheets
- Chromebooks
- SMARTboard
- Wonders Materials
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Teacher Notes: Texts listed above are suggestions and may be supplemented/substituted with other district-approved choices.

SUBJECT: Science
GRADE LEVEL: 4
UNIT 3 TITLE: From Molecules to Organisms: Structures and Processes
LENGTH OF STUDY: Lessons

Unit 3: From Molecules to Organisms: Structures and Processes	**Duration: Days**

Standards/Learning Targets

Focus Standards (Major Standards)

- **PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.** [Assessment Boundary: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.]
- **4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.** [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.]
- **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.** [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.]

Science and Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Develop a model to describe phenomena. (4-PS4-2) • Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2) **Engaging in Argument from Evidence** Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing	• **PS4.B: Electromagnetic Radiation** • An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2) • **LS1.A: Structure and Function** • Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1) • **LS1.D: Information Processing** • 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	• **Cause and Effect** • Cause and effect relationships are routinely identified. (4-PS4-2) • **Systems and System Models** • A system can be described in terms of its components and their interactions. (4-LS1-1), (4-LS1-2)

relevant evidence about the natural and designed world(s). • Construct an argument with evidence, data, and/or a model. (4-LS1-1)	perceptions and memories to guide their actions. (4-LS1-2)	

Supporting and Additional Standards

Engineering Standards should be incorporated throughout science activities, lessons, and tasks

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 improve

Articulation of DCIs across grade-levels:
1.LS1.A (4-LS1-1); **1.LS1.D** (4-LS1-1); **3.LS3.B** (4-LS1-1); **MS.LS1.A** (4-LS1-1), (4-LS1-2); **MS.LS1.D** (4-LS1-2)

Primary Interdisciplinary Connections

Primary Interdisciplinary Connections: Infused within the unit are connections to the NJSLS for Mathematics, Language Arts Literacy

Social Studies
6.1.5.CivicsPD.3: Explain how and why it is important that people from diverse cultures collaborate to find solutions to community, state, national, and global challenges.

ELA/Literacy -
SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-PS4-2) (4-LS1-2)
W.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4-LS1-1)

Mathematics -
MP.4 Model with mathematics. (4-PS4-2)
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. (4-PS4-2)
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. (4-LS1-1)

Computer Science and Design Thinking Standards

- **8.1.5.NI.2**: Describe physical and digital security measures for protecting sensitive personal information.
- **8.2.5.ED.3**: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish
- the task.

Career Readiness, Life Literacies, and Key Skills

- **9.1.5.CR.1**: Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
- **9.2.5.CAP.1**: Evaluate personal likes and dislike sand identify careers that might be suited to personal likes.
- **9.4.5.CI.1**: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Evidence of Student Learning

Performance Tasks/Use of Technology:

- Ongoing Log
- Lab activities/Hands on Activities
- Vocab Study
- Student Response System (Kahoot)
- Science journals with observations and illustrations
- Graphic organizers, using Google Draw or Jamboard
- Technology integration:
  - SMART Board activities
  - Google Forms quizzes
  - Kahoot games
  - YouTube videos
  - Flipgrid activities

Other Assessments

Formative

- Do Nows
- Exit tickets
- Student Reflections
- Teacher Observation of students as they apply new concepts and skills looking for evidence that the students have changed their thinking or behaviors.
- Written Assignments
- Think- Pair- Share
- Classroom Discussions/Participation

S**ummative**

- Unit Project
- Performance Task NGSS
- Summative unit test focusing on analyzing and interpreting
- data and information pertaining to how living organisms
- receive and process information
- Lab activity report
- Project demonstrating understanding of structure and function of living organisms.
- Lab activities report
- Nat Geo Assessment
- State Standardized Assessments

	• SGO Assessments **Benchmark** **Alternative** • Projects: Create a model of a body system using a variety of materials • Portfolios: Create a poster outlining how a specific plant or animal survives using its internal and external system. • Teacher-created assessment developed following 1:1 conference and/or review of student data/needs
Knowledge and Skills	
Content	**Skills**
Unit Essential Questions: • How do plant and animal internal and external structures help them function? **Enduring Understandings** *Students will know...* • That plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. • Animals are able to use their perceptions and memories to guide their actions.	**Unit Goals:** *Students will be able to...* • Demonstrate how an object can be seen when light reflected from its surface enters the eyes with at least 75%accuracy in 3 out of 5 trials. • Determine that different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain with at least 75% accuracy in 2 out of 3 trials.
Instructional Plan	
Suggested Activities	**Resources**
Resources for on-grade students: • 18A:35-4.35: Read "The Girl who thought in Pictures: The Story of Dr. Temple Grandin". https://drive.google.com/file/d/1eXmTnUiubazw3WBxI7HF4XCdT5oHaOz6/view • Discuss how her research helped animals and affected society.	• Chromebooks • SMARTboard • Document Cameras • Nat Geo Materials • Mystery Science Materials

• In this activity students examine how the structure of various animal mouthparts affects their function. They will have an opportunity to predict what foods are likely to be eaten by birds with different beak types, watch a video comparing and analyzing snake and human mouth structures, and construct explanations about how other animals' mouths are related to their feeding strategies. • https://whyy.pbslearningmedia.org/resource/tdc02.sci.life.colt.lp_mouths/animal-mouth-structures/#.WWT2wNUrJD8 • Read the story "Ice Bear" by Nicola Davies. https://vimeo.com/54889228 ○ Have students identify the structures and their specific functions that assist the Polar Bear adapt to living in the harsh arctic environment. • In this lesson students will think about, talk about, and build a model that shows how the information goes from the outside, to the inside, and then back out again. Students will read a book titled "Animal Senses" by Pamela Hickman and watch a video of the baby bear. They will see the bear rolling around, then it stopped, and then it started running. The bear received information because it stopped and then started running for its life. We want you to show us with a model of how that information is processed in the plant or animal. ○ https://learningintwolanguages.com/4ls1a-structure-function-and/ • 4-LS1-2Students learn about insect body structures and their functions through print materials and a video, and then design their own insect to demonstrate understanding of essential life processes. ○ https://ngss.nsta.org/Resource.aspx?ResourceID=38	• **Resources for on-grade students**: • Nat Geo on level resources • National Science Teachers' Association • NGSS Hub https://ngss.nsta.org/Classroom-Resources.aspx • **Resources for students approaching grade level expectations**: • Nat Geo Approaching Resources https://whyy.pbslearningmedia.org/resource/tdc02.sci.life.colt.lp_mouths/animal-mouth-structures/#.WWT2wNUrJD8 • **Resources for students exceeding grade level expectations**: • Nat Geo exceeding resources • National Geographic Kids • **https://kids.nationalgeographic.com/** • **https://pbskids.org/designsquad/build/rubber-band-car/** • **https://njctl.org/materials/units/molecules-to-organisms/** • **Useful links / online resources**: • http://theoceancountylibrary.org/ • http://www.readwritethink.org/ • https://www.commonlit.org/ • https://www.activelylearn.com/ • https://www.readworks.org/
Suggested Options for Differentiation	
English Language Learners: • Provide pictures and well labeled models https://www.edutopia.org/blog/ell-engagment-using-photos	**Special Education:** • Follow specific IEP accommodations and modifications • Multi-sensory instruction

