Rochelle Park School District

Curriculum Guide

Science
Grade 3

BOE Approved on August 30, 2022

Overview

The New Jersey Student Learning Standards for Science (NJSLS-S) describe the expectations for what students should know and be able to do as well as promote three-dimensional science instruction across the three science domains (i.e., physical sciences, life science, Earth and space sciences). From the earliest grades, the expectation is that students will engage in learning experiences that enable them to investigate phenomena, design solutions to problems, make sense of evidence to construct arguments, and critique and discuss those arguments (in appropriate ways relative to their grade level).

The foundation of the NJSLS-S reflects three dimensions — science and engineering practices, disciplinary core ideas, and crosscutting concepts. The performance expectations are derived from the interplay of these three dimensions. It is essential that these three components are integrated into all learning experiences. Within each standard document, the three dimensions are intentionally presented as integrated components to foster sensemaking and designing solutions to problems. Because the NJSLS-S is built on the notions of coherence and contextuality, each of the science and engineering practices and crosscutting concepts appear multiple times across topics and at every grade level. Additionally, the three dimensions should be an integral part of every curriculum unit and should not be taught in isolation.

Unit 1 Overview
Weather and Climate
Grade: 3
Content Area: Earth and Space Science
Pacing: 15 days
Essential Question
What is the typical weather near our home?
How can we protect people from weather-related hazards?
Student Learning Objectives (Performance Expectations)
3-ESS2-1: Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
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.
Unit Summary
In this unit of study, students organize and use data to describe typical weather conditions expected during a particular season. By applying their understanding of weather-related hazards, students are able to make a claim about the merit of a design solution that reduces the impacts of such hazards. The crosscutting concepts of patterns, cause and effect, and the influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in asking questions and defining problems, analyzing and interpreting data, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas.
Technical Terms
Temperature, Precipitation, Pictograph, Climate Range, Predictions, Weather Forecast, Weather Patterns, Cold Front, Warm Front, Absolute Zero, North Pole, South Pole, Radar, Air Quality, Satellite, Severe Weather, Hurricane, Typhoon, Surface Weather, Snow Cover, Fire Weather, Doppler Radar, Atmosphere, Meteorologists, Weather Vane, Anemometer, Hurricane, NASA, Tree Rings, Atmospheric Composition, Coral Bleaching, Rain Stick, El Niño, Greenhouse Effect, Horizon, Flood Barrier, Drought, Lightning Rod, Flash Flood, Thunderstorm
Formative Assessment Measures
Part A: Can we predict the kind of weather that we will see in the spring, summer, autumn, or winter?
Students who understand the concepts can: • Make predictions using patterns of change • Represent data in tables, bar graphs, and pictographs to reveal patterns that indicate relationships. • Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. (Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.) Examples of data could include: Average temperature Precipitation Wind direction
Part B: How can climates in different regions of the world be described?
Students who understand the concepts can: • Make predictions using patterns of change. • Obtain and combine information from books and other reliable media to explain phenomena.

Part C: How can we protect people from natural hazards such as flooding, fast wind, or lightning?
Students who understand the concepts can: • Identify and test cause-and-effect relationships to explain change • 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. • Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Examples of design solutions to weather related hazards could include: Barriers to prevent flooding Wind-resistant roofs Lightning rods • Define a simple design problem that can be solved through the development of an object, tool, process, or system and include several criteria for success and constraints on materials, time, or cost. • Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

Interdisciplinary Connections	
NJSLS- ELA	**NJSLS- Mathematics**
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.3.1 Compare and contrast the most important points and key details presented in two texts on the same topic. (3-ESS2-2) RI.3.9 Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-ESS3-1) W.3.1 Conduct short research projects that build knowledge about a topic. (3-ESS3-1) W.3.7 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) W.3.9	Reason abstractly and quantitatively. (3-ESS2-1),(3-ESS2-2),(3-ESS3-1) MP.2 Model with mathematics. (3-ESS2-1),(3-ESS2-2), (3-ESS3-1) MP.4 Use appropriate tools strategically. (3-ESS2-1) MP.5 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.A.2 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) 3.MD.B.3

Core Instructional Materials	Dimensions,
Career Readiness, Life Literacies and Key Skills	9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6). 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7). 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3). 9.4.5.DC.8: Propose ways local and global communities can engage digitally to participate in and promote climate action (e.g., 6.3.5.GeoHE.1).
Computer Science and Design Thinking	8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim. 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data. 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim. 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Modifications				
English Language Learners	**Special Education**	**At-Risk**	**Gifted and Talented**	**504**
Scaffolding	Word walls	Teacher tutoring	Curriculum compacting	Word walls
Word walls	Visual aides	Peer tutoring	Challenge assignments	Visual aides/Graphic organizers
Sentence/paragraph frames	Graphic organizers	Study guides	Enrichment activities	Multimedia
Bilingual	Multimedia	Graphic organizers	Tiered activities	Leveled readers
dictionaries/translation	Leveled readers	Extended time	Independent research/inquiry	Assistive technology
Think alouds	Assistive technology	Parent communication	Collaborative teamwork	Notes/summaries
Read alouds	Notes/summaries	Modified assignments	Higher level questioning	Extended time
Highlight key vocabulary	Extended time	Counseling	Critical/Analytical thinking tasks	Answer masking
Annotation guides	Answer masking		Self-directed activities	Answer eliminator
Think-pair- share	Answer eliminator			Highlighter/Color contrast
Visual aides	Highlighter			Parent communication
Modeling	Color contrast			Modified assignments
Cognates				Counseling

Unit 1: Weather and Climate		
3-ESS2: Earth's Systems		
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.		
Evidence Statement: 3-ESS2-1		
Science & 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. (3-ESS2-1) **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. (3-ESS2-2)	**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. (3-ESS2-1) Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)	**Patterns** Patterns of change can be used to make predictions. (3-ESS2-1),(3-ESS2-2)

Connections to other DCIs in this grade-band: N/A	
Articulation of DCIs across grade-bands: K.ESS2.D, 4.ESS2.A, 5.ESS2.A, MS.ESS2.C, MS.ESS2.D	
NJSLS- ELA: RI.3.1, RI.3.9, W.3.8	
NJSLS- Math: MP.2, MP.4, MP.5, 3.MD.A.2, 3.MD.B.3	
5E Model	
3-ESS2-1: Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.	
Engage **Anticipatory Set**	Following these videos, teacher will lead discussion on the four seasons, including typical weather forecasts and activities we do in the respective season, as well as the ways in which weather is measured. BrainPOP: Weather & Temperature https://www.brainpop.com/science/weather/weather/ https://www.brainpop.com/science/energy/temperature/ How Windy is Too Windy? Students will watch a brief video of the top of Mount Washington, showing just how powerful wind can be. https://www.mountwashington.org/experience-the-weather/observer-comments.aspx?id=38368 Weather and Seasons https://www.opened.com/video/weather-and-seasons-round-2-youtube/1031221 What is Weather? Students will discuss what they know about weather and how they think it should be measured. http://betterlesson.com/lesson/616162/what-is-weather
Exploration **Student Inquiry**	Step by Step Weather Observations In this activity, students will take their own readings of air temperatures using an outdoor thermometer and then compare their readings those from the National Weather Service, as well as determine normal yearly average temperatures. http://www.earthsciweek.org/classroom-activities/step-step-weather-observations Use the link below to compare student data to National Weather Service data. http://graphical.weather.gov/ Seasonal Weather Patterns: Temperature & Precipitation In this activity, students will predict monthly patterns of temperature and precipitation. Given a set of data, students will represent these data on temperature and precipitation graphs. Students will then use their graphs to draw conclusions on weather patterns. http://www.livebinders.com/media/get/MTE2MjQzMzE= Create a Weather Map In this lesson, students draw pictures that symbolize different types of weather and then use information about today's weather to make their own state weather map. http://nationalgeographic.org/activity/create-weather-map/

	Plotting Climate Data In this lessons, students will use climate data to create a key, plot data points, and interpolate data. http://betterlesson.com/lesson/636909/plotting-climate-data
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): 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. (3-ESS2-1) Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)
Elaboration **Extension Activity**	Sky & Cloud Windows In this activity, students will conduct experiments or participate in demonstrations to answer questions about sky and weather phenomena. Students also will analyze and present data. http://www.earthsciweek.org/classroom-activities/sky-and-cloud-windows Weather Vane and Anemometer In this activity, students create a wind vane and anemometer. Students can see how a wind vane shows wind direction, while an anemometer shows wind speed. http://www.americangeosciences.org/center-for-geo/ern/classroom-activities/weather-vane-and-anemometer Measuring Precipitation his inquiry-based lesson engages students in designing and testing a device to measure rain. https://pmm.nasa.gov/education/lesson-plans/measuring-precipitation Additional Related Lessons http://www.steam4students.com/third-grade-earthspace-3-ess2-earths-systems-quarter-2-2014-2015.html
Evaluation **Assessment Tasks**	Assessment Task A Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. (3-ESS2-1) After completing the Seasonal Weather Patterns: Temperature and Precipitation activity, students will complete the graph to display data. Students will look for patterns and relationships in the data. Assessment Task B Students will display data after completing the Create a Weather Map activity. Assessment Task C Students will create a chart after collecting data in the Plotting Climate Data activity. Students will also complete reflection questions in order to analyze data to reveal patterns and indicate relationships.