• Speak slowly and gesture when necessary • Pre-teach vocabulary words • Provide visual models/examples of projects • Extended Time • Reduce reading load	• Strategic grouping • Pre-teach concepts • Scaffolding Questioning • Small group for assessments • Check ins during experiments to help refocus
Students with 504 Plans: • Check ins during experiments to help refocus • Follow specific504 accommodations and modifications • Strategic grouping • Simplify written and verbal directions • Multi-sensory instruction	**Gifted and Talented**: • Open ended questions to activate higher level thinking • Higher level texts ReadWorks Articles • Student interest-driven activities abcya.com • Problem solving/design challenges • Use more complex concepts • Enrichment opportunities to push assessment boundaries
Students At Risk of School Failure: • Strategic grouping • Pre-teach concepts • Multi-sensory instruction • Small group for assessments • Allow alternate assignments • Check ins during experiments to help refocus • High interest options/topics BrainPOP.com • Provide incentives to increase motivation and collaboration	

Core Instructional and Supplemental Materials

Core Texts
- Nat Geo Exploring Science
- Mystery Science

Supplemental Texts/Materials for Students On-Grade/ Meeting Expectations
- https://scholasticnews.scholastic.com/
- https://www.youtube.com/user/scishowkids
- https://mysteryscience.com/
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- Demonstrations
- Online games
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- https://www.brainpop.com/
- https://www.getepic.com/
- Scholastic News
- YouTube videos
- Chromebooks
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Supplemental Texts/Materials for Students Exceeding Grade Level Expectations

- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- Readworks Articles
- Comprehension worksheets
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Teacher Notes: Texts listed above are suggestions and may be supplemented/substituted with other district-approved choices.

SUBJECT: Science
GRADE LEVEL: 4
UNIT 4 TITLE: Waves and Information
LENGTH OF STUDY: Lessons

Unit 4: 4-PS4 Waves and Information	**Duration: Days**

Standards/Learning Targets

Focus Standards (Major Standards)

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

Science and Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Develop a model using an analogy, example, or abstract representation to describe a scientific principle. (4-PS4-1) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Generate and compare multiple solutions to a problem based on how	• **PS4.A: Wave Properties** • 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. (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) • **PS4.C: Information Technologies and Instrumentation** • Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell	• **Patterns** • 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) • **Connections to Engineering, Technology, and Applications of Science** • **Interdependence of Science, Engineering, and Technology** • Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4-3)

well they meet the criteria and constraints of the design solution. (4-PS4-3) **Connections to Nature of Science** **Science Knowledge Is Based on Empirical Evidence** • Science findings are based on recognizing patterns. (4-PS4-1)	phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3) • **ETS1.C: Optimizing the Design Solution** • Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. *(secondary to 4-PS-3)*	

Supporting and Additional Standards

Engineering Standards should be incorporated throughout science activities, lessons, and tasks

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 improve

Articulation of DCIs across grade-levels:
1.LS1.A (4-LS1-1); **1.LS1.D** (4-LS1-1); **3.LS3.B** (4-LS1-1); **MS.LS1.A** (4-LS1-1),(4-LS1-2); **MS.LS1.D** (4-LS1-2)

Primary Interdisciplinary Connections

Primary Interdisciplinary Connections: Infused within the unit are connections to the NJSLS for Mathematics, Language Arts Literacy

Social Studies
6.1.5.CivicsPD.3: Explain how and why it is important that people from diverse cultures collaborate to find solutions to community, state, national, and global challenges.

ELA/Literacy -
RI.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4-PS4-3)
RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS4-3)
SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-PS4-1)

Mathematics -
MP.4 Model with mathematics. (4-PS4-1)
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. (4-PS4-1)

Computer Science and Design Thinking Standards

- **8.1.5.CS.2**: Model how computer software and hardware work together as a system to accomplish tasks.
- **8.2.5.ITH.1**: Explain how societal needs and wants influence the development and function of a product and a system.

Career Readiness, Life Literacies, and Key Skills

- **9.1.5.CR.1**: Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
- **9.2.5.CAP.3**: Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
- **9.4.5.CI.3**: Research the development process of a product and identify the role of failure as a part of the creative process.

Evidence of Student Learning

Performance Tasks/Use of Technology:

- Ongoing Log
- Lab activities/Hands on Activities
- Vocab Study
- Student Response System (Kahoot)
- Science journals with observations and illustrations
- Graphic organizers, using Google Draw or Jamboard
- Technology integration:
  - SMART Board activities
  - Google Forms quizzes
  - Kahoot games
  - YouTube videos
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Other Assessments

Formative

- Do Nows
- Exit tickets
- Student Reflections
- Teacher Observation of students as they apply new concepts and skills looking for evidence that the students have changed their thinking or behaviors.
- Written Assignments
- Think- Pair- Share
- Classroom Discussions/Participation

Summative

- Summative unit test focusing on analyzing and interpreting data and information pertaining to wave properties
- Lab activity report
- Project demonstrating understanding of wave processes.
- SGO Assessments
- State Standardized Assessments

Benchmark

	• Teacher created **Alternative** • Project Based Learning Unit: Research how wave technology has affected society and made life easier • Unit Portfolio: FLIP Grid that describes how information is shared using waves.
Knowledge and Skills	
Content	**Skills**
Unit Essential Questions: • How does the amplitude and wavelength of waves affect how objects move? **Enduring Understandings** *Students will know...* • 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. • Amplitude is the height of the wave and wavelength is the spacing between peaks. • High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa.	**Unit Goals:** *Students will be able to...* • Identify that waves, which are regular patterns of motion, can be made in water by disturbing the surface with at least 75 % accuracy in 3 out of 5 trials. • Determine that waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks) with at least 75% accuracy. • Explore the concept that digitized information can be transmitted over long distances without significant degradation with at least 75% accuracy.
Instructional Plan	
Suggested Activities	**Resources**
• NJSA 18A 52:16A-86: Discuss the contributions of Katherine Johnson and how her research of waves and information helped NASA https://whyy.pbslearningmedia.org/resource/1fe35938-1f6a-444c-9184-85f4ee66eb6a/katherine-johnson-nasa-computer/#.WnCfYZM-dE4	• Chromebooks • SMARTboard • Document Cameras • Nat Geo Materials • Mystery Science Materials

- 4-PS4-1Use the Bite Size Physics website for humorous and simple hand-on activities to teach physics principles. This lesson gives a background lesson on waves, followed by several simple experiments to teach transverse and longitudinal waves, frequency, wavelength, and amplitude. The activities use only a rope, a slinky and colored tape to teach the concept. http://www.bitesizephysics.com/energywaveslesso.html

- 4-PS4-3. Play a game of Simon Says! With waves. This simple simulation allows the students an opportunity to move around and participate in a guided model of amplitude and wavelength. The students create kinesthetic models of "waves" of varying amplitudes and wavelengths by walking and jumping. https://www.teachengineering.org/activities/view/cub_soundandlight_lesson2_activity1

- **Resources for on-grade students**:
- Nat Geo on level resources
- National Science Teachers' Association
- NGSS Hub https://ngss.nsta.org/Classroom-Resources.aspx

- **Resources for students approaching grade level expectations**:
- Nat Geo Approaching Resources
- https://njctl.org/materials/units/waves-light-information/

- **Resources for students exceeding grade level expectations**:
- Nat Geo exceeding resources
- National Geographic Kids **https://kids.nationalgeographic.com/**
- **https://www.teachengineering.org/activities/view/cub_soundandlight_lesson2_activity1**

- **Useful links / online resources**:
- http://theoceancountylibrary.org/
- http://www.readwritethink.org/
- https://www.commonlit.org/
- https://www.activelylearn.com/
- https://www.readworks.org/

Suggested Options for Differentiation

English Language Learners:
- Provide pictures and well labeled models https://www.edutopia.org/blog/ell-engagment-using-photos
- Speak slowly and gesture when necessary
- Pre-teach vocabulary words
- Provide visual models/examples of projects
- Extended Time
- Reduce reading load

Special Education:
- Follow specific IEP accommodations and modifications
- Multi-sensory instruction
- Strategic grouping
- Pre-teach concepts
- Scaffolding Questioning
- Small group for assessments
- Check ins during experiments to help refocus

Students with 504 Plans: • Check ins during experiments to help refocus • Follow specific504 accommodations and modifications • Strategic grouping • Simplify written and verbal directions • Multi-sensory instruction	**Gifted and Talented**: • Open ended questions to activate higher level thinking • Higher level texts ReadWorks Articles • Student interest-driven activities abcya.com • Problem solving/design challenges • Use more complex concepts • Enrichment opportunities to push assessment boundaries
Students At Risk of School Failure: • Strategic grouping • Pre-teach concepts • Multi-sensory instruction • Small group for assessments • Allow alternate assignments • Check ins during experiments to help refocus • High interest options/topics BrainPOP.com • Provide incentives to increase motivation and collaboration	

Core Instructional and Supplemental Materials

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Supplemental Texts/Materials for Students On-Grade/ Meeting Expectations
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- https://www.youtube.com/user/scishowkids
- https://mysteryscience.com/
- https://mysterydoug.com/
- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- Demonstrations
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Supplemental Texts/Materials for Students Approaching Grade Level Expectations

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- Scholastic News
- YouTube videos
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Supplemental Texts/Materials for Students Exceeding Grade Level Expectations

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- https://scholasticnews.scholastic.com/
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- Readworks Articles
- Comprehension worksheets
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- Mystery Science Materials

Teacher Notes: Texts listed above are suggestions and may be supplemented/substituted with other district-approved choices.

Grade 5

Middle Township School District Science Curriculum	
Content Area: Science	
Course Title: Elementary	**Grade Level: 5**
Unit 1: Earth's Systems	22 Days
Unit 2: Matter and Energy in Organisms and Ecosystems	23 Days
Unit 3: Stars and the Solar System	23 Days
Unit 4: Structures and Properties of Matter	22 Days

Introduction

The performance expectations in fifth grade help students formulate answers to questions such as: "When matter changes, does its weight change? How much water can be found in different places on Earth? Can new substances be created by combining other substances? How does matter cycle through ecosystems? Where does the energy in food come from and what is it used for? How do lengths and directions of shadows or relative lengths of day and night change from day to day, and how does the appearance of some stars change in different seasons?" Fifth grade performance expectations include PS1, PS2, PS3, LS1, LS2, ESS1, ESS2, and ESS3 Disciplinary Core Ideas from the NRC Framework.

Students are able to describe that matter is made of particles too small to be seen through the development of a model. Students develop an understanding of the idea that regardless of the type of change that matter undergoes, the total weight of matter is conserved. Students determine whether the mixing of two or more substances results in new substances. Through the development of a model using an example, students are able to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. They describe and graph data to provide evidence about the distribution of water on Earth. Students develop an understanding of the idea that plants get the materials they need for growth chiefly from air and water. Using models, students can describe the movement of matter among plants, animals, decomposers, and the environment and that energy in animals' food was once energy from the sun.

Students are expected to develop an understanding of patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; energy and matter; and systems and systems models are called out as organizing concepts for these disciplinary core ideas. In the fifth grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in developing and using models, planning, and carrying out investigations, analyzing and interpreting data, using mathematics and computational thinking, engaging in argument from evidence, and obtaining, evaluating, and communicating information; and to use these practices to demonstrate understanding of the core ideas.

SUBJECT: Science
GRADE LEVEL: 5
UNIT 1 TITLE: Earth's Systems
LENGTH OF STUDY: 22 Lessons

Unit 1: Earth's Systems	**Duration: 22 Days**

Standards/Learning Targets

Focus Standards (Major Standards)

- **5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.** [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]

- **5-ESS2-2. Describe and graph the amounts of saltwater and freshwater in various reservoirs to provide evidence about the distribution of water on Earth.** [Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, groundwater, and polar ice caps, and does not include the atmosphere.]

- **5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.**

Science and Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Develop a model using an example to describe a scientific principle. (5-ESS2-1) **Using Mathematics and Computational Thinking** Mathematical and computational thinking at the 3–5 level builds on K–2 experiences	• **ESS2.A: Earth Materials and Systems** • Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the	• **Scale, Proportion, and Quantity** • Standard units are used to measure and describe physical quantities such as weight and volume. (5-ESS2-2) • **Systems and System Models** • A system can be described in terms of its components and their interactions. (5-ESS2-1), (5-ESS3-1)

and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions. • Describe and graph quantities such as area and volume to address scientific questions. (5-ESS2-2) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1)	landforms to determine patterns of weather. (5-ESS2-1) • **ESS2.C: The Roles of Water in Earth's Surface Processes** • Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2) • **ESS3.C: Human Impacts on Earth Systems** • Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)	• **Connections to Nature of Science** • **Science Addresses Questions About the Natural and Material World** • Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)

Supporting and Additional Standards

Engineering Standards should be incorporated throughout science activities, lessons, and tasks

- **6.1.2.Geo.HE.1:** Explain how seasonal weather changes, climate, and other environmental characteristics affect people's lives in a place or region.
- **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.

Articulation of DCIs across grade-levels:
*ESS2-1); **MS.ESS3.A** (5-ESS2-2), (5-ESS3-1); **MS.ESS3.C** (5-ESS3-1); **MS.ESS3.D** (5-ESS3-1)*

Primary Interdisciplinary Connections

Primary Interdisciplinary Connections: Infused within the unit are connections to the NJSLS for Mathematics, Language Arts Literacy

ELA/Literacy -
RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-ESS3-1)
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. (5-ESS2-1) (5-ESS2-2) (5-ESS3-1)
RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS3-1)
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. (5-ESS2-2 (5-ESS3-1)
W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-ESS3-1)
SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-ESS2-1) (5-ESS2-2)

Mathematics -
MP.2 Reason abstractly and quantitatively. (5-ESS2-1) (5-ESS2-2) (5-ESS3-1)
MP.4 Model with mathematics. (5-ESS2-1) (5-ESS2-2) (5-ESS3-1)
5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (5-ESS2-1)

Computer Science and Design Thinking Standards

- **8.1.5.CS.2**: Model how computer software and hardware work together as a system to accomplish tasks.
- **8.2.5.ED.6**: Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process.