Unit 1: Weather and Climate		
3-ESS2: Earth's Systems		
3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.		
Clarification Statement: N/A		
Assessment Boundary: N/A		
Evidence Statement: ESS2-2		
Science & 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. (3-ESS2-1) **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. (3-ESS2-2)	**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. (3-ESS2-1) Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)	**Patterns** Patterns of change can be used to make predictions. (3-ESS2-1),(3-ESS2-2)
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: K.ESS2.D, 4.ESS2.A, 5.ESS2.A, MS.ESS2.C, MS.ESS2.D		
NJSLS- ELA: RI.3.1, RI.3.9, W.3.8		
NJSLS- Math: MP.2, MP.4, MP.5, 3.MD.A.2, 3.MD.B.3		
5E Model		
3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.		
Engage **Anticipatory Set**	National Geographic: Wacky Weather http://kids.nationalgeographic.com/explore/youtube-playlist-pages/youtube-playlist-weather/ National Geographic: Climate and Weather http://video.nationalgeographic.com/video/climate-weather-sci Photo Gallery: Climate http://science.nationalgeographic.com/science/photos/climate/#/baffin-island-sun_833_600x450.jpg	
Exploration **Student Inquiry**	Climate is What You Expect In this lesson, students will closely read a passage about climate and create a visual aid to help others understand the difference	

	between climate and weather. http://betterlesson.com/lesson/630039/climate-is-what-you-expect-close-reading Comparing Regional Temperatures In this two day lesson, students will make comparisons between the daily high and low temperatures in two different climate regions of the United States. http://betterlesson.com/lesson/629732/comparing-regional-temperatures-day-1 http://betterlesson.com/lesson/633892/comparing-regional-temperatures-day-2 Climate Research In this lesson, students will use electronic resources to conduct research and collect data about different climate zones. http://betterlesson.com/lesson/621759/climate-research-independent
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): 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. (3-ESS2-1) Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)
Elaboration **Extension Activity**	NASA: Climate Kids http://climatekids.nasa.gov/menu/weather-and-climate/
Evaluation **Assessment Tasks**	Assessment Task A (Comparing Regional Temperatures) Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. (3-ESS2-1) Students will create a table with the data they collected and explain relationships revealed through data. Assessment Task B (Climate Research) Students will create a short presentation to display and explain data following the activity.

Unit 1: Weather and Climate		
3-ESS: Earth and Human Activity		
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.		
Assessment Boundary: N/A		
Evidence Statement: 3-ESS3-1		
Science & 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). 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. (3-ESS3-1)	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. (3-ESS3-1) (Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1) **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). (3-ESS3-1) **Connections to Nature of Science** **Science is a Human Endeavor** Science affects everyday life. (3-ESS3-1)
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: K.ESS3.B, K.ETS1.A, 4.ESS3.B , 4.ETS1.A, MS.ESS3.B		
NJSLS- ELA: RI.3.1, RI.3.7		
NJSLS- Math: MP.2, MP.4		
5E Model		
3-ESS3-1: Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.		
Engage **Anticipatory Set**	National Weather Service: Weather Safety The following website provides information on safety measures that can be taken during hazardous weather-related events. http://www.weather.gov/safety Weather Related Hazards: Presentation & Graphic Organizer The following presentation provides students with an introduction to weather related hazards and solutions. Students will use a graphic organizer to map their understanding after viewing the presentation. Presentation and Graphic Organizer	

Exploration **Student Inquiry**	The Weather House - Design and Construction In this lesson, students will solve a simple design problem by building a miniature house with a constrained set of materials which will withstand a particular season's weather. http://betterlesson.com/lesson/627162/the-weather-house-design-and-construction Protect My Home! In this lesson, students will create a model barrier or protective wall which could be used to prevent home flooding during a storm surge. http://betterlesson.com/lesson/634338/protect-my-home Can We Build It? Yes, We Can! In this lesson, students will create a model of a roof that can withstand a tornado simulation by designing and then testing the model. http://betterlesson.com/lesson/633800/can-we-build-it-yes-we-can?from=search_lesson_title Fearsome Flash Floods Design Solutions Students will clearly present their idea for designing a solution to a local weather hazard (flash floods.) http://betterlesson.com/lesson/628961/fearsome-flash-floods-design-solutions-explain-session-1 Building an Earthquake Resistant Structure In this lesson, students will build an earthquake resistant structure. http://betterlesson.com/lesson/636080/building-an-earthquake-resistant-structure
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): 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. (3-ESS3-1) (Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)
Elaboration **Extension Activity**	Additional Related Activities & Videos https://www.opened.com/search?standard=3.ESS3.1
Evaluation **Assessment Tasks**	Assessment Task A: 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. (3-ESS3-1) Students will create a model using materials to build a barrier or protective wall to prevent your home from flooding during a storm surge. Students must be able to defend their solution and design. (Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.) See videos in the Protect My Home activity for guidance.

Unit 1: Weather and Climate		
3-5-ETS1-1 Engineering Design		
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.		
Clarification Statement: N/A		
Assessment Boundary: N/A		
Evidence Statements: 3-5-ETS1-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Asking Questions and Defining Problems Asking questions and defining problems in 3-5 builds on grades K-2 experiences and progresses to specifying qualitative relationships. Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.	**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 can be compared on the basis of how well each one meets the specified criteria for success of how well each takes the constraints into account.	**Influence of Science, Engineering, and Technology on Society and the Natural World** People's needs and wants change over time, as do their demands for new and improved technologies.
Connections to other DCIs in this grade-band: 4th Grade P-PS3-4		
Articulation of DCIs across grade-bands: K-2.ETS1.A; MS.ETS1.A; MS.ETS1.B		
NJSLS- ELA: W.5.7; W.5.8; W.5.9		
NJSLS- Math: MP.2; MP.4; MP.5; 3-5.OA		

Unit 2 Overview
Forces in Motion
Grade: 3
Content Area: Physical Science
Pacing: 20 days
Essential Question
How do equal and unequal forces on an object affect the object?
Student Learning Objectives (Performance Expectations)
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.
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.
Unit Summary
In this unit of study, students are able to determine the effects of balanced and unbalanced forces on the motion of an object. The crosscutting concepts of patterns and cause and effect are identified as organizing concepts for these disciplinary core ideas. In the third-grade performance expectations, students are expected to demonstrate grade-appropriate proficiency by planning and carrying out investigations. Students are expected to use these practices to demonstrate understanding of the core ideas.

Technical Terms
Balanced Forces, Unbalanced Forces, Stability, Instability, Collide, Future Motion, Newton's Laws of Motion (1,2, and 3), Inertia, Acceleration, Deceleration, Friction, Magnetism, Vector of Force, Mass, Reaction, Gravity, Pendulum, Magnetic Pull, Magnetic Push, Static Cling, Velocity
Formative Assessment Measures
Part A: How do scientists play soccer?
Students who understand the concepts can: • Identify cause-and-effect relationships. • Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence. • Use fair tests in which variables are controlled and the number of trials considered. • Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
Part B: Can we use patterns that we observed to predict the future?
Students who understand the concepts can: • Make predictions using patterns of change. • Make observations and/or measurements to produce data to serve as the basis of evidence for an explanation of a phenomenon. • Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

Interdisciplinary Connections	
NJSLS- ELA	**NJSLS- Mathematics**
Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. RI.3.1 (3-PS2-1) Conduct short research projects that build knowledge about a topic. W.3.7 (3- PS2-1),(3-PS2-2) Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. W.3.8 (3-PS2-1),(3-PS2-2)	Reason abstractly and quantitatively. MP.2 (3-PS2-1) Use appropriate tools strategically. MP.5 (3-PS2-1) 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.MD.A.2 (3-PS2-1)

Core Instructional Materials	Textbooks Series, Lab Materials, etc.
Career Readiness, Life Literacies and Key Skills	9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). 9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM. IPRET.5).
Computer Science and Design Thinking	8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim. 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. 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.

Modifications				
English Language Learners	**Special Education**	**At-Risk**	**Gifted and Talented**	**504**
Scaffolding Word walls Sentence/paragraph frames Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aides Modeling Cognates	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast	Teacher tutoring Peer tutoring Study guides Graphic organizers Extended time Parent communication Modified assignments Counseling	Curriculum compacting Challenge assignments Enrichment activities Tiered activities Independent research/inquiry Collaborative teamwork Higher level questioning Critical/Analytical thinking tasks Self-directed activities	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast Parent communication Modified assignments Counseling

Unit 2: Forces and Motion		
3-PS2 Motion and Stability: Forces and Interactions		
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.		
Evidence Statements: 3-PS2-1		
Science & 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.	**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.) **PS2.B: Types of Interactions**	**Cause and Effect** Cause and effect relationships are routinely identified.

Connections to Nature of Science **Scientific Investigations Use a Variety of Methods** Science investigations use a variety of methods, tools, and techniques.	Objects in contact exert forces on each other.	

Connections to other DCIs in this grade-band: N/A
Articulation of DCIs across grade-bands: K.PS2.A ; K.PS2.B ; K.PS3.C ; 5.PS2.B ; MS.PS2.A ; MS.ESS1.B ; MS.ESS2.C
NJSLS- ELA: RI.3.1, W.3.7, W.3.8
NJSLS- Math: MP.2, MP.5, 3.MD.A.2
5E Model
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.

Engage **Anticipatory Set**	BrainPOP: Forces https://www.brainpop.com/science/energy/forces/ Balanced and Unbalanced Forces: Presentation https://prezi.com/9meayq6rgboe/balanced-and-unbalanced-force-third-grade/ Tug of War: Kids vs. Teachers After viewing the video, lead a discussion on whether this is an example of balanced or unbalanced forces. https://www.youtube.com/watch?v=rP2MviNn52g
Exploration **Student Inquiry**	Let's Investigate: Balanced and Unbalanced Forces In this lesson, students will investigate how balanced and unbalanced forces affect the motion of a ball. http://www.morethanaworksheet.com/wp-content/uploads/2015/06/Balanced-and-Unbalanced-Forces-Investigation.pdf Forces and Interactions Unit http://www.mccracken.kyschools.us/Downloads/FORCES%20INTERACTIONS%203.pdf The following lessons address the effects of balanced and unbalanced forces on the motion of an object. Forces in Tug of War (pg. 2) Students will learn that an object will move in the direction of the largest force as well as an object will not be in motion if the forces are equal. Falling Objects (pg. 6) Students will understand that gravitational force acts continuously on an object as it falls, that two objects dropped from the same height should hit the ground at the same time and that all things fall to the ground because of the pull of gravity
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): 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.) PS2.B: Types of Interactions Objects in contact exert forces on each other.
Elaboration **Extension Activity**	Additional Related Activities https://eucaps.wsu.edu/wp-content/uploads/sites/731/2015/04/Third-Grade-lesson-plans.pdf
Evaluation **Assessment Tasks**	Assessment Task A: Let's Investigate: Balanced and Unbalanced Forces 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. Students will complete the Let's Investigate activity sheet as they complete the investigation. Assessment Task B: Forces and Interactions Unit Students will complete various investigations and activities in the unit.

Unit 2: Forces and Motion

3-PS2 Motion and Stability: Forces and Interactions

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 see-saw.

Assessment Boundary: Assessment does not include technical terms such as period and frequency.

Evidence Statement: 3-PS2-2

Science & 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 or test a design solution. **Connections to Nature of Science** **Science Knowledge is Based on Empirical Evidence** Science findings are based on recognizing patterns.	**PS2.A: Forces and Motion** 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.)	**Patterns** Patterns of change can be used to make predictions.

Connections to other DCIs in this grade-band: N/A

Articulation of DCIs across grade-bands: 1.ESS1.A ; 4.PS4.A ; MS.PS2.A ; MS.ESS1.B

NJSLS- ELA: W.3.7, W.3.8

NJSLS- Math: N/A

5E Model	
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.	
Engage **Anticipatory Set**	BrainPOP: Newton's Laws of Motions https://www.brainpop.com/science/motionsforcesandtime/newtonslawsofmotion/ Newton's Laws of Motion This website provides an introduction to Newton's three laws of motion. http://teachertech.rice.edu/Participants/louviere/Newton/
Exploration **Student Inquiry**	Force and Motion Investigation In this lesson, students will collaboratively conduct an investigation on the effect of force applied on an object to produce data to serve as the basis for evidence, by using fair tests in which variables are controlled and the number of trials are considered. http://betterlesson.com/lesson/632779/force-and-motion-investigation Forces and Interactions Unit http://www.mccracken.kyschools.us/Downloads/FORCES%20INTERACTIONS%203.pdf The following lessons address the motion of objects and how patterns can be used to predict future motion. Flicking with Forces (pg. 8) Students will predict and observe what happens when force is applied to an object, and compare the relative effects of a force of the same strength on objects of different weights. Pendulum Swing (pg. 12) Students plan and conduct an investigation to explore forces on the motion of an object. Students make predictions on the effect of different forces on a moving object. Students make observations of an object's motion to provide evidence that a pattern can be used to predict future motion.
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. PS2.A: Forces and Motion 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.)
Elaboration **Extension Activity**	Additional Related Activities http://ngss.nsta.org/DisplayStandard.aspx?view=dci&id=19 https://www.teacherspayteachers.com/Browse/Price-Range/Free/Grade-Level/Third/Search:force+and+motion
Evaluation **Assessment Tasks**	Assessment Task A: Forces and Motion Investigation 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. After students complete the data collection part of the activity, students will demonstrate understanding by completing the guiding reflection questions.

Unit 3 Overview
Electrical and Magnetic Forces
Grade: 3
Content Area: Physical Science
Pacing: 15 days
Essential Question
How can we use our understandings about magnets be used to solve problems?
Student Learning Objectives (Performance Expectations)
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.
3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets.*
Unit Summary
In this unit of study, 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. The crosscutting concept of cause and effect, and the interdependence of science, engineering, and technology, and the influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in asking questions and defining problems. Students are also expected to use these practices to demonstrate understanding of the core ideas.
Technical Terms
Cause and Effect, Electric Interaction, Magnetic Interaction, Electromagnetic, Magnetism, Magnetic Field, Bar Magnetic, Electrical Charge
Formative Assessment Measures
Part A: What are the relationships between electrical and magnetic forces?
Students who understand the concepts can: • Identify and test cause-and-effect relationships in order to explain change • Ask questions that can be investigated based on patterns such as cause-and effect relationships. • Ask questions to determine cause-and-effect relationships in electric or magnetic interactions between two objects not in contact with each other. • Magnetic forces could include: The force between two permanent magnets; The force between an electromagnet and steel paperclips; The force exerted by one magnet versus the force exerted by two magnets. • Cause-and-effect relationships could include: How the distance between objects affects the strength of the force How the orientation of magnets affects the direction of the magnetic force.
Part B: How can we use our understandings about magnets be used to solve problems?
Students who understand the concepts can: • Define a simple problem that can be solved through the development of a new or improved object or tool. • Define a simple design problem that can be solved by applying scientific ideas about magnets (e.g., constructing a latch to keep a door shut or creating a device to keep two moving objects from touching each other). • Define a simple design problem that can be solved through the development of an object, tool, process, or system, and include several criteria for success and constraints on material, time, or cost. • Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
Interdisciplinary Connections

NJSLS- ELA	
● Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-PS2-3) RI.3.1 ● 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.3.3 ● 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) RI.3.8 ● Ask and answer questions about information from a speaker, offering appropriate elaboration and detail. (3-PS2-3) SL.3.3	
Core Instructional Materials	Textbooks Series, Lab Materials, etc.
Career Readiness, Life Literacies and Key Skills	9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6). 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3). 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3).
Computer Science and Design Thinking	8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data. 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. 8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process. 8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process.