Career Readiness, Life Literacies, and Key Skills

- **9.1.5.FP.3**: Analyze how spending choices and decision-making a result in positive or negative consequences.
- **9.2.5.CAP.8**: Identify risks that individuals and households face
- **9.4.5.CI.1**: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Evidence of Student Learning	

Performance Tasks/Use of Technology:
• Ongoing Log
• Lab activities/Hands on Activities
• Vocab Study
• Student Response System (Kahoot)
• Science journals with observations and illustrations
• Graphic organizers, using Google Draw or Jamboard
• Technology integration:
  o SMART Board activities
  o Google Forms quizzes
  o Kahoot games
  o YouTube videos
  o Flipgrid activities
	Other Assessments
	Formative
	• Do Nows
	• Exit tickets
	• Student Reflections
	• Teacher Observation of students as they apply new concepts and skills looking for evidence that the students have changed their thinking or behaviors.
	• Written Assignments
	• Think- Pair- Share
	• Classroom Discussions/Participation
	• Monitoring Student Understanding
	  o 1. What have you noticed?
	  o 2. Why do you suppose ___?
	  o 3. What have you found so far?
	  o 4. Has your thinking changed?
	  o 5. What evidence do you have?
	  o 6. How did you decide _____?
	  o 7. What conclusion can you draw about ___?
	
	S**ummative**
	• Unit Project
	• Performance Task NGSS
	• Class/teams work together to identify examples of the atmosphere and create a poster demonstrating knowledge of the Earth's spheres
	• Lab activity report
	• Nat Geo Assessment
	• State Standardized Assessments
	• SGO Assessments
	
	Benchmark
	• Teacher created
	• Standardized State Assessment

	Alternative • Project Based Learning Unit: develop a plan to limit climate change and reverse the effects. • Unit Portfolios • Teacher-created assessment developed following 1:1 conference and/or review of student data/needs
Knowledge and Skills	
Content	**Skills**
Unit Essential Questions: • How do the geosphere, biosphere, hydrosphere and/or atmosphere interact? **Enduring Understandings** *Students will know...* • the relevant components of the following systems: Geosphere (i.e., solid, and molten rock, soil, sediment, continents, mountains), Hydrosphere (i.e., water and ice in the form of rivers, lakes, glaciers), Atmosphere (i.e., wind, oxygen) and Biosphere (i.e., plants, animals [including humans]). • How a given human activity (e.g., in agriculture, industry, everyday life) affects the Earth's resources and environments. • How a given community uses scientific ideas to protect a given natural resource and the environment in which the resource is found.	**Unit Goals:** *Students will be able to...* • develop a model, using a specific given example of a phenomenon, to describe ways that the geosphere, biosphere, hydrosphere, and/or atmosphere interact with at least 75 % accuracy. • graph the given data (using standard units) about the amount of salt water and the amount of freshwater in oceans, lakes, rivers, glaciers, and polar caps, as well as in all the reservoirs combined with at least 70% accuracy in 2 out of 3 trials. • combine information from two or more sources to provide and describe evidence about the positive and negative effects on the environment as a result of human activities with at least 75% accuracy.
Instructional Plan	
Suggested Activities	**Resources**
Climate Change • https://drive.google.com/file/d/1ks133wmlNOmemfBIH9dA9_9HwtgRWDVr/view	• Chromebooks • SMARTboard • Document Cameras • Nat Geo Materials • Mystery Science Materials

- (ESS2-2) In this lesson, students explore the major biomes on Earth by labeling a world map and by examining how the Earth's systems affect the biomes on Earth.
    - https://teaching.betterlesson.com/lesson/634346/biosphere-the-earth-s-biomes-day-1

- (ESS2-1) In this lesson, students will begin creating a 3D model of the rain shadow effect. Then, students will explore the rain shadow effect by accessing several online Resources.
    - https://teaching.betterlesson.com/lesson/634353/researching-the-rain-shadow-effect

Next Generation Science Standards Interactive Read Alouds

- https://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf

- **Resources for on-grade students**:
- Nat Geo on level resources
- National Science Teachers' Association
- NGSS Hub https://ngss.nsta.org/Classroom-Resources.aspx
- Resources for on-grade students:
- Inspire on level resources
- Fifth grade Lesson Researching The Rain Shadow Effect
- https://ngss.nsta.org/

- **Resources for students approaching grade level expectations**:
- Nat Geo Approaching Resources
- https://ngss.nsta.org/

- **Resources for students exceeding grade level expectations**:
- Nat Geo exceeding resources
- National Geographic Kids
- **https://kids.nationalgeographic.com/**
- **https://pbskids.org/designsquad/build/rubber-band-car/**
- **https://njctl.org/materials/units/earths-systems/**

- **Useful links / online resources**:
- http://theoceancountylibrary.org/
- http://www.readwritethink.org/
- https://www.commonlit.org/
- https://www.activelylearn.com/
- https://www.readworks.org/

Suggested Options for Differentiation	
English Language Learners: • Provide pictures and well labeled models https://www.edutopia.org/blog/ell-engagment-using-photos • Speak slowly and gesture when necessary • Pre-teach vocabulary words • Provide visual models/examples of projects • Extended Time • Reduce reading load	**Special Education:** • Follow specific IEP accommodations and modifications • Multi-sensory instruction • Strategic grouping • Pre-teach concepts • Scaffolding Questioning • Small group for assessments • Check ins during experiments to help refocus
Students with 504 Plans: • Check ins during experiments to help refocus • Follow specific504 accommodations and modifications • Strategic grouping • Simplify written and verbal directions • Multi-sensory instruction	**Gifted and Talented**: • Open ended questions to activate higher level thinking • Higher level texts ReadWorks Articles • Student interest-driven activities abcya.com • Problem solving/design challenges • Use more complex concepts • Enrichment opportunities to push assessment boundaries
Students At Risk of School Failure: • Strategic grouping • Pre-teach concepts • Multi-sensory instruction • Small group for assessments • Allow alternate assignments • Check ins during experiments to help refocus • High interest options/topics BrainPOP.com • Provide incentives to increase motivation and collaboration	
Core Instructional and Supplemental Materials	
Core Texts • Nat Geo Exploring Science • Mystery Science	

Supplemental Texts/Materials for Students On-Grade/ Meeting Expectations

- https://scholasticnews.scholastic.com/
- https://www.youtube.com/user/scishowkids
- https://mysteryscience.com/
- https://mysterydoug.com/
- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- Demonstrations
- Online games
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Supplemental Texts/Materials for Students Approaching Grade Level Expectations

- Listening Option on Scholastic: https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- https://www.getepic.com/
- Scholastic News
- YouTube videos
- Chromebooks
- SMARTboard
- Mystery Science Materials

Supplemental Texts/Materials for Students Exceeding Grade Level Expectations

- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- Readworks Articles
- Comprehension worksheets
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Teacher Notes: Texts listed above are suggestions and may be supplemented/substituted with other district-approved choices.

SUBJECT: Science
GRADE LEVEL: 5
UNIT 2 TITLE: Matter and Energy in Organisms and Ecosystems
LENGTH OF STUDY: 23 Lessons

Unit 2: Matter and Energy in Organisms and Ecosystems	**Duration: 23 Days**

Standards/Learning Targets

Focus Standards (Major Standards)

- **5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.** [Clarification Statement: Examples of models could include diagrams, and flow charts.]
- **5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.** [Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.]
- **5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.** [Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.] [Assessment Boundary: Assessment does not include molecular explanations.]