Modifications				
English Language Learners	**Special Education**	**At-Risk**	**Gifted and Talented**	**504**
Scaffolding	Word walls	Teacher tutoring	Curriculum compacting	Word walls
Word walls	Visual aides	Peer tutoring	Challenge assignments	Visual aides
Sentence/paragraph frames	Graphic organizers	Study guides	Enrichment activities	Graphic organizers
Bilingual dictionaries/translation	Multimedia	Graphic organizers	Tiered activities	Multimedia
Think alouds	Leveled readers	Extended time	Independent research/inquiry	Leveled readers
Read alouds	Assistive technology	Parent communication	Collaborative teamwork	Assistive technology
Highlight key vocabulary	Notes/summaries	Modified assignments	Higher level questioning	Notes/summaries
Annotation guides	Extended time	Counseling	Critical/Analytical thinking tasks	Extended time
Think-pair- share	Answer masking		Self-directed activities	Answer masking
Visual aides	Answer eliminator			Answer eliminator
Modeling	Highlighter			Highlighter
Cognates	Color contrast			Color contrast
				Parent communication
				Modified assignments
				Counseling

Unit 3: Electrical and Magnetic Forces		
3-PS2 Motion and Stability: Forces and Interactions		
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 paperclips, 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.		
Evidence Statement: 3-PS2-3		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
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.	**PS2.B: Types of Interactions** 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.	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: MS.PS2.B		
NJSLS- ELA: RI.3.1, RI.3.3, RI.3.8, SL.3.3		
NJSLS- Math: N/A		
5E Model		
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.		
Engage **Anticipatory Set**	BrainPOP: Magnetism & Electromagnetic Induction https://www.brainpop.com/science/motionsforcesandtime/magnetism/ https://www.brainpop.com/science/motionsforcesandtime/electromagneticinduction/ Bill Nye: Magnetism https://www.schooltube.com/video/dedad2d7f6354a87bcdf/Bill%20Nye%20Magnetism	
Exploration **Student Inquiry**	What Are Magnets? In this lesson, students will make predictions and observations to determine the cause and effect relationship between magnets and magnetic and nonmagnetic items. http://betterlesson.com/lesson/636548/2-what-are-magnets Magnetism Exploration Students will be able to identify objects that are attracted or repelled by magnetism.	

	http://betterlesson.com/lesson/638686/magnetism-exploration Forces and Interactions Unit http://www.mccracken.kyschools.us/Downloads/FORCES%20INTERACTIONS%203.pdf The following lessons address electric and magnetic interactions. Static Electricity (pg. 17) In this lesson, students will learn about and observe the effects of static electricity. Introduction to Magnets (pg. 20)- Students will investigate and confirm their understanding of how magnets attract and repel other magnets. Multiple Magnets (pg. 30)- Students will determine that the strength of combined magnets is stronger than that of one magnet and that the strength of magnets does not go up exponentially when more magnets are added. Magnetic Object Sort (pg. 34)- Students make predictions and test various items for their magnetic interaction. Students observe that magnetic objects are affected by the strength of the magnet and the distance from the magnet. Paperclip Walk (pg. 39)- Students will demonstrate that magnetic objects are affected by the distance from the magnet. Electromagnets (pg. 42)- Students observe that the strength of the electromagnet can be increased by increasing the number of coils wrapped around the iron bolt and how tightly they are wrapped.
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): PS2.B: Types of Interactions 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.
Elaboration **Extension Activity**	Exploring Magnets http://www.crscience.org/lessonplans/2_Exploring_Magnets_for_Bayer-13-14.pdf
Evaluation **Assessment Tasks**	Ask questions that can be investigated based on patterns such as cause and effect relationships. Assessment Task A: What Are Magnets? Assess through class discussion and student feedback to check for understanding. http://betterlesson.com/lesson/reflection/21207/referring-back-to-the-original-question-brings-closure-to-a-lesson Assessment Task B: Magnetism Exploration - Using the Investigation Organizer have teams partner and share their investigations and related results. http://betterlesson.com/lesson/resource/3218312/investigation-organizer?from=resource_image Assessment Task C: Forces and Interactions - reference assessment tasks in http://www.mccracken.kyschools.us/Downloads/FORCES%20INTERACTIONS%203.pdf

Unit 3: Electrical and Magnetic Forces		
3-PS2 Motion and Stability: Forces and Interactions		
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.		
Assessment Boundary: N/A		
Evidence Statement: 3-PS2-4		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
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. Define a simple problem that can be solved through the development of a new or improved object or tool.	**PS2.B: Types of Interactions** 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.	**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.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: N/A		
NJSLS- ELA: RI.3.1, RI.3.3, RI.3.8, W.3.7, W.3.8, SL.3.3		
NJSLS- Math: MP.2, MP.5, 3.MD.A.2		

5E Model	
3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets.*	
Engage **Anticipatory Set**	Magnets All Around Us https://prezi.com/jmgpzduo4die/magnets-all-around-us/ Magnetic Powered Tram Cars in South Korea https://www.youtube.com/watch?v=UsEYped_gZc
Exploration **Student Inquiry**	I Need a Magnet Students will be able to use their knowledge of magnetism to solve a problem or respond to a situation. http://betterlesson.com/lesson/639709/i-need-a-magnet Magnet Engineering Design Challenge Students will use the Engineering Design Process to create a solution to problem involving magnets. http://betterlesson.com/lesson/645199/magnet-engineering-design-challenge

Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): PS2.B: Types of Interactions 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.
Elaboration **Extension Activity**	Inventions of Tomorrow That Will Rely On Magnetism, A Writing Activity In this lesson, students will write an informative / explanatory essay explaining a possible invention in the future, that would rely on magnetism to work by including a minimum of three magnetism facts that would support the invention. http://betterlesson.com/lesson/637343/5-inventions-of-tomorrow-that-will-rely-on-magnetism-a-writing-activity
Evaluation **Assessment Tasks**	Assessment Task A: Define a simple problem that can be solved through the development of a new or improved object or tool. Using Magnets to Solve a Problem (link below) assess student responses and, if time permits, ask students to share any revisions they would make. http://betterlesson.com/lesson/resource/3228140/situations?from=resource_image Assessment Task B: Develop a rubric to assess the student's design for developing a solution to a problem, ensuring that the problem can be solved through the development of a new or improved object or tool.

Unit 4 Overview
Heredity: Inheritance and Variation of Traits
Grade: 3
Content Area: Life Science
Pacing: 15 days
Essential Question
What kinds of traits are passed on from parent to offspring? What environmental factors might influence the traits of a specific organism?
What environmental factors might influence the traits of a specific organism?
Student Learning Objectives (Performance Expectations)
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.
3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.
Unit Summary
In this unit of study, students acquire an understanding that organisms have different inherited traits and that the environment can also affect the traits that an organism develops. The crosscutting concepts of patterns and cause and effect are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in analyzing and interpreting data, constructing explanations, and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ideas.
Technical Terms
Trait, Organism, Offspring, Sibling, Inherited Traits, Non-inherited Traits, Adapted Traits, Genetics, DNA, Vertebrate Systems, Invertebrate Systems, Genetic Variation, Mutation, Observable Trait, Heredity, Types of Biomes (6), Ecosystems, Adaptation, Predator, Prey, Growth Rate, Natural Selection, Tropisms, Pollination, Germination, Seedling, Photosynthesis, Chromatophores
Formative Assessment Measures
Part A: What kinds of traits are passed on from parent to offspring?
Students who understand the concepts can: • Sort and classify natural phenomena using similarities and differences. (Clarification: Patterns are the similarities and differences in traits shared between offspring and their parents or among siblings, with an emphasis on organisms other than humans). • Analyze and interpret data to make sense of phenomena using logical reasoning. • 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. (Assessment does not include genetic mechanisms of inheritance and prediction of traits, and is limited to non humans.)
Part B: What environmental factors might influence the traits of a specific organism?
Students who understand the concepts can: • Identify cause-and-effect relationships in order to explain change. • Use evidence (e.g., observations, patterns) to support an explanation. • Use evidence to support the explanation that traits can be influenced by the environment. Examples of the environment's effect on traits could include: Normally tall plants that grow with insufficient water are stunted. A pet dog that is given too much food and little exercise may become overweight.

Interdisciplinary Connections	
NJSLS- ELA	**NJSLS- Mathematics**
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) RI.3.1 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) RI.3.2 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) RI.3.3 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS3-1),(3-LS3-2),(3-LS4-2) W.3.2 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) SL.3.4	Reason abstractly and quantitatively. (3-LS3-1),(3-LS3-2) MP.2 Model with mathematics. (3-LS3-1),(3-LS3-2) MP.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.MD.B.4

Core Instructional Materials	Textbooks Series, Lab Materials, etc.
Career Readiness, Life Literacies and Key Skills	9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). 9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data. 9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM. IPRET.5).
Computer Science and Design Thinking	8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim. 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data. 8.2.5.ED.1: Explain the functions of a system and its subsystems.

Modifications				
English Language Learners	**Special Education**	**At-Risk**	**Gifted and Talented**	**504**
Scaffolding Word walls Sentence/paragraph frames Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aides Modeling Cognates	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast	Teacher tutoring Peer tutoring Study guides Graphic organizers Extended time Parent communication Modified assignments Counseling	Curriculum compacting Challenge assignments Enrichment activities Tiered activities Independent research/inquiry Collaborative teamwork Higher level questioning Critical/Analytical thinking tasks Self-directed activities	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast Parent communication Modified assignments Counseling

Unit 4: Traits		
3-LS3 Heredity: Inheritance and Variation of Traits		
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.		
Evidence Statement: 3-LS3-1		
Science & 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.	**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.	**Patterns** Similarities and differences in patterns can be used to sort and classify natural phenomena.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: 1.LS3.A, 1.LS3.B, MS.LS3.A, MS.LS3.B		
NJSLS- ELA: RI.3.1, RI.3.2, RI.3.3, W.3.2, SL.3.4		
NJSLS- Math: MP.2, MP.4, 3.MD.B.4		

5E Model	
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.	
Engage **Anticipatory Set**	Learn Genetics: What Are Traits? http://learn.genetics.utah.edu/content/basics/traits/ Learn Genetics: What is Inheritance? http://learn.genetics.utah.edu/content/basics/inheritance/ Heredity: Video and Interactive Website https://www.brainpop.com/science/cellularlifeandgenetics/heredity/ http://studyjams.scholastic.com/studyjams/jams/science/human-body/heredity.htm An Inventory of My Traits Students take an inventory of their own easily observable genetic traits. Working in small groups, they observe how their trait inventories differ from those of others. Students record their observations in a data table and make a bar graph to show the most and least common traits in the group. http://learn.genetics.utah.edu/content/basics/activities/pdfs/InventoryOfTraits.pdf
Exploration **Student Inquiry**	Guppies Galore (If you can not use actual guppies, you can use photos of guppies or any other plant or animal) http://ngss.nsta.org/Resource.aspx?ResourceID=321 Animal Detectives http://ngss.nsta.org/Resource.aspx?ResourceID=505 Inheritance and Variation of Traits: Life Cycles and Traits Unit http://missmillersroom.weebly.com/uploads/1/3/7/1/13713346/inheritance.pdf Mammals and Their Parents, Perfect Together Identify and interpret traits that are found in mammals by noticing differences among animals of the same species. Make a claim that traits are inherited from parents that is supported by evidence. http://betterlesson.com/lesson/623417/mammals-and-their-parents-perfect-together Inherited and Observable Traits In this lesson, students will review inherited and observable traits, use this knowledge to poll their classmates, and create a frequency table from this gathered data. https://www.teachervision.com/tv/printables/geneticsbeginnerext.pdf Awesome Bird Traits

	In this lesson, students will explore the idea that animals have characteristics that help them survive because they have different inherited information. http://betterlesson.com/lesson/627509/awesome-bird-traits Plant Structure and Function- Lesson 3: Inherited Characteristics In this lesson, student will learn how plants have inherited characteristics that help them live in a particular environment. http://www.duxbury.k12.ma.us/cms/lib2/MA01001583/Centricity/Domain/488/Grade%203%20Life%20Science.pdf
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): 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.
Elaboration **Extension Activity**	Additional Related Lessons and Resources https://www.opened.com/search?standard=3.LS3.1
Evaluation **Assessment Tasks**	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. Guppies Galore Assessment The instructional materials include student journal pages to record observations, but the performance expectation could be further strengthened if the students took pictures of the mother, father and offspring and made a visual family tree. To help the students analyze and interpret the data that they have collected, the teacher could provide the students with labeled Venn diagrams to record the similarities and differences between (1) the male and female guppies (before the fry are born), (2) the parents and their offspring, and (3) two of the offspring. Animal Detectives Assessment http://ngss.nsta.org/Resource.aspx?ResourceID=505 Inheritance and Variation of Traits: Life Cycles and Traits Unit Assessment http://missmillersroom.weebly.com/uploads/1/3/7/1/13713346/inheritance.pdf

Unit 4: Traits		
3-LS3 Heredity: Inheritance and Variation of Traits		
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.		
Assessment Boundary: N/A		
Evidence Statement: 3-LS3-2		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
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.	**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.	**Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: 1.LS3.A, 1.LS3.B, MS.LS1.B, MS.LS3.A, MS.LS3.B		
NJSLS- ELA: RI.3.1, RI.3.2, RI.3.3, W.3.2, SL.3.4		
NJSLS- Math: MP.2, MP.4, 3.MD.B.4		

5E Model	
3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.	
Engage **Anticipatory Set**	Plant and Animal Adaptations http://studyjams.scholastic.com/studyjams/jams/science/plants/plant-adaptations.htm http://studyjams.scholastic.com/studyjams/jams/science/animals/animal-adaptations.htm https://jr.brainpop.com/science/plants/plantadaptations/ https://www.brainpop.com/science/ecologyandbehavior/camouflage/
Exploration **Student Inquiry**	Inheritance and Variation of Traits: Life Cycles and Traits Unit http://missmillersroom.weebly.com/uploads/1/3/7/1/13713346/inheritance.pdf Biomes Students will need some background knowledge of biomes before we can begin to discuss organisms that survive well, or not well, in those environments. This lesson will build motivation and provide an opportunity to build background schema. Students will be able to organize information from visuals about the major biomes of the world. http://betterlesson.com/lesson/632382/biomes Adaptations

	Students will be able to obtain critical information about organisms that live in certain environments, through informational reading http://betterlesson.com/lesson/632632/adaptations An Animal That Can Survive In All Biomes Students will be able to use information about environments and adaptations in order to design an animal or plant that could survive in all. http://betterlesson.com/lesson/632921/an-animal-that-can-survive-in-all-biomes-a-two-day-activity Adaptation: Bird Beaks Students will use hands on materials to simulate how birds with different beaks eat and survive in an ecosystem. Students will use multiple methods of addition to calculate amount of food that birds have consumed with their different beaks. http://www.wccusd.net/cms/lib03/CA01001466/Centricity/domain/1040/grade%203%20lessons/AdaptationThruAddition.pdf
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): 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.
Elaboration **Extension Activity**	Hunger Games: Animal Adaptations for Survival In a world where organisms must compete to survive, students will learn about animal adaptations and how they can help, or hurt, their chances for survival and reproduction. The competition is fierce and there can only be one (ok, not really one) winner of… The Hunger Games! http://www.crscience.org/lessonplans/3_TheHungerGamesAnimalAdaptationsforSurvival_14-15.pdf Additional Related Lessons and Resources https://www.opened.com/search?standard=3.LS3.2
Evaluation **Assessment Tasks**	Use evidence (e.g., observations, patterns) to support an explanation. Inheritance and Variation of Traits: Life Cycles and Traits Unit Assessment http://missmillersroom.weebly.com/uploads/1/3/7/1/13713346/inheritance.pdf Adaptation: Bird Beaks Assessment http://www.wccusd.net/cms/lib03/CA01001466/Centricity/domain/1040/grade%203%20lessons/AdaptationThruAddition.pdf Teacher will use exit slip to assess students understanding of the lesson.

Unit 5 Overview
Continuing the Cycle
Grade: 3
Content Area: Life Science
Pacing: 10 days
Essential Question
Do all living things have the same life cycle?
Are there advantages to being different?
Student Learning Objectives (Performance Expectations)
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.
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.
Unit Summary
In this unit of study, 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. The crosscutting concepts of patterns and cause and effect are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade appropriate proficiency in developing and using models and constructing explanations and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ideas.
Technical Terms
Life Cycle, Molecules, "Survival of the Fittest", Charles Darwin, Natural Selection, Animal Defenses, Embryo, Metamorphosis
Formative Assessment Measures
Part A: Do all living things have the same life cycle?
Students who understand the concepts can: • Sort and organism's (inherited traits) using similarities and differences in patterns. • Make predictions using patterns of change • Develop models to describe phenomena • Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. (I.e., Changes organisms go through during their life form a pattern.)
Part B: Are there advantages to being different?
Students who understand the concepts can: • Identify cause-and-effect relationships in order to explain change. • Use evidence (e.g., observations, patterns) to construct an explanation. 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. Examples of cause and-effect relationships could include: Plants that have larger thorns than other plants may be less likely to be eaten by predators. Animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.