Science and Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
• **Developing and Using Models** • Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Develop a model to describe phenomena. (5-LS2-1) • Use models to describe phenomena. (5-PS3-1) • **Engaging in Argument from Evidence** • Engaging in argument from evidence in 3–5 builds on K–2 experiences and	• **PS3.D: Energy in Chemical Processes and Everyday Life** • The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1) • **LS1.C: Organization for Matter and Energy Flow in Organisms** • Food provides animals with the materials they need for body repair and growth and the energy they need to	**Systems and System Models** • A system can be described in terms of its components and their interactions. (5-LS2-1) **Energy and Matter** • Energy can be transferred in various ways and between objects. (5-PS3-1) • Matter is transported into, out of, and within systems. (5-LS1-1)

progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). • Support an argument with evidence, data, or a model. (5-LS1-1) • **Connections to Nature of Science** • **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** • Science explanations describe the mechanisms for natural events. (5-LS2-1) •	maintain body warmth and for motion. *(secondary to 5-PS3-1)* • Plants acquire their material for growth chiefly from air and water. (5-LS1-1) • **LS2.A: Interdependent Relationships in Ecosystems** • The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1) • **LS2.B: Cycles of Matter and Energy Transfer in Ecosystems** • Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1)	

Supporting and Additional Standards

Engineering Standards should be incorporated throughout science activities, lessons, and tasks

- **5-PS1-1.** Develop a model to describe that matter is made of particles too small to be seen. [Clarification Statement: Examples of evidence supporting a model could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.] [Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.]
- **5-PS1-2.** Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. [Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances.] [Assessment Boundary: Assessment does not include distinguishing mass and weight.]
- **5-PS1-3**. Make observations and measurements to identify materials based on their properties. [Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.] [Assessment Boundary: Assessment does not include density or distinguishing mass and weight.]
- **5-PS1-4.** Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
- **5-ESS2-1.** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]
- 5-ESS2-2. Describe and graph the amounts of saltwater and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. [Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, groundwater, and polar ice caps, and does not include the atmosphere.]
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Articulation of DCIs across grade-levels:
K.LS1.C *(5-PS3-1),(5- LS1-1);* ***2.PS1.A*** *(5-LS2-1);* ***2.LS2.A*** *(5-PS3-1),(5-LS1-1);* ***2.LS4.D*** *(5-LS2-1);* ***4.PS3.A*** *(5-PS3-1);* ***4.PS3.B*** *(5-PS3-1);* ***4.PS3.D*** *(5-PS3-1);* ***4.ESS2.E*** *(5-LS2-1);* ***MS.PS3.D*** *(5-PS3-1),(5-LS2-1);* ***MS.PS4.B*** *(5-PS3-1);* ***MS.LS1.C*** *(5- PS3-1), (5-LS1-1), (5-LS2-1);* ***MS.LS2.A*** *(5-LS2-1);* ***MS.LS2.B*** *(5-PS3-1), (5-LS2-1)*

Primary Interdisciplinary Connections

Primary Interdisciplinary Connections: Infused within the unit are connections to the NJSLS for Mathematics, Language Arts Literacy

Social Studies
6.1.5.CivicsPD.3: Explain how and why it is important that people from diverse cultures collaborate to find solutions to community, state, national, and global challenges.

ELA/Literacy -
RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-LS1-1)
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. (5-PS3-1) (5-LS2-1)
RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

(5-LS1-1)
W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-LS1-1)
SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-PS3-1) (5-LS2-1)

Mathematics -
MP.2 Reason abstractly and quantitatively. (5-LS1-1) (5-LS2-1)
MP.4 Model with mathematics. (5-LS1-1) (5-LS2-1)
MP.5 Use appropriate tools strategically. (5-LS1-1)
5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. (5-LS1-1)

Computer Science and Design Thinking Standards

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

Career Readiness, Life Literacies, and Key Skills

- **9.1.5.FP.5**: Illustrate how inaccurate information is disseminated through various external influencers including the media, advertisers/marketers, friends, educators, and family members.
- **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**: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Evidence of Student Learning

Performance Tasks/Use of Technology:

- Ongoing Log
- Lab activities/Hands on Activities
- Vocab Study
- Student Response System (Kahoot)
- Science journals with observations and illustrations
- Graphic organizers, using Google Draw or Jamboard
- Technology integration:
  - SMART Board activities
  - Google Forms quizzes
  - Kahoot games
  - YouTube videos
  - Flipgrid activities

Other Assessments

- **Formative**
- Do Nows
- Exit tickets
- Student Reflections
- Teacher Observation of students as they apply new concepts and skills looking for evidence that the students have changed their thinking or behaviors.
- Written Assignments
- Think- Pair- Share
- Classroom Discussions/Participation
- Monitoring Student Understanding
  - 1. What have you noticed?

	○ 2. Why do you suppose ___? ○ 3. What have you found so far? ○ 4. Has your thinking changed? ○ 5. What evidence do you have? ○ 6. How did you decide ____? ○ 7. What conclusion can you draw about ___? **Summative** • Unit Project • Performance Task NGSS • Lab activity report • Nat Geo Assessment • State Standardized Assessments • SGO Assessments **Benchmark** • Teacher created • Standardized State Assessment **Alternative** • Project Based Learning: Create a flip grid that discusses how George Washington Carver used his knowledge of plants to develop farming ideas. • Unit Portfolios: Design a diagram that explains the food chain • Unit Presentations • Fall/Spring benchmarks • Teacher-developed/online assessments to track and monitor student growth over time
Knowledge and Skills	
Content	**Skills**
Unit Essential Questions: • How does energy flow through an ecosystem?	**Unit Goals:** *Students will be able to...* • Use a model to describe and identify that energy from the sun is directly related to plants and animals, including their bodily

Enduring Understandings
Students will know...

- that energy in animals' food was once energy from the sun.
- Since all food can eventually be traced back to plants, all the of the energy that animals use for body repair, growth, motion, and body warmth maintenance is energy that once came from the sun.
- Energy from the sun is transferred to animals through a chain of events that begins with plants producing food then being eaten by animals.
- that plants acquire the materials they need for growth chiefly from air and water.
- The relationship between organisms and the exchange of matter from and back into the environment (e.g., organisms obtain matter from their environments for life processes and release waste back into the environment, decomposers break down plant and animal remains to recycle some materials back into the soil).

functions (e.g., body repair, growth, motion, body warmth maintenance) with at least 75% accuracy in 3 out of 5 trials.

- Students develop a model to describe a phenomenon that includes the movement of matter within an ecosystem with at least 75% accuracy in 3 out of 5 trials.
- Students use the model to describe the cycling of matter in the system between plants, animals, decomposers, and the environment with at least 75 % accuracy in 3 out of 5 trials.
- use reasoning to connect the relevant and appropriate evidence to support the claim if Earth is spherical, and all observers see objects near them falling directly "down" to the Earth's surface, then all observers would agree that objects fall toward the Earth's center with at least 70% accuracy in 1 out of 2 trials.