Interdisciplinary Connections	
NJSLS- ELA	**NJSLS- Mathematics**
Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS4-2) RI.3.1 Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS4-2) RI.3.2 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-LS4-2) RI.3.3 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) RI.3.7 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-LS4-2) SL.3.4 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) SL.3.5 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-2) W.3.2	Reason abstractly and quantitatively. (3-LS4-2) MP.2 Model with mathematics. (3-LS1-1), (3-LS4-2) MP.4 Number and Operations in Base Ten (3-LS1-1) 3.NBT Number and Operations—Fractions (3-LS1-1) 3.NF "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.3" 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.MD.B.4

Core Instructional Materials	Textbooks Series, Lab Materials, etc.
Career Readiness, Life Literacies and Key Skills	9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one’s thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). 9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images, graphics, or symbols. 9.4.5.TL.5: Collaborate digitally to produce an artifact (e.g., 1.2.5CR1d).
Computer Science and Design Thinking	8.2.5.ED.1: Explain the functions of a system and its subsystems. 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. 8.2.5.ED.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).

Modifications				
English Language Learners	**Special Education**	**At-Risk**	**Gifted and Talented**	**504**
Scaffolding Word walls Sentence/paragraph frames Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aides Modeling Cognates	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast	Teacher tutoring Peer tutoring Study guides Graphic organizers Extended time Parent communication Modified assignments Counseling	Curriculum compacting Challenge assignments Enrichment activities Tiered activities Independent research/inquiry Collaborative teamwork Higher level questioning Critical/Analytical thinking tasks Self-directed activities	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast Parent communication Modified assignments Counseling

Unit 5: Continuing the Cycle		
3-LS1 From Molecules to Organisms: Structures and Processes		
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.		
Evidence Statement: 3-LS1-1		
Science & 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 models to describe phenomena. (3-LS1-1) **Connections to Nature of Science** **Scientific Knowledge is Based on Empirical Evidence** Science findings are based on recognizing patterns.	**LS1.B: Growth and Development of Organisms** Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1)	**Patterns** Patterns of change can be used to make predictions. (3-LS1-1)
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: MS.LS1.B		
NJSLS- ELA: RI.3.7, SL.3.5		
NJSLS- Math: MP.4, 3.NBT, 3.NF		

5E Model	
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.	
Engage **Anticipatory Set**	BrainPOP: Plant Life Cycle https://jr.brainpop.com/science/plants/plantlifecycle/ Life Cycles: Video and Games http://www.sheppardsoftware.com/scienceforkids/life_cycle/movie.htm http://www.sheppardsoftware.com/scienceforkids/life_cycle/games.htm Animal Life Cycles http://www.kidzone.ws/animals/lifecycle.htm
Exploration **Student Inquiry**	Animal Life Cycles: Introduction In this lesson, students will explain commonalities in animal life cycles as well and to compare life cycles of different animal grou http://betterlesson.com/lesson/639116/animal-life-cycles-introduction Life Cycle Lessons The following lessons all address the big idea that all organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. Lessons include: butterflies and grasshoppers, ants, chicken, salmon, frogs and sea turtles. Lessons include the development of visual models of life cycles including drawings and graphic organizers. http://betterlesson.com/lesson/637832/life-cycles-lesson-1-butterflies-and-grasshoppers http://betterlesson.com/lesson/640795/lesson-2-life-cycle-of-an-ant http://betterlesson.com/lesson/637838/life-cycles-lesson-3-chicken-the-egg http://betterlesson.com/lesson/637836/life-cycles-lesson-4-the-atlantic-salmon http://betterlesson.com/lesson/637837/life-cycles-lesson-5-frogs http://betterlesson.com/lesson/617772/life-cycles-lesson-6-examining-the-life-cycle-of-the-sea-turtle Scholastic: 10 Ready-to-Go Resources for Teaching Life Cycles http://www.scholastic.com/teachers/top-teaching/2014/04/10-ready-go-resources-teaching-life-cycles PBS: Plant Life Cycles Students explore the cycles of plant life and compare them with those of animals. http://nj.pbslearningmedia.org/resource/tdc02.sci.life.colt.lp_plantcycle/plant-life-cycles/
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): LS1.B: Growth and Development of Organisms Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1)

Elaboration **Extension Activity**	Additional Related Lessons and Activities http://ngss.nsta.org/DisplayStandard.aspx?view=pe&id=53 https://www.opened.com/search?standard=3.LS1.1
Evaluation **Assessment Tasks**	Assessment Task A: Life Cycle Lessons Develop models to describe phenomena. (3-LS1-1) Students will research and develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction and death.

Unit 5: Continuing the Cycle		
3-LS4 Biological Evolution: Unity and Diversity		
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.		
Assessment Boundary: N/A		
Evidence Statement: 3-LS4-2		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
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 construct an explanation.	**LS4.B: Natural Selection** Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.	**Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: MS.LS2.A, MS.LS3.B, MS.LS4.B		
NJSLS- ELA: RI.3.1, RI.3.2, RI.3.3, W.3.2, SL.3.4		
NJSLS- Math: MP.2, MP.4, 3.MD.B.3		
5E Model		
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.		
Engage **Anticipatory Set**	BrainPOP: Natural Selection https://www.brainpop.com/science/ecologyandbehavior/naturalselection/ Charles Darwin: Theory of Natural Selection https://www.youtube.com/watch?v=vnktXHBvE8s	
Exploration	Natural Selection Webquest	

Student Inquiry	The following unit includes individual and group activities on natural selection and animal adaptations found in various species. These lessons will help students understand how certain traits allow animals to survive in certain environments. Key questions addressed in the unit include: - What is natural selection? What is adaptation? - What different types of adaptations do animals have? - How do certain adaptations help a species survive? http://naturalselectionwbi.weebly.com/ Animal Adaptations, Their Best Defense In this two day lesson, students will determine how a specific inherited trait or adaptation helps an animal survive by observing and discussing in collaborative groups. http://betterlesson.com/lesson/623416/animal-adaptations-their-best-defense http://betterlesson.com/lesson/631801/animal-adaptations-their-best-defense-day-2
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): LS4.B: Natural Selection Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.
Elaboration **Extension Activity**	Additional Related Lessons and Activities http://ngss.nsta.org/DisplayStandard.aspx?view=dci&id=27 https://www.opened.com/search?standard=3.LS4.2
Evaluation **Assessment Tasks**	Assessment Task A:Natural Selection Webquest Use evidence (e.g., observations, patterns) to construct an explanation. Students will complete the assessment following the Webquest. (Use the rubric attached at the bottom of the page to assess.) View Assessment Task Here

Organisms and the Environment

Grade: 3

Content Area: Life Science

Pacing: 15 days

Essential Question

Why don't we see alligators in the arctic?

Student Learning Objectives (Performance Expectations)

3-LS2-1. Construct an argument that some animals form groups that help members survive.

3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Unit Summary

In this unit of study, students develop an understanding of the idea that when the environment changes, some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die. The crosscutting concepts of cause and effect and the interdependence of science, engineering, and technology are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in engaging in argument from evidence. Students are also expected to use this practice to demonstrate understanding of the core ideas.

Technical Terms

Ecosystems, Survival, Mammals, Reptiles, Amphibians, Species, Colonies, Pods, Herds, Survival Needs (4)

Formative Assessment Measures

Part A: In a particular habitat, why do some organisms survive well, some survive less well, and some not survive at all?

Students who understand the concepts can:
• Identify cause-and-effect relationships in order to explain change.
• Construct an argument with evidence
• Construct an argument with evidence (e.g., needs and characteristics of the organisms and habitats involved) that in a particular habitat, some organisms can survive well, some can survive less well, and some cannot survive at all.

Interdisciplinary Connections

NJSLS- ELA	NJSLS- Mathematics
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-LS4-3) RI.3.1 Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS4-3) RI.3.2 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-LS4-3) RI.3.3	Model with mathematics. (3-LS2-1),(3-LS4-3) MP.4 Number and Operations in Base Ten. (3-LS2-1) 3.NBT

Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS2-1), (3-LS4-3) W.3.1 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-3) W.3.2 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) SL.3.4	

Core Instructional Materials	Textbooks Series, Lab Materials, etc.
Career Readiness, Life Literacies and Key Skills	9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). 9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM. IPRET.5).
Computer Science and Design Thinking	8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim. 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data. 8.2.5.ED.1: Explain the functions of a system and its subsystems.

Modifications

English Language Learners	Special Education	At-Risk	Gifted and Talented	504
Scaffolding	Word walls	Teacher tutoring	Curriculum compacting	Word walls
Word walls	Visual aides	Peer tutoring	Challenge assignments	Visual aides
Sentence/paragraph frames	Graphic organizers	Study guides	Enrichment activities	Graphic organizers
Bilingual dictionaries/translation	Multimedia	Graphic organizers	Tiered activities	Multimedia
Think alouds	Leveled readers	Extended time	Independent research/inquiry	Leveled readers
Read alouds	Assistive technology	Parent communication	Collaborative teamwork	Assistive technology
Highlight key vocabulary	Notes/summaries	Modified assignments	Higher level questioning	Notes/summaries
Annotation guides	Extended time	Counseling	Critical/Analytical thinking tasks	Extended time
Think-pair- share	Answer masking		Self-directed activities	Answer masking
Visual aides	Answer eliminator			Answer eliminator
Modeling	Highlighter			Highlighter
Cognates	Color contrast			Color contrast
				Parent communication
				Modified assignments
				Counseling

Unit 6: Organisms and Environment		
3-LS2 Ecosystems: Interactions, Energy, and Dynamics		
3-LS2-1. Construct an argument that some animals form groups that help members survive.		
Clarification Statement: N/A		
Assessment Boundary: N/A		
Evidence Statement: 3-LS2-1		
Science & 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.	**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).	**Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: 1.LS1.B, MS.LS2.A		
NJSLS- ELA: RI.3.1, RI.3.3		
NJSLS- Math: MP.4, 3.NBT		
5E Model		
3-LS2-1. Construct an argument that some animals form groups that help members survive.		
Engage **Anticipatory Set**	Animal Groups In this introductory activity, students will learn that 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. Animals form groups to help members survive. http://www.educationinnature.com/~/media/Corporate/EIN/Files/LessonPlans/AnimalGroupsLessonPlan.ashx?force=1 How Do Herds Help Animals? In this activity, students will use digital media to observe animal herds, take notes only about what they observe, and write an expository paragraph. http://betterlesson.com/lesson/632313/how-do-herds-help-animals	
Exploration **Student Inquiry**	Animal Groups - Benefits and Disadvantages In this lesson, students will read short passages about animals that live in groups and participate in a discussion about how groups benefit some (but not all) animals. http://betterlesson.com/lesson/632399/animal-groups-benefits-and-disadvantages Animal Groups- What Purpose Do They Serve? Students will observe and act out a few group behaviors of non-herd animals and then will be able to discuss and write about possible	

	benefits of living in a group. http://betterlesson.com/lesson/632602/animal-groups-what-purpose-do-they-serve Ant Colonies: The Power of Cooperation In this lesson, students begin to gather data on animals that live in groups in order to increase their survival. This initial study focuses on ants. http://the-curious-scientist.weebly.com/uploads/2/3/6/6/23667706/lesson_1-ant_colonies_complete2.pdf
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): 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).
Elaboration **Extension Activity**	Insects That Work Together In this lesson, students continue to gather data on animals that live in groups in order to increase their chances of survival. Using a jigsaw approach, groups of students become "experts" on specific types of insects and create a chart explaining how their insect works together in groups to help them survive. http://the-curious-scientist.weebly.com/uploads/2/3/6/6/23667706/animal_groups_lesson_2-insects_that_work_together.pdf
Evaluation **Assessment Tasks**	Assessment Task A Construct an argument with evidence, data, and/or a model. After students engaged in the above exploration activities, students will work in groups to collect data and construct arguments that some animals form groups to help members survive. Students will share arguments with class to engage in a discussion.

Unit 6: Organisms and Environment		
3-LS4 Biological Evolution: Unity and Diversity		
3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive 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.		
Assessment Boundary: N/A		
Evidence Statement: 3-LS4-3		
Science & 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	**LS4.C: Adaptation** For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.	**Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.

world(s). Construct an argument with evidence.		
Connections to other DCIs in this grade-band: 3.ESS2.D		
Articulation of DCIs across grade-bands: K.ESS3.A, 2.LS2.A, 2.LS4.D, MS.LS2.A, MS.LS4.B, MS.LS4.C, MS.ESS1.C		
NJSLS- ELA: RI.3.1, RI.3.2, RI.3.3, W.3.1, W.3.2, SL.3.4		
NJSLS- Math: MP.2, 3.MD.B.3		

5E Model	
3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.	
Engage **Anticipatory Set**	BrainPOP: Habitats https://jr.brainpop.com/science/habitats/ What's Your Habitat Students explore basic survival needs of humans and wildlife by drawing their own homes and neighborhoods. https://www.nwf.org/~/media/PDFs/Be%20Out%20There/Schoolyard%20Habitats/whatsyourhabitat2.pdf Habitat and Adaptation: Informational Text http://wwf.panda.org/about_our_earth/teacher_resources/webfieldtrips/hab_adaptation/
Exploration **Student Inquiry**	Would Your Animal Survive Here? In this two day lesson, students will determine whether an animal can survive in a different environment than its own based on its inherited traits. http://betterlesson.com/lesson/631250/would-your-animal-survive-here-day-1 http://betterlesson.com/lesson/627888/would-your-animal-survive-there-day-2 If Frogs Need Water, Why Do They Want to Live in the Desert? In this lesson, students will read an expository text about amphibians in two different states, and then will collect and graph data about their different habitats. http://betterlesson.com/lesson/630027/if-frogs-need-water-why-do-they-want-to-live-in-the-desert
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): LS4.C: Adaptation For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.
Elaboration **Extension Activity**	Additional Related Lessons and Resources https://www.opened.com/search?standard=3.LS4.3
Evaluation **Assessment Tasks**	Assessment Task A: Would Your Animal Survive Here? Construct an argument with evidence. Students will use the Sample Accountable Talk Sentence Stems and Starters to construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. Talk Sentence Stems

Unit 7 Overview
Unit 7: Using Evidence to Understand Change in Environments
Grade: 3
Content Area: Life Science
Pacing: 15 Instructional Days
Essential Question
What do fossils tell us about the organisms and the environments in which they lived?
Student Learning Objectives (Performance Expectations)
3-LS4-1.Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.
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.*
Unit Summary
In this unit of study, students develop an understanding of the types of organisms that lived long ago and also about the nature of their environments. Students develop an understanding of the idea that when the environment changes, some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die. The crosscutting concepts of systems and system models; scale, proportion, and quantity; and the influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in asking questions and defining problems, analyzing and interpreting data, and engaging in argument from evidence. Students are also expected to use these practices to demonstrate understanding of the core ideas.
Technical Terms
Biological Evolution, Unity vs. Diversity, Body Fossils, Trace Fossils, Sediment, Paleontology, Evolve, Endangered, Critically Endangered, Extinct in the Wild, Extinct, Environmental Changes, Bycatch, Deforestation, Illegal Wildlife Trade, Overfishing, Soil Erosion, Soil Degradation, Ecological Footprint
Formative Assessment Measures
Part A: What do fossils tell us about the organisms and the environments in which they lived?
Students who understand the concepts are able to: Observe that phenomena exist from very short to very long periods of time. Analyze and interpret data to make sense of phenomena using logical reasoning. Analyze and interpret data from fossils (e.g., type, size, distributions of fossil organisms) to provide evidence of the organisms and the environments in which they lived long ago. (Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.) Examples of fossils and environments could include: Marine fossils found on dry land; Tropical plant fossils found in Arctic areas; or Fossils of extinct organisms.
Part B: What happens to the plants and animals when the environment changes?
Students who understand the concepts are able to: Describe a system in terms of its components and interactions. 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 a problem. 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. (Assessment is limited to a single environmental change and does not include the greenhouse effect or climate change.) Examples of environmental changes could include changes in Land characteristics, Water distribution, Temperature, Food, or Other organisms.

Define a simple design problem that can be solved through the development of an object, tool, process, or system and that includes several criteria for success and constraints on materials, time, or cost.
Define a simple design problem reflecting a need or want that includes specified criteria for success and constraints on materials, time, or cost.