Instructional Plan

Suggested Activities	Resources
● NJSA 18A 52:16A-86: Discuss the contributions of Geroge Washington Carver ○ https://drive.google.com/file/d/1U9ryVb8GR-ZnZAtb0gtI85WSAJlsWqDq/view ● (PS3-1) In this lesson, students will research several sources to answer the question, "What is an ecosystem?" At the end of today's lesson, students will compile their research in a class idea web. https://teaching.betterlesson.com/lesson/631075/what-is-an-ecosystem • (PS3-1) In this lesson, students research the roles of producers, consumers, and decomposers within an ecosystem. Then,	• Chromebooks • SMARTboard • Document Cameras • Nat Geo Materials • Mystery Science Materials **Resources for on-grade students**: • Nat Geo on level resources • National Science Teachers' Association • NGSS Hub https://ngss.nsta.org/Classroom-Resources.aspx • Resources for on-grade students: • Inspire on level resources • https://ngss.nsta.org/

students apply this understanding by identifying the roles of organisms within the Yellowstone National Park ecosystem. ○ https://teaching.betterlesson.com/lesson/631349/producers-consumers-decomposers ● *Next Generation Science Standards Interactive Read Alouds https://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf	**Resources for students approaching grade level expectations**: • Nat Geo Approaching Resources • https://ngss.nsta.org/ **Resources for students exceeding grade level expectations**: • Nat Geo exceeding resources • National Geographic Kids **https://kids.nationalgeographic.com/** • **https://pbskids.org/** • https://njctl.org/materials/units/matter-energy-in-everyday-life/ **Useful links / online resources**: • http://theoceancountylibrary.org/ • http://www.readwritethink.org/ • https://www.commonlit.org/ • https://www.activelylearn.com/ • https://www.readworks.org/
Suggested Options for Differentiation	
English Language Learners: • Provide pictures and well labeled models https://www.edutopia.org/blog/ell-engagment-using-photos • Speak slowly and gesture when necessary • Pre-teach vocabulary words • Provide visual models/examples of projects • Extended Time • Reduce reading load	**Special Education:** • Follow specific IEP accommodations and modifications • Multi-sensory instruction • Strategic grouping • Pre-teach concepts • Scaffolding Questioning • Small group for assessments • Check ins during experiments to help refocus
Students with 504 Plans: • Check ins during experiments to help refocus • Follow specific504 accommodations and modifications • Strategic grouping • Simplify written and verbal directions • Multi-sensory instruction	**Gifted and Talented**: • Open ended questions to activate higher level thinking • Higher level texts ReadWorks Articles • Student interest-driven activities abcya.com • Problem solving/design challenges • Use more complex concepts • Enrichment opportunities to push assessment boundaries

Students At Risk of School Failure: • Strategic grouping • Pre-teach concepts • Multi-sensory instruction • Small group for assessments • Allow alternate assignments • Check ins during experiments to help refocus • High interest options/topics BrainPOP.com • Provide incentives to increase motivation and collaboration	

Core Instructional and Supplemental Materials

Core Texts

- Nat Geo Exploring Science
- Mystery Science

Supplemental Texts/Materials for Students On-Grade/ Meeting Expectations

- https://scholasticnews.scholastic.com/
- https://www.youtube.com/user/scishowkids
- https://mysteryscience.com/
- https://mysterydoug.com/
- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- Demonstrations
- Online games
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Supplemental Texts/Materials for Students Approaching Grade Level Expectations

- Listening Option on Scholastic: https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- https://www.getepic.com/
- Scholastic News
- YouTube videos

- Chromebooks
- SMARTboard
- Mystery Science Materials

Supplemental Texts/Materials for Students Exceeding Grade Level Expectations

- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- Readworks Articles
- Comprehension worksheets
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Teacher Notes: Texts listed above are suggestions and may be supplemented/substituted with other district-approved choices.

SUBJECT: Science
GRADE LEVEL: 5
UNIT 3 TITLE: Stars and the Solar System
LENGTH OF STUDY: 23 Lessons

Unit 3: Stars and the Solar System	**Duration: 23 Days**
Standards/Learning Targets	
Focus Standards (Major Standards)	

- **5-ESS1-1. Support an argument that the apparent brightness of the sun and stars is due to their relative distances from the Earth.** [Assessment Boundary: Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, stage).]
- **5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.** [Clarification Statement: Examples of patterns could include the position and

motion of Earth with respect to the sun and selected stars that are visible only in particular months.] [Assessment Boundary: Assessment does not include causes of seasons.]

- **5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.** [Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth.] [Assessment Boundary: Assessment does not include mathematical representation of gravitational force.]

Science and Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
• **Analyzing and Interpreting Data** • Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. • Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. (5-ESS1-2) • **Engaging in Argument from Evidence** • Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). • Support an argument with evidence, data, or a model. (5-ESS1-1), (5-PS2-1)	**PS2.B: Types of Interactions** • The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5-PS2-1) **ESS1.A: The Universe and Its Stars** • The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. (5-ESS1-1) **ESS1.B: Earth and the Solar System** • The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. (5-ESS1-2)	• **Patterns** • Similarities and differences in patterns can be used to sort, classify, communicate, and analyze simple rates of change for natural phenomena. (5-ESS1-2) • **Cause and Effect** • Cause and effect relationships are routinely identified and used to explain change. (5-PS2-1) • **Scale, Proportion, and Quantity** • Natural objects exist from the very small to the immensely large. (5-ESS1-1)

Supporting and Additional Standards

Engineering Standards should be incorporated throughout science activities, lessons, and tasks

- **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 ETS-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.

Articulation of DCIs across grade-levels:
1.ESS1.A (5-ESS1-2); 1.ESS1.B (5-ESS1-2); 3.PS2.A (5-PS2-1), (5-ESS1-2); 3.PS2.B (5-PS2-1); MS.PS2.B (5-PS2-1); MS.ESS1.A (5-ESS1-1), (5-ESS1-2); MS.ESS1.B (5-PS2-1), (5-ESS1-1), (5-ESS1-2); MS.ESS2.C (5-PS2-1)

Primary Interdisciplinary Connections

Primary Interdisciplinary Connections: Infused within the unit are connections to the NJSLS for Mathematics, Language Arts Literacy

ELA/Literacy -
RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-ESS1-1) (5-PS2-1)
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. (5-ESS1-1)
RI.5.8 Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). (5-ESS1-1)
RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS1-1) (5-PS2-1)
SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-ESS1-2)
W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-ESS1-1) (5-PS2-1)

Mathematics -
MP.2 Reason abstractly and quantitatively. (5-ESS1-1) (5-ESS1-2)
MP.4 Model with mathematics. (5-ESS1-1) (5-ESS1-2)
5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. (5-ESS1-1)
5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (5-ESS1-2)

Computer Science and Design Thinking Standards

- 8.1.5.CS.2: Model how computer software and hardware work together as a system to accomplish tasks.
- 8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system.