Interdisciplinary Connections

NJSLS- ELA	NJSLS- Mathematics
Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS4-4) RI.3.1 Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS4-1),(3-LS4-4) RI.3.2 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-LS4-1),(3-LS4-4) RI.3.3 Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS4-1),(3-LS4- 4) W.3.1 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-1),(3-LS4-4) W.3.2 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) W.3.8 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (3-5-ETS1-1) W.5.7 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. (3-5-ETS1-1) W.5.8	Reason abstractly and quantitatively. (3-LS4-1),(3-LS4-4), (3-5- ETS1-1) MP.2 Model with mathematics. (3-LS4-1),(3-LS4-4), (3-5-ETS1-1) MP.4 Use appropriate tools strategically. (3-LS4-1), (3-5-ETS1-1) MP.5 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-LS4-3) 3.MD.B.3 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.MD.B.4 Operations and Algebraic Thinking (3-ETS1-1) 3-5.OA

Core Instructional Materials	Textbooks Series, Lab Materials, etc.
Career Readiness, Life Literacies and Key Skills	9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). 9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data.

	9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM. IPRET.5).
Computer Science and Design Thinking	8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim. 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data. 8.2.5.ED.1: Explain the functions of a system and its subsystems.

Modifications				
English Language Learners	**Special Education**	**At-Risk**	**Gifted and Talented**	**504**
Scaffolding	Word walls	Teacher tutoring	Curriculum compacting	Word walls
Word walls	Visual aides	Peer tutoring	Challenge assignments	Visual aides
Sentence/paragraph frames	Graphic organizers	Study guides	Enrichment activities	Graphic organizers
Bilingual	Multimedia	Graphic organizers	Tiered activities	Multimedia
dictionaries/translation	Leveled readers	Extended time	Independent research/inquiry	Leveled readers
Think alouds	Assistive technology	Parent communication	Collaborative teamwork	Assistive technology
Read alouds	Notes/summaries	Modified assignments	Higher level questioning	Notes/summaries
Highlight key vocabulary	Extended time	Counseling	Critical/Analytical thinking tasks	Extended time
Annotation guides	Answer masking		Self-directed activities	Answer masking
Think-pair- share	Answer eliminator			Answer eliminator
Visual aides	Highlighter			Highlighter
Modeling	Color contrast			Color contrast
Cognates				Parent communication
				Modified assignments
				Counseling

Unit 7: Using Evidence to Understand Change in Environments		
3-LS4 Biological Evolution: Unity and Diversity		
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.		
Evidence Statement: 3-LS4-1		
Science & 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. Analyze and interpret data to make sense of phenomena using logical reasoning.	**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.	**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.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: 4.ESS1.C, MS.LS2.A, MS.LS4.A, MS.ESS1.C, MS.ESS2.B		
NJSLS- ELA: RI.3.1, RI.3.2, RI.3.3, W.3.1, W.3.2, W.3.8		
NJSLS- Math: MP.2, MP.4, MP.5, 3.MD.B.3, 3.MD.B.4		
5E Model		
3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.		
Engage **Anticipatory Set**	BrainPOP: Fossils https://jr.brainpop.com/science/land/fossils/ https://www.brainpop.com/science/diversityoflife/fossils/ How Do We Know What Dinosaurs and Other Extinct Animals Ate? This video shows how scientists use fossil evidence to answer this question. https://www.opened.com/video/how-do-we-know-what-dinosaurs-and-other-extinct-animals/934125 Fossil Record Mystery: Video Fossils from the mid-Jurassic left a hole in the paleontologist's knowledge. Now, new fossil finds are bridging the gap. https://www.opened.com/video/fossil-record-mystery-youtube/233923	
Exploration **Student Inquiry**	Fossils: Prezi Lesson This lessons explores how fossils are formed and how they are used. https://prezi.com/4z0q_3ioyxuf/5e-lesson-plan-fossils/	

	Fossil Webquest Working in collaborative groups, student engage in an interactive research about fossils. http://betterlesson.com/lesson/638575/fossil-webquest How Fossil Records Add to Our Understanding In this two day lesson, student identify and illustrate how fossil records are used. http://betterlesson.com/lesson/638809/how-fossil-records-add-to-our-understanding-day-1 http://betterlesson.com/lesson/638823/how-fossil-records-add-to-our-understanding-day-2-biodiversity Fossils and Dinosaurs Students will understand what can be learned from fossils and in doing so, realize the difference between fact and theory (idea). They will also gain a general understanding of how fossils are formed. http://sciencenetlinks.com/lessons/fossils-1-fossils-and-dinosaurs/ Uncovering the Facts Students will recognize the kind of information that can be accumulated by studying dinosaur fossils, as well as understand that some fossil facts are made based on comparisons with living organisms. http://sciencenetlinks.com/lessons/fossils-2-uncovering-the-facts/
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): 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.
Elaboration **Extension Activity**	Fossil Formation Students will learn about how fossils are formed and why they are important. http://www.crscience.org/lessonplans/2-Fossil_Formation-Alice_Mel_11-12.pdf Discovering Fossils This activity allows students to explore the process used by paleontologists — scientists who study fossils to understand ancient landscapes, climate, and life on Earth — to find and identify fossils. http://www.earthsciweek.org/classroom-activities/discovering-fossils Can You Dig It? http://www-tc.pbskids.org/dragonflytv/web_assets/pdf/dftv_gpsedguide_babydinosaurs.pdf
Evaluation **Assessment Tasks**	Analyze and interpret data to make sense of phenomena using logical reasoning. Assessment Task A Fossil Webquest

	Fossil Webquest Rubric Assessment Task B Check for student understanding through written and/or verbal feedback (group discussion can be implemented) http://sciencenetlinks.com/lessons/fossils-1-fossils-and-dinosaurs/ Assessment Task C Uncovering the Facts From Fossils to Facts From Fossils to Facts Answer Key

Unit 7: Organisms and Environment		
3-LS4 Biological Evolution: Unity and Diversity		
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.		
Evidence Statement: 3-LS4-4		
Science & 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). 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.	**LS2.C: Ecosystem Dynamics, Functioning, and Resilience** 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 affects the organisms living there.	**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** Interdependence of Engineering, Technology, and Science on Society and the Natural World Knowledge of relevant scientific concepts and research findings is important in engineering.
Connections to other DCIs in this grade-band: 3.ESS3.B		
Articulation of DCIs across grade-bands: K.ESS3.A ; K.ETS1.A ; 2.LS2.A ; 2.LS4.D ; 4.ESS3.B ; 4.ETS1.A ; MS.LS2.A ; MS.LS2.C ; MS.LS4.C ; MS.ESS1.C ; MS.ESS3.C		
NJSLS- ELA: RI.3.1, RI.3.2, RI.3.3, W.3.1, W.3.2, SL.3.4		
NJSLS- Math: MP.2, MP.4		

5E Model	
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.*	
Engage **Anticipatory Set**	Changes In the Environment: Video What's happening to our environment? And how do creatures adapt to it? http://www.bbc.co.uk/bitesize/ks3/science/environment_earth_universe/changes_in_environment/activity/ Tackling Threats that Impact Earth http://www.worldwildlife.org/threats
Exploration **Student Inquiry**	How Can We Help Endangered Species? Students will engage in a preliminary investigation of how people can help animals that are not adapting well to environmental changes, such as habitat loss. http://betterlesson.com/lesson/638380/engage-how-can-we-help-endangered-species Presenting a Persuasive Argument- Children Can Change the World Students will present their ideas about how to solve an environmental problem involving natural resource use and loss of gorilla habitat. http://betterlesson.com/lesson/638108/presenting-a-persuasive-argument-children-can-change-the-world Engineering Design Project: Deforestation (Prezi Lesson) In this lesson, students will learn about different causes and effects of deforestation. They will demonstrate their knowledge of deforestation by coming up with a potential solutions and explaining their ideas to the class. Through the use of an exit ticket, the students will evaluate the solutions proposed by each group, identifying which solution they liked best and why. https://prezi.com/2-91yro6p89h/engineering-design-project/
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): LS2.C: Ecosystem Dynamics, Functioning, and Resilience 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 affects the organisms living there.
Elaboration **Extension Activity**	Additional Related Lessons and Resources https://www.opened.com/search?standard=3.LS4.4
Evaluation **Assessment Tasks**	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. Assessment Task A In completing the activities in the Exploration section, students will make claims about the merit of solutions to various environmental change problems. Student claims and justifications should be evaluated.