Career Readiness, Life Literacies, and Key Skills

- 9.1.5.FP.3: Analyze how spending choices and decision-making can result in positive or negative consequences.
- 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, medical, education) and examples of these requirements
- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

Evidence of Student Learning

Performance Tasks/Use of Technology:

- Ongoing Log
- Lab activities/Hands on Activities
- Vocab Study
- Student Response System (Kahoot)
- Science journals with observations and illustrations
- Graphic organizers, using Google Draw or Jamboard
- Technology integration:
  - SMART Board activities
  - Google Forms quizzes
  - Kahoot games
  - YouTube videos
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Other Assessments

- Formative
- Do now and Exit tickets
- Observation
- Question and Response questions
- List conclusions we can draw about gravity, weight, mass, and an astronaut's jump on the Moon verses the Earth.
-
- Summative
- Unit Projects
- NGSS Performance Tasks
- Lab experiments
- SGO Assessments
- Unit Assessment
- State Standardized Assessments
-
- Benchmark
- Fall/Spring benchmarks
- Teacher-developed/online assessments to track and monitor student growth over time
-
- Alternative
- Projects: Present the qualifications Sally Ride must have had in order to go to space
- Portfolios: Illustrate the different STAR patterns for each season of the year.
- Teacher-created assessment developed following 1:1 conference and/or review of student data/needs
-

Knowledge and Skills	
Content	**Skills**
Unit Essential Questions: • How do I prove there are observable patterns for the sun and stars? **Enduring Understandings** *Students will know...* • That the gravitational force exerted by Earth on objects is directed down toward the center of Earth. • That objects dropped appear to fall straight down. • That people live all around the spherical Earth, and they all observe that objects appear to fall straight down. • The claim includes the idea that the apparent brightness of the sun and stars is due to their relative distances from Earth. • The apparent motion of the sun from east to west results in patterns of changes in length and direction of shadows throughout a day as Earth rotates on its axis. • The length of the day gradually changes throughout the year as Earth orbits the sun, with longer days in the summer and shorter days in the winter. • Some stars and/or groups of stars (i.e., constellations) can be seen in the sky all year, while others appear only at certain times of the year.	**Unit Goals:** *Students will be able to...* • use reasoning to connect the relevant and appropriate evidence to support the claim that since an object that is initially stationary when held moves downward when it is released, there must be a force (gravity) acting on the object that pulls the object toward the center of Earth with at least 70% accuracy. • evaluate the evidence to determine whether it is relevant to supporting the claim, and sufficient to describe the relationship between apparent size and apparent brightness of the sun and other stars and their relative distances from Earth in 3 out of 5 trials. • Use graphical displays (e.g., bar graphs, pictographs), students organize data pertaining to daily and seasonal changes caused by the Earth's rotation and orbit around the sun with at least 75% accuracy in 3 out of 5 trials.
Instructional Plan	
Suggested Activities	**Resources**
• 18A:35-4.35: Read and discuss the contributions of Sally Ride. https://drive.google.com/file/d/1xSybYYdb5nd1e2xs4HZzaBD-I0sbQcPK/view • (PS2-1) In this lesson, students will explore why an astronaut can jump higher on the Moon than on Earth by researching	• Chromebooks • SMARTboard • Document Cameras • Nat Geo Materials • Mystery Science Materials

weight, mass, and gravity. https://teaching.betterlesson.com/lesson/626414/weight-mass-gravity ● (ESS1-1) In this lesson, students explore the brightness of stars by examining a photo of the night sky. Then, students use flashlights to investigate how distance impacts star brightness. https://teaching.betterlesson.com/lesson/635919/investigating-star-brightness-distance ● *Next Generation Science Standards Interactive Read Alouds https://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf	• **Resources for on-grade students**: • Nat Geo on level resources • National Science Teachers' Association • NGSS Hub https://ngss.nsta.org/Classroom-Resources.aspx • Resources for on-grade students: • Inspire on level resources • https://ngss.nsta.org/ • **Resources for students approaching grade level expectations**: • Nat Geo Approaching Resources • https://ngss.nsta.org/ • **Resources for students exceeding grade level expectations**: • Nat Geo exceeding resources • National Geographic Kids **https://kids.nationalgeographic.com/** • **https://pbskids.org/** • https://njctl.org/materials/units/matter-energy-in-everyday-life/ • • **Useful links / online resources**: • http://theoceancountylibrary.org/ • http://www.readwritethink.org/ • https://www.commonlit.org/ • https://www.activelylearn.com/ • https://www.readworks.org/
Suggested Options for Differentiation	
English Language Learners: • Provide pictures and well labeled models https://www.edutopia.org/blog/ell-engagment-using-photos • Speak slowly and gesture when necessary • Pre-teach vocabulary words • Provide visual models/examples of projects	**Special Education:** • Follow specific IEP accommodations and modifications • Multi-sensory instruction • Strategic grouping • Pre-teach concepts

• Extended Time • Reduce reading load	• Scaffolding Questioning • Small group for assessments • Check ins during experiments to help refocus
Students with 504 Plans: • Check ins during experiments to help refocus • Follow specific504 accommodations and modifications • Strategic grouping • Simplify written and verbal directions • Multi-sensory instruction	**Gifted and Talented**: • Open ended questions to activate higher level thinking • Higher level texts ReadWorks Articles • Student interest-driven activities abcya.com • Problem solving/design challenges • Use more complex concepts • Enrichment opportunities to push assessment boundaries
Students At Risk of School Failure: • Strategic grouping • Pre-teach concepts • Multi-sensory instruction • Small group for assessments • Allow alternate assignments • Check ins during experiments to help refocus • High interest options/topics BrainPOP.com • Provide incentives to increase motivation and collaboration	
Core Instructional and Supplemental Materials	
Core Texts • Nat Geo Exploring Science • Mystery Science **Supplemental Texts/Materials for Students On-Grade/ Meeting Expectations** • https://scholasticnews.scholastic.com/ • https://www.youtube.com/user/scishowkids • https://mysteryscience.com/ • https://mysterydoug.com/ • https://kids.nationalgeographic.com/ • https://www.getepic.com/ • Demonstrations • Online games	

- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Supplemental Texts/Materials for Students Approaching Grade Level Expectations

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- https://www.getepic.com/
- Scholastic News
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- Chromebooks
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Supplemental Texts/Materials for Students Exceeding Grade Level Expectations

- https://kids.nationalgeographic.com/
- https://www.getepic.com/
- https://scholasticnews.scholastic.com/
- https://www.brainpop.com/
- Readworks Articles
- Comprehension worksheets
- Chromebooks
- SMARTboard
- Wonders Materials
- Mystery Science Materials

Teacher Notes: Texts listed above are suggestions and may be supplemented/substituted with other district-approved choices.

SUBJECT: Science
GRADE LEVEL: 5
UNIT 4 TITLE: Structure and Properties of Matter
LENGTH OF STUDY: 22 Lessons

Unit 3: Structure and Properties of Matter	**Duration: 22 Days**

Standards/Learning Targets

Focus Standards (Major Standards)

- **5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. [**Clarification Statement: Examples of evidence supporting a model could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.] [Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.]
- **5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.** [Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances.] [Assessment Boundary: Assessment does not include distinguishing mass and Weight.]
- **5-PS1-3. Make observations and measurements to identify materials based on their properties**. [Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.] [Assessment Boundary: Assessment does not include density or distinguishing mass and weight.]
- **5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.**

Science and Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
• **Developing and Using Models** • Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Develop a model to describe phenomena. (5-PS1-1) • **Planning and Carrying Out Investigations** • Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and	**PS1.A: Structure and Properties of Matter** • Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. (5-PS1-1) • The amount (weight) of matter is conserved when it changes form, even	• **Cause and Effect** • Cause and effect relationships are routinely identified and used to explain change. (5-PS1-4) • **Scale, Proportion, and Quantity** • Natural objects exist from the very small to the immensely large. (5-PS1-1) • Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-2), (5-PS1-3)

provide evidence to support explanations or design solutions. • 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. (5-PS1-4) • Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (5-PS1-3) • **Using Mathematics and Computational Thinking** • Mathematical and computational thinking at the 3–5 level builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions. • Measure and graph quantities such as weight to address scientific and engineering questions and problems. (5-PS1-2)	in transitions in which it seems to vanish. (5-PS1-2) • Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3) **PS1.B: Chemical Reactions** • When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4) • No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) (5-PS1-2)	• **Connections to Nature of Science** • **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** • Science assumes consistent patterns in natural systems. (5-PS1-2)

Supporting and Additional Standards

Engineering Standards should be incorporated throughout science activities, lessons, and tasks

- **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 ETS-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.

Articulation of DCIs across grade-levels:
2.PS1.A (5-PS1-1), (5-PS1-2), (5-PS1-3); 2.PS1.B 5-PS1-2), (5-PS1-4); MS.PS1.A (5-PS1-1), (5-PS1-2), (5-PS1-3), (5-PS1-4); MS.PS1.B 5-PS1-2), (5-PS1-4)

Primary Interdisciplinary Connections

Primary Interdisciplinary Connections: Infused within the unit are connections to the NJSLS for Mathematics, Language Arts Literacy

ELA/Literacy -
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. (5-PS1-1)
W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (5-PS1-2) (5-PS1-3) (5-PS1-4)
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. (5-PS1-2) (5-PS1-3) (5-PS1-4)
W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
(5-PS1-2) (5-PS1-3) (5-PS1-4)

Mathematics -
MP.2 Reason abstractly and quantitatively. (5-PS1-1) (5-PS1-2) (5-PS1-3)
MP.4 Model with mathematics. (5-PS1-1) (5-PS1-2) (5-PS1-3)
MP.5 Use appropriate tools strategically. (5-PS1-2) (5-PS1-3)
5.NBT.A.1 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. (5-PS1-1)
5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (5-PS1-1)
5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems. (5-PS1-2)
5.MD.C.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement. (5-PS1-1)
5.MD.C.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. (5-PS1-1)

Computer Science and Design Thinking Standards

- **8.1.5.NI.1**: Develop models that successfully transmit and receive information using both wired and wireless methods.
- **8.2.5.ED.4**: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).

Career Readiness, Life Literacies, and Key Skills

- **9.1.5.FP.3**: Analyze how spending choices and decision-making can result in positive or negative consequences.
- **9.2.5.CAP.3**: Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
- **9.4.5.CI.3**: Research the development process of a product and identify the role of failure as a part of the creative process.

Evidence of Student Learning

Performance Tasks/Use of Technology:

- Ongoing Log
- Lab activities/Hands on Activities
- Vocab Study
- Student Response System (Kahoot)
- Science journals with observations and illustrations
- Graphic organizers, using Google Draw or Jamboard
- Technology integration:
  - SMART Board activities
  - Google Forms quizzes
  - Kahoot games
  - YouTube videos
  - Flipgrid activities

Other Assessments

Formative

- Do now and Exit tickets
- Observation
- Question and Response questions
- List conclusions we can draw about gravity, weight, mass, and an astronaut's jump on the Moon verses the Earth.

Summative

- Unit Projects
- NGSS Performance Tasks
- Lab experiments
- SGO Assessments
- Unit Assessment
- State Standardized Assessments
- https://teaching.betterlesson.com/lesson/631039/unit-2-assessment
- Written Assessment Choice Board- Students are given a variety of choices to demonstrate knowledge of content of standards https://betterlesson.com/lesson/631039/unit-2-assessment

Benchmark

- Fall/Spring benchmarks
- Teacher-developed/online assessments to track and monitor student growth over time

Alternative

- Projects: Present the qualifications Sally Ride must have had in order to go to space

	• Portfolios: Illustrate the different STAR patterns for each season of the year. • Teacher-created assessment developed following 1:1 conference and/or review of student data/needs •

Knowledge and Skills	
Content	**Skills**
Unit Essential Questions: • How do I identify matter based on its structure and properties? **Enduring Understandings** *Students will know...* • That matter is made of particles too small to be seen. • Materials have properties that can be used to identify those materials (e.g., color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility). • reactions or changes could include phase changes, dissolving, and mixing that form new substances.	**Unit Goals:** *Students will be able to...* • develop a model to describe the idea that matter is made of particles too small to be seen. In the model, students identify bulk matter (macroscopic observable matter; e.g., as sugar, air, water) and particles of matter that are too small to be seen with 75% accuracy in 3 out of 5 trials. • measure and graph the given quantities using standard units, including the weight of substances before they are heated, cooled, or mixed and the weight of substances, including any new substances produced by a reaction, after they are heated, cooled, or mixed with 75% accuracy in 3 out of 5 trials.

Instructional Plan	
Suggested Activities	**Resources**
• (PS1-1), (PS1-3) After determining that matter exists in the forms of solids, liquids, and gases, inform students they are doing a characteristic sort to identify characteristics that distinguish solids, liquids, and gases. • ○ https://betterlesson.com/lesson/636178/states-of-matter • (PS1-1), (PS-4) In order to introduce students to chemical changes, this activity will lead them into thinking scientifically about how heat is created from a mixture. The objective is for students to make observations that lead to their own	• Chromebooks • SMARTboard • Document Cameras • Nat Geo Materials • Mystery Science Materials • https://ngss.nsta.org/DisplayStandard.aspx?view=topic&id=19 • **Resources for on-grade students**: • Nat Geo on level resources • National Science Teachers' Association

discovery of a chemical change. https://teaching.betterlesson.com/lesson/630451/physical-changes-versus-chemical-changes ● *Next Generation Science Standards Interactive Read Alouds https://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf	• NGSS Hub https://ngss.nsta.org/Classroom-Resources.aspx • Resources for on-grade students: • Inspire on level resources • https://ngss.nsta.org/ • **Resources for students approaching grade level expectations**: • Nat Geo Approaching Resources • https://ngss.nsta.org/ • **Resources for students exceeding grade level expectations**: • Nat Geo exceeding resources • National Geographic Kids **https://kids.nationalgeographic.com/** • **https://pbskids.org/** • **Useful links / online resources**: • http://theoceancountylibrary.org/ • http://www.readwritethink.org/ • https://www.commonlit.org/ • https://www.activelylearn.com/ • https://www.readworks.org/
Suggested Options for Differentiation	
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Students with 504 Plans:	**Gifted and Talented**:

• Check ins during experiments to help refocus • Follow specific504 accommodations and modifications • Strategic grouping • Simplify written and verbal directions • Multi-sensory instruction	• Open ended questions to activate higher level thinking • Higher level texts ReadWorks Articles • Student interest-driven activities abcya.com • Problem solving/design challenges • Use more complex concepts • Enrichment opportunities to push assessment boundaries
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- Wonders Materials
- Mystery Science Materials

Teacher Notes: Texts listed above are suggestions and may be supplemented/substituted with other district-approved choices.